INFORMATION HANDOUT

For Contract No. 04-264094
At 04-Mrn,Son-101-26.8/27.6&0.0/2.0

Identified by
Project ID 0400000735

PERMITS

California Department of Fish and Wildlife, 1602

Notification No. 1600-2013-0296-R3

United States Army Corps of Engineers

Non-Reporting Nationwide 404, Permit No. SPN-2001-262140 N

WATER QUALITY

California Regional Water Quality Control Board

San Francisco Bay Section,
Board Order No. 2009-00009-DWQ
NPDES Permit No. CAS000002

AGREEMENTS

National Marine Fisheries Services (Biological Opinion)

United States Fish and Wildlife Service (Biological Opinion)

ENCROACHMENT PERMITS

North Marin Water District

Permit No. 0413-NUR2169

PG&E Company

Permit No. 0413-NUR2304

PG&E Company

Permit No. 0413-NUR2265

AT&T California

Permit No. 0413-NUR2318

AT&T California

Permit No. 0414-NUR1283

MATERIALS INFORMATION

Materials Recommendations - Final Pavement and Corrosion Recommendations

Caltrans, dated February 18, 2011

Site Investigation Report

Geocon Project No. E8469-06-02

Foundation Report for San Antonio Creek Bridge

Caltrans, dated September 9, 2013

Geotechnical Design Report

Caltrans, dated September 2013

Project Report

Caltrans, dated October 2007

Underground Classifications (Tunnels)

CA Dept. of Industrial Relations, dated July 21, 2014

Water Source Information for North Marin Water District

North Marin Water District Letter, dated September 9, 2014

Final Hydraulic Report for San Antonio Creek

Caltrans, dated February 10, 2011

Addendum To The Final Hydraulic Report

Caltrans, dated March 9, 2011

Improvement Plans for North Marin Water District - North Marin Aqueduct Relocation

CSW/ST2, dated December 9, 2013

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.wildlife.ca.gov

EDMUND G. BROWN JR., *Governor*
CHARLTON H. BONHAM, *Director*

January 21, 2014

Mr. Hardeep Takhar
California Department of Transportation
111 Grand Avenue
Oakland, CA 94612

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2013-0296-R3
San Antonio Creek

Dear Mr. Takhar:

Enclosed is the final Streambed Alteration Agreement ("Agreement") for the Marin Sonoma Narrows Highway Improvements Segment B3 ("Project"). Before the Department may issue an Agreement, it must comply with the California Environmental Quality Act ("CEQA"). In this case, the Department, acting as a responsible agency, filed a notice of determination ("NOD") on January 21, 2014 based on information contained in the Negative Declaration the lead agency prepared for the Project.

Under CEQA, filing a NOD starts a 30-day period within which a party may challenge the filing agency's approval of the project. You may begin your project before the 30-day period expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Melissa Escaron, Staff Environmental Scientist, at (925)786-3045 or Melissa.escaron@wildlife.ca.gov.

Sincerely,

Craig J. Weightman
Environmental Program Manager
Bay Delta Region

cc: Stuart Kirkham
Lieutenant Jones
Warden Thiem

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
BAY DELTA REGION
7329 SILVERADO TRAIL
NAPA, CALIFORNIA 94558
(707) 944-5500
WWW.WILDLIFE.CA.GOV

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2013-0296-R3
SAN ANTONIO CREEK

CALIFORNIA DEPARTMENT OF TRANSPORTATION
US101 MARIN SONOMA NARROWS, SEGMENT B3

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and the California Department of Transportation as represented Mr. Hardeep Takhar.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified CDFW on July 23, 2013, that Permittee intends to complete the Project described herein.

WHEREAS, pursuant to FGC section 1603, CDFW has determined that the Project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the Project in accordance with the Agreement

PROJECT LOCATION

The Project is located along US Route 101 at San Antonio Creek in Sonoma County.

PROJECT DESCRIPTION

This Project is part of the larger Marin-Sonoma Narrows Interstate 101 High Occupancy Vehicle Lane Project. This Agreement addresses the construction of a new US 101 new bridge over San Antonio Creek, the extension of a box culvert within an unnamed creek, the filling of two roadside runoff ditches, and the demolition of the existing southbound US 101 bridge.

The new San Antonio Creek Bridge will be a concrete box girder structure on concrete columns. The nine columns will be 78-inch diameter and cast in drill hole piles. Six of the nine columns are located within a riparian area. The new bridge is approximately 10 feet higher than the existing bridge. The in-stream piles will be placed into drilled holes inside cofferdams, the abutment piles may require using an impact hammer. A Class 1 bike path will be built under the new US 101 bridge, adjacent to the north abutment to connect to a new east-side frontage road. Four drainage outfalls will be built to empty into San Antonio Creek. Vegetative erosion protection will be installed to prevent erosion of the creek banks.

On the west side of US 101 approximately 2400 feet north of San Antonio Creek is a small unnamed creek that drains from the west and crosses under US 101 in a 12 by 6-foot concrete box culvert. The creek continues on the east side of US 101. This project proposes to extend the concrete box culvert by 165 feet to the west. Two proposed bioswales will be constructed and drain into the unnamed creek. The bioswales are relatively wide and the flow velocities are low.

There is a jurisdictional roadside ditch on the west side of US 101, approximately 3350 feet north of San Antonio Creek. The ditch collects runoff from the large, open hillside to the west. The ditch flows southerly and then under the highway in a 4 by 4-foot concrete box culvert. This ditch will be filled to achieve the proposed highway grade.

On the west side of US 101 approximately 3700 feet north of San Antonio Creek is a deep jurisdictional roadside ditch. The ditch collects runoff from the large, open hillside to the west. This area will be filled to achieve the proposed highway grade.

The existing southbound bridge will be removed as a part of the project. The existing northbound bridge will remain in place for private property access. Bridge removal will consist of breaking and removing the existing concrete structure. Over land, the bridge will be dropped in sections onto filter fabric or similar material and removed. Over the creek, the Permittee will use approved Best Management Practices to protect the creek from falling debris.

Construction vehicle access to creek bed will be from San Antonio Road. Vehicles will proceed north on San Antonio Road to the area of the proposed cul de sac, just south of the new embankment. The vehicles will then traverse over land toward the creek. Vehicles will then travel east along the northerly edge of the riparian corridor between the new embankment and the creek, toward the existing southbound bridge. Just to the west of that bridge there is an area of relatively gentle slopes that will allow access to the creek bed. Trees in this area will have been removed for the embankment grading. Minor grading may be required to accommodate vehicle access. Crane mats will be required in the creek bed in the area of the pile-driving rig.

PROJECT IMPACTS

Existing fish or wildlife resources the Project could substantially adversely affect include:

- Potential California red-legged frogs and habitat
- Bird nesting
- Bat roosting
- Western pond turtles
- Native riparian vegetation

The adverse effects the Project could have on the fish or wildlife resources identified above include:

- California red-legged frog mortality
- Degradation of California red-legged frog habitat
- Disruption of bird nesting
- Disruption of bat roosting
- Disruption of western pond turtle nesting
- Decreased cover and shading within riparian corridor
- Loss of native vegetation

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the Project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the Project at the Project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the Project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that CDFW personnel may, with notification of the Resident Engineer, enter the Project site at any time to verify compliance with the Agreement.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below. These conditions apply to CDFW jurisdiction as described in the Project Description above.

2.1 All work within riparian zones shall occur between June 15 and October 15.

2.2 Permittee shall submit a Bridge Demolition Plan to CDFW for approval 30 days prior to demolition. The Bridge Demolition Plan shall detail methods to prevent debris from falling into San Antonio Creek.

2.3 Trees shall be trimmed and/or removed in a two-phase system over two consecutive days. Limbs and branches shall be removed using chainsaws only during the afternoon of the first day. Limbs with cavities, crevices, or deep bark fissures will be avoided on the first day. On the second day the remaining branches can be removed, or the entire tree as needed.

2.4 At least 30-days prior to commencing Project activities covered by this Agreement, the Permittee shall submit to CDFW, for review and approval, the qualifications for a number of biologists (Qualified Biologist) that shall oversee the implementation of the conditions in this Agreement. At a minimum, the Qualified Biologists shall have a combination of academic training and professional experience in biological sciences and related resource management activities. The Qualified Biologists shall communicate to the Resident Engineer when any activity is not in compliance with this Agreement and the Resident Engineer shall immediately stop the activity that is not in compliance with this Agreement.

2.5 Before the onset of construction activities, a Qualified Biologist shall conduct an education program for all construction personnel. At a minimum the training will include a description of California red legged frog, migratory birds, bats, and their habitats; the occurrence of these species within the Project site; an explanation of their state and federal statuses; avoidance and minimization measures; habitats as they relate to the Project site; and boundaries within which construction may occur. A fact sheet conveying this information will be prepared and distributed to all construction crews and Project personnel entering the Project site. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all the avoidance and minimization measures.

2.6 A Qualified Biologist shall conduct clearance surveys and be on-site during all activities that may result in the take of California red-legged frog (CRLF). The Qualified Biologist shall stop work through the Resident Engineer if activities are identified that may result in the take of CRLF.

2.7 Preconstruction surveys for the western pond turtle in potential habitat shall be conducted 48 hours prior to construction by a Qualified Biologist. If western pond turtles are found in the project area during preconstruction surveys, CDFW shall be notified. If preconstruction surveys identify active western pond turtle nests, a Qualified Biologist shall establish a no-disturbance buffer zone around the nest using temporary orange construction fencing. The radius of the buffer zone and the duration of the exclusion shall be determined in consultation with CDFW. The buffer zone and fencing shall remain in place until the young have left the nest, as determined by a Qualified Biologist. The Qualified Biologist shall also remain present during construction in the area to inspect the work area, including construction equipment left on-site, for western pond turtles to ensure that individuals have not moved into the work area.

2.8 Prior to the start of construction Environmentally Sensitive Areas (ESAs) will be clearly delineated using high-visibility orange fencing to protect sensitive habitats. The ESA fencing will remain in place throughout the duration of the Project. The final Project plans will depict all locations where ESA fencing will be installed and how it will be installed. The bid solicitation package special provisions will clearly describe acceptable fencing material and prohibited construction-related activities, vehicle operation, material and equipment storage, and other surface-disturbing activities within ESAs. ESA fencing shall be erected as directed by a Qualified Biologist.

2.9 If Project activities will occur between February 15 and September 1, a Qualified Biologist shall conduct pre-construction surveys for nesting birds no more than one week prior to construction. Surveys shall consist of multiple days of observations. If nests are found the Qualified Biologist shall establish an appropriate buffer to be in compliance with Migratory Bird Treaty Act (MBTA) and Fish and Game Code 3503. The Qualified Biologist shall perform at least two hours of pre-construction monitoring of the nest to characterize "typical" bird behavior. The Qualified Biologist shall monitor the nesting birds and shall increase the buffer if the Qualified Biologist determines the birds are showing signs of unusual or distressed behavior by Project activities. Atypical nesting behaviors which may cause reproductive harm include, but are not limited to, defensive flights/vocalizations directed towards Project personnel, standing up from a brooding position, and flying away from the nest. The Qualified Biologist shall have authority, through the Resident Engineer, to order the cessation of all Project activities if the nesting birds exhibit atypical behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young) until an appropriate buffer is established. To prevent encroachment, the established buffer(s) shall be clearly marked by high visibility material. The established

buffer(s) shall remain in effect until the young have fledged or the nest has been abandoned as confirmed by the Qualified Biologist. Any sign of nest abandonment shall be reported to CDFW within 48 hours.

2.10 To prevent inadvertent entrapment of animals during construction, all excavated, steep-walled holes or trenches more than 2-feet deep will be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks at an angle no greater than 30 degrees. Before such holes or trenches are filled they must be thoroughly inspected for trapped animals. All replacement pipes, culverts, or similar structures stored in the action area overnight will be inspected before they are subsequently moved, capped and/or buried.

2.11 Fish relocation is not anticipated, however, if fish relocation becomes necessary, Permittee shall submit to CDFW for review and approval a Fish Relocation Plan at least 15 days prior to fish relocation activities.

2.12 Permittee shall provide to CDFW at least 6 months prior to construction, a Bat Protection Plan for review and approval. CDFW may require bat habitat mitigation as a condition of the Bat Protection Plan approval.

2.13 Permittee shall conduct ground disturbing work defined in the above Project Description, and within the Project area, only during periods of dry weather. The Project area is defined as the bed, bank, channel, and associated wetland habitat. The Permittee shall monitor forecasted precipitation. When ¼ inch or more of precipitation is forecasted to occur, the Permittee shall stop work before precipitation commences. No Project activities may be started if its associated erosion control measures cannot be completed prior to the onset of precipitation. After any storm event, the Permittee shall inspect all sites currently under construction and all sites scheduled to begin construction within the next 72 hours for erosion and sediment problems and take corrective action as needed. Seventy-two hour weather forecasts from National Weather Service shall be consulted and work shall not start back up until runoff ceases and there is less than a 30% forecast for precipitation for the following 24-hour period.

2.14 Permittee shall utilize erosion control measures throughout all phases of operation where sediment runoff from exposed slopes threatens to enter waterways. At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream. Erosion control installations shall be monitored for effectiveness and shall be repaired or replaced as recommended by a Qualified Biologist or Water Quality Monitor to the Resident Engineer. As needed to prevent sediment transport, Permittee shall deploy soil stabilizer such as hydroseeding, netting, erosion control mats, mulch, fiber rolls, silt fences, check dams, and flow velocity dissipation devices. Permittee shall stabilize and equip construction site entrances and exits with tire washing

capability. Materials containing monofilament or plastic shall not be used. Erosion and sediment control measures shall be installed prior to unseasonable rain storms.

2.15 All disturbed areas shall be permanently re-graded and hydroseeded following construction. Hydroseed shall not contain invasive exotic plant species. Prohibited exotic plant species include those identified in the California Exotic Pest Plant Council's database, which is accessible at: http://www.cal ipc.org/ip/inventory/weedlist.php.

2.16 Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the creek channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the creek shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream must be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

2.17 Refueling of mobile construction equipment and vehicles shall not occur within 50 feet of any water body, or anywhere that spilled fuel could drain to a water body. Refueling of stationary equipment requiring breakdown and setup to move will remain in place. All equipment shall be refueled with appropriate drip pans, absorbent pads, and water quality Best Management Practices. Equipment and vehicles operating in the Project site shall be checked and maintained daily to prevent leaks of fuels, lubricants, or other liquids.

2.18 Permittee shall comply with all applicable state and federal laws, including the California and Federal Endangered Species Act. This Agreement does not authorize the take of any state or federally endangered listed species. Liability for any take or incidental take of such species remains the responsibility of the Permittee for the duration of the Project. Any unauthorized take of listed species may result in prosecution and nullification of the Agreement. This Agreement does not authorize the capture or relocation of Fully Protected Species.

3. Mitigation and Reporting

3.1 Permittee shall submit to CDFW for approval, a Riparian Mitigation Plan to compensate for linear foot impacts to temporarily (1:1 mitigation to impact ratio) and permanently (3:1 mitigation to impact ratio) disturbed riparian habitat, including the unnamed creeks. Native trees shall be replaced at a 3:1 ratio, native oak trees shall be replaced at a 5:1 ratio. The Riparian Mitigation Plan shall show clear accounting of offsite mitigation at the Tolay Creek Mitigation Project per the CDFW-approved Final Mitigation and Monitoring Plan for Contracts A1, A2, A3, B1, B2/B4, B3, and C3, and shall provide an onsite

restoration plan that includes an appropriate native plant pallet and success criteria, prior to the start of construction.

3.2 Permittee shall provide a Final Biological Monitoring Report to CDFW no later than 60 days after construction completion, any special status species observations, measures taken to avoid and minimize impacts to individuals, and recommendations to further avoid and minimize impacts to special status species in the future.

3.3 Permittee shall provide a Tree Removal Report no later than 60 days after construction completion. The Tree Removal Report shall include removal locations, tree species, and diameters at breast height.

CONTACT INFORMATION

Any communication that Permittee or CDFW submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or CDFW specifies by written notice to the other.

To Permittee:

California Department of Transportation
Hardeep Takhar
111 Grand Ave.
Oakland, Ca
Hardeep.takhar@dot.ca.gov

To CDFW:

California Department of Fish and Wildlife
Bay Delta Region
7329 Silverado Trail
Napa, California 94558
Attn: Lake and Streambed Alteration Program – Melissa Escaron
Notification #1600-2013-0296-R3
Fax (707) 944-5553
Melissa.escaron@wildlife.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers,

employees, representatives, agents or contractors and subcontractors, to complete the Project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the Project. The decision to proceed with the Project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the Project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse

disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). CDFW shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the Project the Agreement covers (Fish & G. Code, § 1605, subd. (f)). .

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.wildlife.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2017, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the Project described herein. If Permittee begins or completes a Project different from the Project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hardeep Takhar
California Department of Transportation

12.19.13
Date

FOR DEPARTMENT OF FISH AND WILDLIFE

Craig Weightman
Environmental Program Manager

1/21/14
Date

Prepared by: Melissa Escaron
Staff Environmental Scientist

Date Prepared: October 12, 2013
Date Sent: October 18, 2013
Revised: December 19, 2013

FOR DEPARTMENT USE ONLY				
Date Received	Amount Received	Amount Due	Date Complete	Notification No.
7-23-13	$ 448275	$		1600-2013-0296-3

#082-2602765
Bill Lockyear Treasurer State of CA

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

Escaron
Lt Jones
Wdn Thiem

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Fish & Game
JUL 23 2013
Yountville

Name	Hardeep Takhar		
Business/Agency	California Department of Transportation		
Street Address	111 Grand Avenue		
City, State, Zip	Oakland, CA 94612		
Telephone	(510) 286-7182	Fax	(510) 286-6374
Email	hardeep_takhar@dot.ca.gov		

2. CONTACT PERSON (*Complete only if different from applicant*)

Name	Stuart Kirkham		
Street Address	111 Grand Avenue		
City, State, Zip	Oakland, CA 94612		
Telephone	(510) 286-5602	Fax	
Email	stuart_kirkham@dot.ca.gov		

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name			
Street Address			
City, State, Zip			
Telephone		Fax	
Email			

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	Route 101 - Marin/Sonoma Narrows Curve Correction Project, Segment B3 - Highway			
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years*)			
C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (*year*)	Ending (*year*)	Start Date (*month/day*)	End Date (*month/day*)	
2013	2017	06/15	10/15	800.00

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.

A.	☑ Standard *(Most construction projects, excluding the categories listed below)*	
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*)	*Mine I.D. Number:* _____
C.	☐ Timber Harvesting (*Attachment B*)	THP *Number:* _____
D.	☐ Water Diversion/Extraction/Impoundment (*Attachment C*)	*SWRCB Number:* _____
E.	☐ Routine Maintenance (*Attachment D*)	
F.	☐ DFG Fisheries Restoration Grant Program (FRGP)	*FRGP Contract Number:* _____
G.	☐ Master	
H.	☐ Master Timber Harvesting	

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: The Department may not process this notification until the correct fee has been received.***

	A. Project	B. Project Cost	C. Project Fee
1	101 MSN Segment B3 Highway Improvements	$49,500,000.00	$4,482.75
2			
3			
4			
5			
		D. Base Fee *(if applicable)*	$4,482.75
		E. TOTAL FEE ENCLOSED	

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant: _____ Notification Number: _____ Date: _____

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

☑ No ☐ Yes (*Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.*)

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.

(*Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway*)

The project is located on US Highway 101 from 1/2 mile south of the Marin/Sonoma County Line in Marin County to Kastania Road in Sonoma County, California. The project lies in a rural section of Highway 101 between the cities of Novato and Petaluma known as the "Narrows". The project area is located between latitude 38-10'40" N and 38-11'25" N and longitude 122-35'45" W and 122-36'00" W, or T4N, R7W in sections 11, 14, and 23 in the Petaluma River USGS 7.5 minute Quadrangle. The elevation ranges from about 14 feet to about 166 feet above mean sea level.

☐ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	San Antonio Creek, unnamed stream and ditches
C. What water body is the river, stream, or lake tributary to?	San Antonio Creek/Petaluma River
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	Sonoma

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Petaluma River	4N	7W	11,14,23	

☐ *Continued on additional page(s)*

K. Meridian (*check one*)	☐ Humboldt ☑ Mt. Diablo ☐ San Bernardino

L. Assessor's Parcel Number(s)

See Supplemental Information.

☑ *Continued on additional page(s)*

M. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes*)

Latitude/Longitude	*Latitude:* 38 11' 25" N	*Longitude:* 122 36' 00" W	
	☑ Degrees/Minutes/Seconds	☐ Decimal Degrees	☐ Decimal Minutes
UTM	*Easting:* 535028	*Northing:* 4227003	☑ Zone 10 ☐ Zone 11
Datum used for Latitude/Longitude or UTM	☐ NAD 27	☑ NAD 83 or WGS 84	

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☐	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	☐	☐	☐
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	☑	☐	☐
Channel clearing/vegetation management	☑	☐	☐
Culvert	☑	☐	☑
Debris basin	☐	☐	☐
Dam	☐	☐	☐
Diversion structure – weir or pump intake	☐	☐	☐
Filling of wetland, river, stream, or lake	☑	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☐	☐	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☑	☐	☑
Sediment removal – pond, stream, or marina	☐	☐	☐
Storm drain outfall structure	☑	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing : Horizontal Directional Drilling	☑	☐	☐
Jack/bore	☐	☐	☐
Open trench	☐	☐	☐
Other *(specify)*:	☐	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

The Marin-Sonoma Narrows (MSN) Curve Correction Project B3 is one segment of the overall MSN project that proposes to add High Occupancy Vehicle (HOV) facilities to US Highway 101 from State Route (SR) 37 in Novato to north of the Corona Road Overcrossing in Petaluma.

Refer to complete project description and photos of impacted waters in the Supplementary Information.

☑ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

Excavators, bulldozers, earth movers, compaction equipment, front loader, dump truck, back hoe, paver, grader, mixers, pile drivers, concrete pumps, cranes, jack-and-bore drill, HDD drill.

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☐ Yes ☑ No (*Skip to box 11*)
D. Will the proposed project require work in the wetted portion of the channel?	☐ Yes (*Enclose a plan to divert water around work site*) ☐ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

See Section 11A in the attached Supplemental information.

☑ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No

Vegetation Type	Temporary Impact	Permanent Impact
See Table 3 in the Supplemental information.	Linear feet: _____ Total area: _____	Linear feet: _____ Total area: _____
	Linear feet: _____ Total area: _____	Linear feet: _____ Total area: _____

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)
See Table 4 and 5 in the Supplemental info.		

☐ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes *(List each species and/or describe the habitat below)* ☐ No ☐ Unknown

California red-legged frog, Central California Coast Steelhead

☑ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

USFWS Biological Opinion (attached), NMFS Biological Opinion (attached)

☑ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☑ Yes (*Enclose the biological study*) ☐ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

☑ Yes (*Enclose the hydrological study*) ☐ No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

A variety of techniques will be implemented for the project to prevent sediment from entering the watercourses and to prevent erosion and degradation to water quality. Biofiltration swales, fiber rolls, and erosion control netting will be utilized throughout the construction zone to reduce loose disturbed sediment from entering waters. Temporary silt fencing will be placed near riparian areas and throughout the construction zone to reduce sediment loads into waters. Fencing for environmentally sensitive areas (ESA) will be installed around riparian areas and wetlands that are not to be impacted by the project except during certain times (June 15 through October 31). Additional details are given in the supplement.

☑ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

Avoidance and Minimization measures will be implemented as part of the construction activities to minimize and avoid impacts to special status species and habitat, as well as common biological resources. See Box 12B in the supplement for additional information.

☑ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

Caltrans has established conservation easements with an endowment and management plan at the Barboni Ranch, the purchase of wetland mitigation credits at the Burdell Ranch Wetland Mitigation Bank has already occurred, and the Tolay Creek Ranch mitigation is finalized.

☑ *Continued on additional page(s)*

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A.	401 Clean Water Certification with San Francisco RWQCB	☑ Applied	☐ Issued
B.	USACE Individual 404 Permit	☑ Applied	☐ Issued
C.	USFWS, NMFS Biological Opinions	☐ Applied	☑ Issued

D. Unknown whether ☐ local, ☐ state, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☑ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?

☑ Yes (*Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each*)

☐ No (*Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared*)

☐ Notice of Exemption	☐ Mitigated Negative Declaration	☑ NEPA document (*type*): EIS
☐ Initial Study	☑ Environmental Impact Report	☐ CESA document (*type*):
☐ Negative Declaration	☑ Notice of Determination (*Enclose*)	☑ ESA document (*type*): Biological Opinion
☐ THP/ NTMP	☑ Mitigation, Monitoring, Reporting Plan	

B. State Clearinghouse Number (*if applicable*)	2001042115		
C. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes D, E, and F*)	☐ No (*Skip to box 14.G*)	
D. CEQA Lead Agency	California Department of Transportation		
E. Contact Person	Yolanda Rivas	F. Telephone Number	(510) 286-6216

G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.

The MSN B3 Curve Correction project is one segment of the overall MSN project that proposes to improve highway geometry, eliminate direct access, and add HOV facilities to US Highway 101 from State Route 37 in Novato to north of the Corona Road Overcrossing in Petaluma.

☐ *Continued on additional page(s)*

H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?

☑ Yes (*Enclose proof of payment*) ☐ No (*Briefly explain below the reason a filing fee has not been paid*)

Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.

15. SITE INSPECTION

Check one box only.

☐ In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.

☑ I request the Department to first contact (*insert name*) Stuart Kirkham at (*insert telephone number*) (510) 286-5602 to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☑ Yes (Please enclose the information via digital media with the completed notification form)

☐ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

Signature of Applicant or Applicant's Authorized Representative

7/17/13
Date

Hardeep Takhar
Print Name

DEPARTMENT OF THE ARMY PERMIT

PERMITTEE: California Department of Transportation, District 4

PERMIT NO.: SPN-2001-262140 N

ISSUING OFFICE: San Francisco District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate District or Division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below:

PROJECT DESCRIPTION:

The Marin Sonoma Narrows (MSN) B3 project consists of 2.4 miles of new highway realignment, with three lanes in each direction. Phase B3 of the project will realign the highway to correct substandard horizontal curves, re-profile the highway to correct substandard vertical curve sight distance, and construction of a new San Antonio Creek Bridge (at a higher profile to raise it out of the floodplain). Removal of direct vehicle access to the highway will be accomplished through the construction of new frontage roads and conversion of the existing northbound lanes to a frontage road. The project will accommodate future construction of a High Occupancy Vehicle (HOV) lane in each direction for the entire length of the project.

Implementation of phase B3 of the MSN project will require the following work within waters of the U.S.:
San Antonio Creek:
A new San Antonio Bridge will be installed consisting of a concrete box girder structure supported by nine 78" diameter steel piles. Six of the nine columns will be located within the creek banks; one will be placed below the ordinary high water mark of San Antonio Creek. To protect the bridge from erosion, the southwest corner of the bridge abutment/embankment will be protected with a 70'-long sheet pile wall adjacent to the edge of pavement. The northeast corner abutment will be protected from erosion with a 20'-long sheet pile wall. The new bridge is approximately 10 feet higher than the existing bridge and above the 100-year floodplain elevation. Coffer dams may be required at footing locations. The steel piles will be dropped inside of the drilled holes, followed by the pouring of concrete over the piles to form the footings. Crane mats (or temporary gravel access pads) will be required for access within the creek. Minor grading of the creek bank may be required to accommodate vehicle access during construction. The existing southbound bridge will be removed as a part of the project. The existing northbound bridge will remain in place for private property access.

Klatte Property Access:
At an unnamed tributary, 1,900 feet north of San Antonio Creek, an existing 12' by 6' concrete box culvert will be extended through the placement of two 72" culverts. Construction of the Klatte Driveway will require grading and asphalt paving over the new 72" culverts.

Bicycle Path:
A portion of the bike path will be constructed just east of the proposed new San Antonio Creek Bridge requiring work within the creek banks.

Drainage System Improvements:
Highway construction will intersect several natural drainage courses, which will be collected in a system of swales and pipes and will be conveyed to San Antonio Creek. 1,489 linear feet of drainage ditches and 1,000 linear feet of natural drainages adjacent to the roadway will be filled and replaced in-kind post construction with 5,479 linear feet of grass lined ditches within the project area. Where existing driveway culverts are impacted, the culverts will be replaced in-kind. Seven (7) culverts currently crossing the highway will be replaced and/or extended (i.e, cw-2, cw-3, cw-4, cw-5, cw-6, the culvert adjacent to wl-9, and culvert within wl-8). Four (4) of these will be extended/modified, and three (3) of these will

be removed/replaced. Outfalls will be placed in San Antonio Creek and at the unnamed tributary to San Antonio Creek. At these outfall locations HEC 15 vegetative erosion protection will be placed to protect the creek bank from erosion. In total ten (10) bioretention basins will also be installed.

Utility Work:
Underground and overhead utilities will need to be relocated as part of the project. The underground utilities will be installed in areas of the project that are proposed for permanent or temporary disturbance by other project elements and thus will not result in additional impacts to waters of the U.S. One PG&E pole will require installation in WL-8. The North Marin Water District Pipeline will be relocated requiring jack and bore under San Antonio Creek. The entry and exit pit will be dug outside of the extent of jurisdiction of San Antonio Creek.

All work shall be completed in accordance with the plans and drawings titled "*USACE File #2001-262140N, Marin Sonoma Narrows-Segment B3, February 6, 2014, Figures 1 to 14*", provided as enclosure 1.

The project will result in the permanent discharge of fill material into 3.33 acres of seasonal wetland and 0.47 acre of other waters of the United States. Temporary impacts will occur to 1.5 acres of jurisdictional wetlands and 0.13 acre of jurisdictional waters of the U.S. Discharge of fill material is depicted in drawings titled, "*USACE File # 2001-262140N, Marin Sonoma Narrows- Segment B Impact Maps, January 30, 2014, Figures 1 to 7*", provided as enclosure 2.

Permanently impacted jurisdictional seasonal wetlands have been mitigated off site by the purchase of wetland mitigation credits (45 credits, December 2, 2010) from the Burdell Ranch Wetland Conservation Bank. Permanently impacted jurisdictional other waters of the U.S. will be mitigated for through the implementation of the "*Offsite Mitigation Agreement at Tolay Creek-Sonoma Land Trust*" (final mitigation plan) dated January 17, 2013. Work includes stabilization of 4,160 linear feet of stream channel, riparian enhancement plantings along 26,200 feet of Tolay Creek and its tributaries, installation of 13,000 feet of cattle exclusion fencing, plantings of oaks and other native species, and approximately 100 acre of invasive species control and grazing management.

PROJECT LOCATION: Phase B3 is located from the southern intersection with San Antonio Road to the south intersection of Kastania Road along HWY 101 near Novato in Marin and Sonoma Counties, California.

PERMIT CONDITIONS:

GENERAL CONDITIONS:

1. The time limit for completing the work authorized ends on February 15, 2019. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project, you must comply with the conditions

specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached (enclosure 3).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

7. You understand and agree that, if future operations by the United States require the removal, relocation or other alteration of the structure or work authorized herein, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, you will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

SPECIAL CONDITIONS:

1. This Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA Section 7 with "incidental take" provisions with which you must comply). The enclosed U.S. Fish and Wildlife Service (USFWS) BO dated April 1, 2009 (see Enclosure 4), and National Marine Fisheries Service (NOAA-Fisheries) BO dated January 26, 2009 (see Enclosure 5), contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that are also specified in the BO and letter of concurrence. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the attached BO and letter of concurrence, whose terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO or letter of concurrence, where a 'take' of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. The USFWS and NOAA-Fisheries are the appropriate authorities to determine compliance with the terms and conditions of their BO, letter of concurrence, and with the ESA.

2. You shall employ sediment and erosion control best management practices as needed throughout the project area. No objects or fill shall be placed where they can be eroded or washed into drainage systems in the project area. All debris generated as a result of the project, shall be removed from the site and disposed of at an approved location outside of Corps jurisdiction. All project staging and equipment storage areas shall be located away from areas subject to the jurisdiction of the Corps. After construction, any materials used to dewater areas within the creeks shall be removed in their entirety.

3. Within 1-year of initiation of temporary impact to a jurisdictional feature, you shall re-contour the temporarily impacted area and replant it with appropriate soil-stabilizing native species. You shall monitor each re-vegetated area for 5 years. At the end of the fifth year, re-vegetated areas shall provide 75% absolute vegetative cover. In re-vegetated wetlands, over half of the cover must be occupied by hydrophytic plants (having a facultative (FAC) or wetter indicator status). You shall submit a monitoring report for the re-vegetated areas at the end of years 1, 3, and 5. The reports shall include representative photos of the re-vegetated areas. If the cover requirements for the re-vegetated areas are not met, the Corps may require further monitoring, re-vegetation, and/or off-site mitigation.

4. The "*Offsite Mitigation Agreement at Tolay Creek-Sonoma Land Trust*" (final mitigation plan) dated January 17, 2013 has been approved to provide compensatory mitigation for the permanent fill of 1.66 acres (7,242 linear feet) of Other Waters of the U.S. for all phases of the Marin Sonoma Narrows project through stabilization of 4,160 linear feet of stream channel, riparian enhancement plantings along 26,200 feet of Tolay Creek and its tributaries, installation of 13,000 feet of cattle exclusion fencing, plantings of oaks and other native species, and approximately 100 acre of invasive species control and grazing management. A 10-year monitoring program shall be implemented as described in the MMP. Mitigation monitoring reports shall be submitted for years 0 (as-built report), 1, 3, 5, 7, and 10. All monitoring reports shall include photo-documentation utilizing consistent

photo vantage points. If the monitoring report includes remediation recommendations, then the report must include implementation schedule of the management recommendations. Remediation measures shall be implemented upon approval from the Corps in writing. The report shall be submitted to the Corps by January 1 of each year.

5. As stipulated in the final mitigation plan dated January 17, 2013, an escrow account with funding to address project needs that cannot be forecasted or other Corps-approved financial assurance mechanism, or alternate mechanism, such as a formal, documented commitment from Caltrans or a public authority, must be in place within ninety (90) days following permit issuance or prior to commencing the permit activity, whichever is sooner. It must ensure a high level of confidence that the compensatory mitigation will be performed and maintained, in accordance with 33 C.F.R. § 332.3(n) and the Institute for Water Resources White Paper, *Implementing Financial Assurance for Mitigation Project Success*, June 2011. A minimum of 20% of the estimate for planning, plan implementation, performance standard monitoring, and contingency implementation shall be provided to the escrow account. The cost estimate of the listed items shall be provided to the Corps thirty (30) days following permit issuance.

6. In the event that you are unable to implement the plan described in special condition 3 within 1-year of initiation of temporary impact to a jurisdictional feature, you must purchase credits at a Corps approved mitigation bank to compensate for the temporary impact at a 3:1 ratio. If no approved bank or in-lieu fee is available, you shall propose an alternative mitigation plan to be reviewed and approved by the Corps.

7. Your responsibility to complete the required compensatory mitigation as set forth in Special Conditions 3-5 above will not be considered fulfilled until you have demonstrated mitigation success and have received written verification from the Corps.

8. You shall ensure that a conservation easement for the Mitigation area is completed and recorded with the County Recorder's Office, specifying the preservation of the mitigation area as wetland and riparian wildlife habitat in perpetuity. Copies of the recorded documents shall be provided to the Corps within six (6) months of issuance of this authorization letter.

9. You shall comply completely with the conditions established in the "*Memorandum of Agreement Between The Federal Highway Administration and the California State Historic Preservation Officer Regarding Lane Widening of Highway 101, Marin and Sonoma Counties, California*" signed September 11, 2008.

10. During removal of the southbound bridge at San Antonio Creek all debris will be prevented from falling into the creek.

11. Work within the area from top of bank to top of bank of San Antonio Creek or any other Water of the U.S. will be limited to June 15 to October 15.

12. All stockpiling of excavated material shall occur outside of USACE jurisdiction at approved locations.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403).
(x) Section 404 of the Clean Water Act (33 U.S.C. Section 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Section 1413).

2. Limits of this authorization:

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate. (See Item 4 above.)

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 C.F.R. Section 325.7 or enforcement procedures such as those contained in 33 C.F.R. Sections 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 C.F.R. Section 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Hardy Chilton 2.14.14

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Jane M. Hughes 2/14/14

for John K. Baker, P.E.
Lieutenant Colonel, U.S. Army
Commander and District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

January 30, 2014
CIWQS Place No. 797380

Sent via electronic mail--no hard copy to follow

California Department of Transportation
Attn: Betcy Joseph
Betcy_joseph@dot.ca.gov
111 Grand Ave.
Oakland, CA 94612-3717

Subject: Water Quality Certification for the Highway 101 Marin-Sonoma Narrows Segment B3 Project, Marin and Sonoma Counties

Department Project No.: EA 04-264091

Dear Ms. Joseph:

We have reviewed and hereby issue water quality certification (Certification) to the California Department of Transportation (Department) for the Highway 101 Marin-Sonoma Narrows Segment B3 HOV Widening Project (Project). The Department is seeking an Individual Permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344). As such, the Department has applied to the San Francisco Bay Regional Water Quality Control Board (Water Board) for a Clean Water Act Section 401 water quality certification that the Project will not violate State water quality standards.

Project:

The Department is proposing to upgrade U.S. Highway 101 (U.S. 101) between Novato and Petaluma as part of the Marin-Sonoma Narrows HOV Widening Project (MSN). The Department has divided the overall MSN project into six individual contracts:

- A1, from State Route 37 to just north of Atherton Avenue in Novato. A 401 certification was issued for this project on July 22, 2010;

- A3, between Marin County U.S. 101 post-miles 22.2 and 24.1. A 401 certification was issued for this project on June 1, 2012;

- B1, between Marin County U.S. 101 post-miles 23.3 and 27.6. A 401 certification was issued for this project on March 26, 2012;

- B3, The subject of this Certification;

- B2/B4, between Sonoma County U.S. 101 post-miles 0.9 and 3.6. A 401 certification was issued for this project on March 26, 2012; and

- C3, between Sonoma County U.S. 101 post-miles 3.4 and 4.1. A 401 certification was issued for this project on May 17, 2012.

This Certification addresses MSN Segment B3 which starts approximately one-half mile south of San Antonio Creek in Marin County, and ends at Kastania Road in Sonoma County. This Project consists of realigning the highway to correct substandard horizontal curves, re-profiling the highway to correct substandard vertical curve sight distance, reducing flood hazard by building a new San Antonio Creek Bridge at a higher profile to raise it out of the floodplain, and removing direct vehicle access to the highway by constructing new frontage roads and by converting the existing northbound lanes to a frontage road once the new lanes are in place.

Major Project elements include:

- Realignment of 2.4 miles of Highway 101 to correct substandard horizontal curves, resulting in three lanes in each direction;

- Re-profiling of Highway 101 to correct substandard vertical curve sight distance;

- Construction of a new bridge to carry Highway 101 over San Antonio Creek. The bridge will be a concrete box girder structure on concrete piers and will be built ten feet higher than the existing bridge to alleviate flooding of Highway 101;

- Construction of a cul-de-sac to disconnect San Antonio Road from Highway 101;

- Removal of the existing southbound Highway 101 bridge, while leaving in place the northbound bridge which will remain for property access south of the creek;

- Construction of a bicycle path;

- Retaining wall construction at the San Antonio Creek Bridge, between the new freeway and the existing northbound lanes between frontage road stations 6593+20 and 6599+31;

- Culvert replacement and extensions;

- Construction of biofiltration swales to treat stormwater runoff;
- Relocation of underground and overhead utilities; and
- Relocation of North Marin Water District water main.

Impacts: Project implementation would permanently impact approximately 3.34 acres of jurisdictional seasonal freshwater wetlands, approximately 3,922 linear feet of jurisdictional waters, and approximately 2.29 acres of riparian habitat where 199 riparian trees will be removed. Permanent impacts are summarized below in Table 1, *Summary of Permanent Impacts*.

Project implementation would result in temporary impacts to approximately 1.50 acres of jurisdictional seasonal freshwater wetlands and approximately 1,210 linear feet of jurisdictional waters. Temporary impacts are summarized below in Table 2, *Summary of Temporary Impacts*.

Table 1: Summary of Permanent Impacts

Activity	Jurisdictional Feature Impacted (Feature ID, as shown in attached impact maps)	Acreage and/or Linear Footage of Permanent Impact
Highway grading	Seasonal wetland WL-1	0.01 acres
Highway grading	Seasonal wetland WL-2	1.32 acres
Highway grading	Jurisdictional water OW-1	522 linear feet
Bridge pile and shading	Seasonal wetland WL-3	0.07 acres
Riparian tree removal	Riparian area DFG-1	1.68 acres - 180 trees
Tree removal and bridge shading	Jurisdictional water OW-2	286 linear feet
Highway grading	Jurisdictional water OW-3	30 linear feet
Highway and bike path grading	Seasonal wetland WL-4	0.91 acres
Highway and bike path grading	Seasonal wetland WL-5	0.48 acres
Highway grading	Jurisdictional water OW-4	205 linear feet
Driveway grading	Seasonal wetland WL-6	0.00 acres
Highway grading	Jurisdictional water OW-5	280 linear feet
Storm drain outfall riprap	Jurisdictional water OW-7	12 linear feet
Highway grading, culvert extension	Jurisdictional water OW-8	184 linear feet
Riparian tree removal	Riparian area DFG-2	0.71 acres - 40 trees

Table 1 (continued)

Activity	Jurisdictional Feature Impacted (Feature ID, as shown in attached impact maps)	Acreage and/or Linear Footage of Permanent Impact
Highway fill	Jurisdictional water OW-9	794 linear feet
Riparian tree removal	Riparian area DFG-3	0.10 acres - 5 trees
Riparian tree removal	Riparian area DFG-4	0.51 acres - 14 trees
Highway cut grading	Jurisdictional water OW-10	205 linear feet
Highway cut grading	Jurisdictional water OW-11	525 linear feet
Highway cut grading	Jurisdictional water OW-12	879 linear feet
Highway cut grading	Seasonal wetland WL-7	0.12 acres
PG&E relocation, water main trenching	Seasonal wetland WL-8	0.07 acres
Highway cut grading	Seasonal wetland WL-9	0.04 acres
Highway grading	Seasonal wetland WL-10	0.14 acres
Water main trenching	Seasonal wetland WL-13	0.18 acres
	Totals:	3.34 acres of wetlands 3,922 linear feet of waters 2.29 acres riparian (199 trees)

Table 2: Summary of Temporary Impacts

Activity	Jurisdictional Feature Impacted (Feature ID, as provided in application materials)	Acreage and/or Linear Footage of Permanent Impact
Highway grading, construction vehicle access	Seasonal wetland WL-1	0.03 acres
Highway grading and water main trenching	Seasonal wetland WL-2	1.34 acres
Bridge removal	Jurisdictional water OW-6	64 linear feet
Highway cut grading	Jurisdictional water OW-11	6 linear feet
Water main trenching	Seasonal wetland WL-12	0.11 acres
Water main trenching	Jurisdictional water OW-13	1,140 linear feet
Water main trenching	Seasonal wetland WL-11	0.02 acres
Water main trenching	Seasonal wetland WL-13	0.00 acres - minor temporary impact
	Totals:	1.50 acres of wetlands 1,210 linear feet of waters

See Attachment for permanent and temporary impact maps.

Roadway Pollutant Impacts: Project implementation would result in approximately 29.7 acres of new and 4.1 acres of reworked impervious area. This includes the new bridge surface over San Antonio Creek. Stormwater runoff from impervious areas may contain hydrocarbons, metals, volatile organic compounds, trash, and sediment at levels that may significantly impact waters of the State if left untreated.

Hydromodification Impacts: Added impervious areas may result in alterations to existing hydrologic regimes, resulting in erosion and/or changes of sediment transport in receiving waters (hydromodification). Because stormwater runoff from the Project discharges to tidally influenced creeks and channels, hydromodification mitigation is not required.

Avoidance and Minimization: The Department has avoided and minimized impacts to jurisdictional wetlands and waters, and riparian vegetation by reducing the overall project footprint in the following ways: steepening cut and fill slopes; constructing retaining walls; and eliminating a planned frontage road along the east side of Highway 101 south of San Antonio Creek.

Mitigation: To mitigate for permanent impacts to 3.34 acres of jurisdictional seasonal freshwater wetlands, the Department purchased 2.9 acres of wetland mitigation bank credits from Burdell Ranch Wetland Conservation Bank on December 2, 2010. The remaining 0.44 acres will come from surplus credits purchased from the Burdell Ranch Wetland Conservation Bank for the MSN B1 project. The MSN B1 project resulted in a wetland credit surplus of 0.961 acres after 3.5 acres of credits were purchased for 2.539 acres of impacts.

To mitigate for approximately 3,922 linear feet of permanent impacts to jurisdictional waters, the Department will construct 5,479 linear feet of earthen channels within the Project limits (see Condition no. 5 for locations and monitoring requirements). In addition, the Department shall enhance Tolay Creek by providing riparian tree re-vegetation along 2,885 linear feet of the creek and 2,756 linear feet of a Tolay Creek tributary. Riparian tree species established shall include a combination of willow, coast live oak, valley oak, California buckeye, blue elderberry, and big-leaf maple. Mitigation shall be done in cooperation with the land owner, Sonoma Land Trust.

To mitigate for temporarily impacted wetlands and waters, the Department shall restore those areas to their original or improved conditions (see Condition no. 4).

Roadway Pollutant Mitigation: As mitigation for increased pollutant loads associated with approximately 33.80 acres of added and reworked impervious area for this Project. The MSN B1 project resulted in a surplus of 0.29 acres of treated impervious surface which is being used toward the mitigation requirement for this Project. As such, the Department is required to treat runoff from a total of 33.51 acres. The Department plans to construct nine

biofiltration swales to treat stormwater runoff from 26.32 acres of impervious surfaces within the Project limits. See Attachment for onsite biofiltration swale plans and details. The Department plans to treat 7.19 acres of impervious surface offsite at a location to be approved by Water Board staff (see Condition no. 1).

CEQA Compliance: The Department prepared and approved an Environmental Impact Report for this Project pursuant to the requirements of the California Environmental Quality Act (CEQA). The Department filed a Notice of Determination on July 29, 2009 (SCH No. 2001042115).

EcoAtlas: It has been determined through regional, state, and national studies that tracking of mitigation/restoration projects must be improved to better assess the performance of these projects, following monitoring periods that last several years. In addition, to effectively carry out the State's Wetlands Conservation Policy of no net loss to wetlands, the State needs to closely track both wetland losses and mitigation/restoration project success. Therefore, we require that the applicant use the California Wetlands Form to provide Project information related to impacts and mitigation/restoration measures (see Condition No. 8 of this Certification). An electronic copy of the form and instructions can be downloaded at: http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml. Project information concerning impacts and mitigation/restoration will be made available at the web link: http://ecoatlas.org.

Certification: I hereby issue an order certifying that any discharge from the referenced Project will comply with the applicable provisions of sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 – DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification" which requires compliance with all conditions of this Certification. The following conditions are associated with this Certification:

1. The Department shall provide stormwater treatment for 26.32 acres of impervious surface within the Project area using 9 biofiltration swales in accordance with the plans and soil specifications in the Attachment of this Certification. The biofiltration swale locations are specified in the Bioswale Summary table below. An as-built report of the biofiltration swales shall be submitted to the Water Board not later than three months from the Project completion date.

Bioswale Summary

Bioswale Number as shown in plan sheets in the Attachment	Swale Surface Area (ft^2)	From "A" Line Station (approx.)	To "A" Line Station (approx.)	Treated Impervious Area (acres)
102	4,207	6560+90	6563+05	2.41
103	3,660	6564+30	6565+75	1.46
104	3,341	6568+20	6570+70	1.82
105	3,292	6570+55	6573+50	2.46
106	11,786	6576+05	6580+60	7.62
107	419	6641+50	6642+05	0.12
109	13,220	6646+60	6654+00	9.00
110	2,044	6653+20	6654+70	1.17
111	998	6654+80	6655+90	0.26
			Total:	26.32

In order to meet the stormwater treatment deficit, the Department shall provide treatment of runoff with similar pollutant loading to the Project site for an additional 7.19 acres of impervious surface. A proposal to treat 7.19 acres of impervious surface shall be submitted and approved by Water Board staff before commencement of Project construction, and the treatments shall be installed no later than the end of Project construction. If these additional treatments are not installed by the completion of Project construction, a penalty will be assessed annually as follows: the initial treatment area requirement will be augmented by 20% of the Project's remaining (uninstalled) treatment balance;

2. The Department shall perform mitigation for jurisdictional waters impacts at the Tolay Creek mitigation site in accordance with the *US Route 101 Marin-Sonoma Narrows HOV Widening Project Final Mitigation and Monitoring Plan for Contract A1, A2, A3, B1, B2/B4, B3, and C3* (MMP) dated January 17, 2013.

   The MMP includes a plan to re-vegetate 2,210 linear feet of Tolay Creek (both banks) in "Revegetation Zone C," 675 linear feet (both banks) in "Revegetation Zone E," and 2,756 linear feet in "Tributary Enhancement Zone T1" as identified in the Tolay Creek Mitigation Site Map in the Attachment. All mitigation required in Tolay Creek Zones C, E, and T1 shall be fully implemented prior to Project completion.

   Annual Reports shall be submitted to the Water Board by December 31, of years 0 (as-built conditions), 1, 2, 3, 5, 7, 9, and 10;

3. Mitigation areas at Tolay Creek shall be subject to the terms of the December 21, 2007, Grant Deed of Conservation Easement (Easement), and the November 2009, Tolay Creek Ranch Management Plan (Management Plan). Any subsequent change to the Easement or Management Plan shall be subject to the acceptance of Water Board staff;

4. The Department shall restore all temporarily impacted jurisdictional wetlands and waters to their pre-project or improved conditions, within the first growing season following cessation of construction activity in those areas. All temporarily disturbed areas shall be re-vegetated using only native plant species. The Department shall not cause, through operation of heavy machinery, or any other construction activity, compaction of wetlands or waters. Any compaction of wetlands or waters shall require mitigation. The Department shall submit photo-documentation to the Water Board of the pre- and post-project conditions of temporarily impacted areas annually until the Project construction is complete;

5. The Department shall construct no less than 5,479 linear feet of unlined channels at the 17 locations specified in the table below:

Alignment	From station	To station	Ditch Length (feet)
A	6546+77.35	6549+12.10	266.1
A	6549+40.57	6555+30.64	578
A	6555+53.31	6561+45.72	589.5
BP	16+90.03	21+10.27	426.7
BP	25+70.74	26+48.90	99.4
A	6564+61.01	6568+05.85	339.4
A	6568+26.47	6569+60.04	130.3
A	6564+23.57	6567+12.51	296.9
A	6570+71.78	6578+48.03	763
A	6593+49.41	6593+92.33	42.9
A	6600+21.11	6603+04.06	283.1
A	6630+53.75	6635+19.39	409.5
A	6635+20.02	6639+50.45	442
A	6639+50.41	6641+62.54	215.7
A	6655+92.49	6657+68.48	178
BP	14+69.84	15+65.60	95.7
A	6538+93.06	6542+10.46	323.6
		Total:	5479.8

An as-built report of the constructed channels shall be submitted to the Water Board not later than three months from the Project completion date. Photo-documentation shall be provided each year thereafter, for three years, to demonstrate that the channels are exhibiting wetland and water characteristics;

6. Utility line hydrostatic testing water shall not be discharged if residual chlorine levels exceed 0.0 mg/L, or pH is below 6.5, or above 8.5. Chlorine residual detection methods shall have a detection limit no greater than 0.5 mg/L. Discharge of hydrostatic testing water shall be subject to chlorine and pH testing every 15 minutes

until a steady state of discharge is reached. Discharge of water shall not cause erosion at the point of discharge;

7. The Department is required to use the standard California Wetlands Form to provide Project information describing impacts and restoration measures within 14 days from the date of this certification. An electronic copy of the form can be downloaded at: http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml. The completed form shall be submitted electronically to habitatdata@waterboards.ca.gov or shall be submitted as a hard copy to both (1) the Water Board (see the address on the letterhead), to the attention of EcoAtlas and (2) the San Francisco Estuary Institute, 4911 Central Avenue, Richmond, CA 94804, to the attention of EcoAtlas;

8. Tolay Creek monitoring reports shall be submitted by December 31 of each year either by uploading them to the EcoAtlas website at http://ecoatlas.org/regions/ecoregion/bay-delta/projects, via email, or via mail (see the address on the letterhead). To upload the reports, go to the above link, click on your project, click on Files & Links, and follow the steps. If the Applicant chooses to upload the Annual Report to the EcoAtlas website, the Applicant shall notify the Water Board project manager that the report has been uploaded;

9. The Resident Engineer (or appropriately authorized agent) shall hold onsite water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on violation avoidance and violation reporting procedures. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the Project, shall be present at the meetings. The Department shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Water Board on request;

10. Concrete shall be excluded from surface water for a period of 30 days after it is poured/sprayed. During that time the concrete shall be kept moist and runoff from the concrete shall not be allowed to enter State waters. Commercial sealants may be applied to the concrete surface in instances where 30 days of water exclusion is infeasible. If sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water;

11. The Project shall be constructed in conformance with the Project Description described in this Certification and Certification application materials. Any change in the Project that could impact State waters may require compensatory mitigation and shall first be reported to and found acceptable by the Water Board Executive Officer;

12. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any other water quality problem arises, the associated Project activities shall immediately cease until adequate BMPs are implemented. The Water Board shall be notified promptly within 24 hours after the unauthorized discharge or water quality problem arises;

13. The Department shall adhere to the conditions imposed by the Individual Permit issued to the Department by the U.S. Army Corps of Engineers, the Streambed Alteration Agreement issued to the Department by the California Department of Fish and Wildlife, the Biological Opinion issued to the Department by the U.S. Fish and Wildlife Service on April 1, 2009, and the Biological Opinion issued by the National Marine Fisheries Service on January 26, 2009;

14. All activities and best management practices (BMPs) shall be implemented according to the submitted application materials and the findings and conditions of this Certification. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and in place at commencement of, during, and after any ground clearing activities, construction activities, or any other Project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. BMPs for erosion and sediment control shall be utilized throughout all phases of construction, regardless of date, wherever sediment-laden runoff threatens to enter waters of the State. The Department shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer's specifications. If the Project Resident Engineer elects to install alternative BMPs for use on the project, the Department shall submit a proposal to Water Board staff for review and concurrence;

15. The Department shall not use or allow the use of erosion control products that contain synthetic materials within waters of the State at any time. The Department shall request approval from Water Board staff if an exception from this requirement is needed at a specific location. In upland and riparian areas, the Department shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products. The Department shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the Project).

    If the Department finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products;

16. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be prohibited within waters of the State. Fueling of individual equipment types

within waters of the State may be authorized if the Department first prepares a fueling plan that:

a. Identifies the specific piece of machinery that may require fueling within waters of the State;

b. Provides justification for the need to refuel within State waters. The justification shall describe why fueling outside of jurisdictional waters is infeasible; and

c. Includes a narrative of specific BMPs that shall be employed to prevent and capture fuel releases.

Fueling of equipment within waters of the State shall be prohibited until the above mentioned plan has been approved by Water Board staff. The fueling plan may be submitted individually, included in the project Storm Water Pollution Prevention Plan (SWPPP), or submitted as a SWPPP amendment.

17. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State. At no time shall the Department use any vehicle or equipment which leaks any substance that may impact water quality;

18. Except as expressly allowed in this Certification, the Department is prohibited from discharging waste to waters of the State. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this Certification, shall be allowed to enter into waters of the State. Except for temporary stockpiling of waste generated during demolition operations ("temporary" in this instance means generated and removed during the same working day), waste materials shall not be placed where the materials may be washed by rainfall into waters of the State;

19. The Department shall provide analysis and verification that placement of non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All Project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When construction is complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the State and Federal laws and regulations, the Department is liable and responsible for the proper disposal of waste generated by their Project;

20. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill onsite shall be performed in

accordance with all State and Federal policies and established guidelines; a plan for such re-use must first be submitted to Water Board staff for review and concurrence;

21. Work in flowing or standing surface waters is prohibited;

22. The Department shall submit, subject to the acceptance of Water Board staff, a dewatering and/or diversion plan that appropriately describes the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity. Diversion/dewatering activities shall be prohibited until Water Board staff has accepted the dewatering/diversion plan for that specific water. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State, avoid fish entrainment, and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of Project activities;

23. This Certification does not allow for the take, or incidental take, of any special status species. The Department shall use the appropriate protocols, as approved by the California Department of Fish and Wildlife and the USFWS, to ensure that Project activities do not impact the Beneficial Use of the Preservation of Rare and Endangered Species, as described in the San Francisco Bay Regional Water Quality Control Plan;

24. The Department shall maintain a copy of this Certification at the Project site to be available at all times to Project personnel. It is the responsibility of the Department to assure that all personnel (employees, contractors, and subcontractors) are adequately informed and trained regarding the conditions of this Certification;

25. The Water Board may add to or modify the conditions of this Certification, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act;

26. This Certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the California Water Code and Title 23 of the California Code of Regulations, Section 3867;

27. This Certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license, unless

the pertinent certification application was filed pursuant to California Code of Regulations Title 23, Subsection 3855(b) and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought; and

28. This Certification is conditioned upon total payment of the full fee required in State regulations (23 CCR Section 3833). The Water Board has received the full fee for this Certification.

We anticipate your cooperation in implementing these conditions. However, please be advised that any violation of water quality certification conditions is a violation of State law and subject to administrative civil liability pursuant to California Water Code, Section 13350. Failure to respond, inadequate response, late response, or failure to meet any condition of this Certification may subject you to civil liability imposed by the Water Board to a maximum of $5,000 per day per violation or $10 for each gallon of waste discharged in violation of this Certification.

This Certification includes requirements for information and reports. Any requirement for a report made as a condition to this action is a formal requirement pursuant to CWC section 13267, and failure or refusal to provide, or falsification of such required report is subject to civil liability as described in California Water Code, Section 13268.

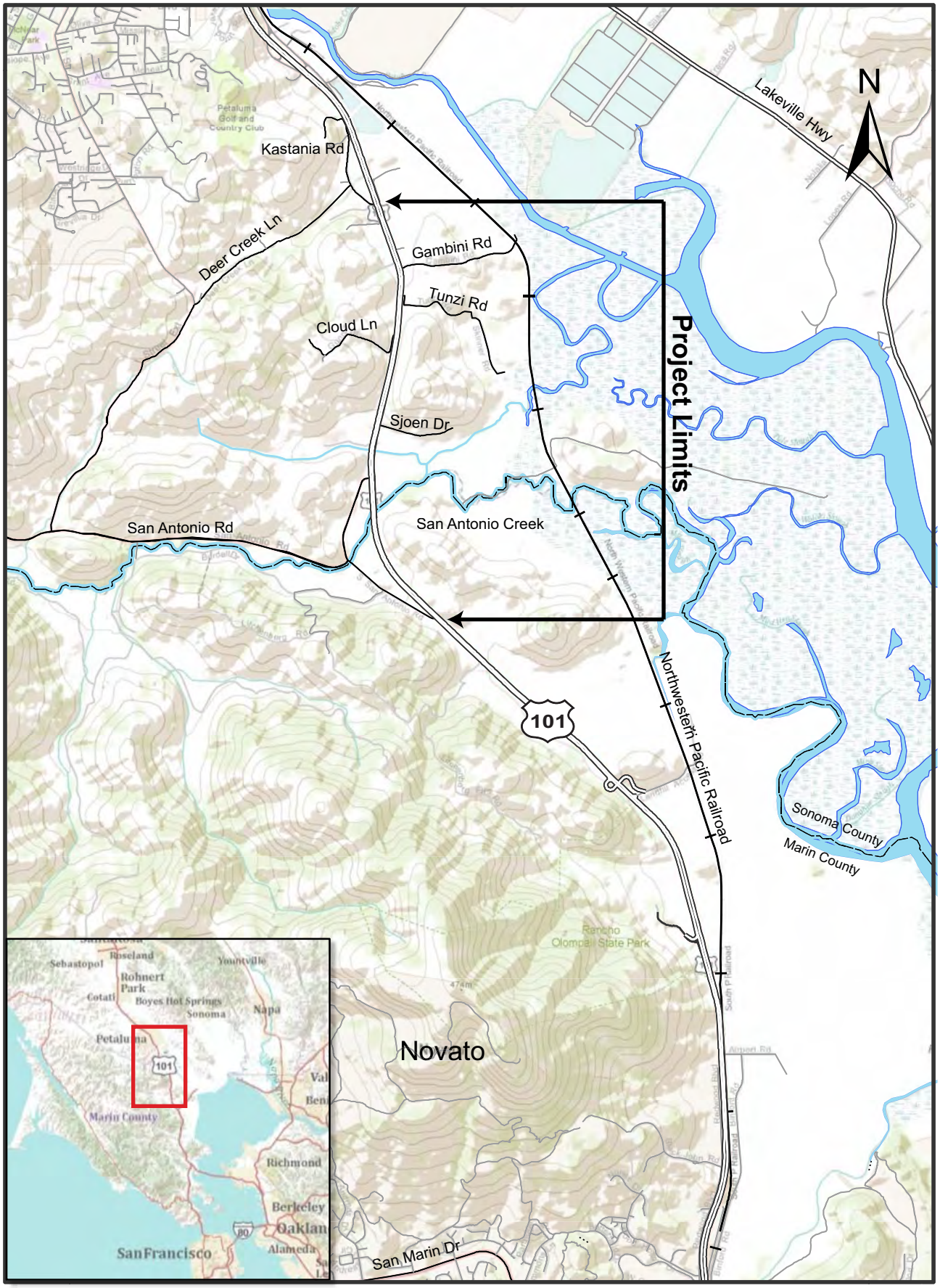
If you have any questions, please contact Derek Beauduy at (510) 622-2348, or via e-mail to derek.beauduy@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

Attachment

cc (via e-mail):
Mr. Bill Orme SWRCB-DWQ
Mr. Cameron Johnson, USACE
Ms. Jane Hicks, Regulatory Branch, USACE
Ms. Melissa Escaron, CDFW
Ms. Paula Gill, USACE
Mr. Dale Bowyer, Water Board
Mr. Cyrus Vafai, Caltrans
Mr. Hardeep Takhar, Caltrans
Mr. Jason Brush, USEPA
Mr. Ryan Olah, USFWS

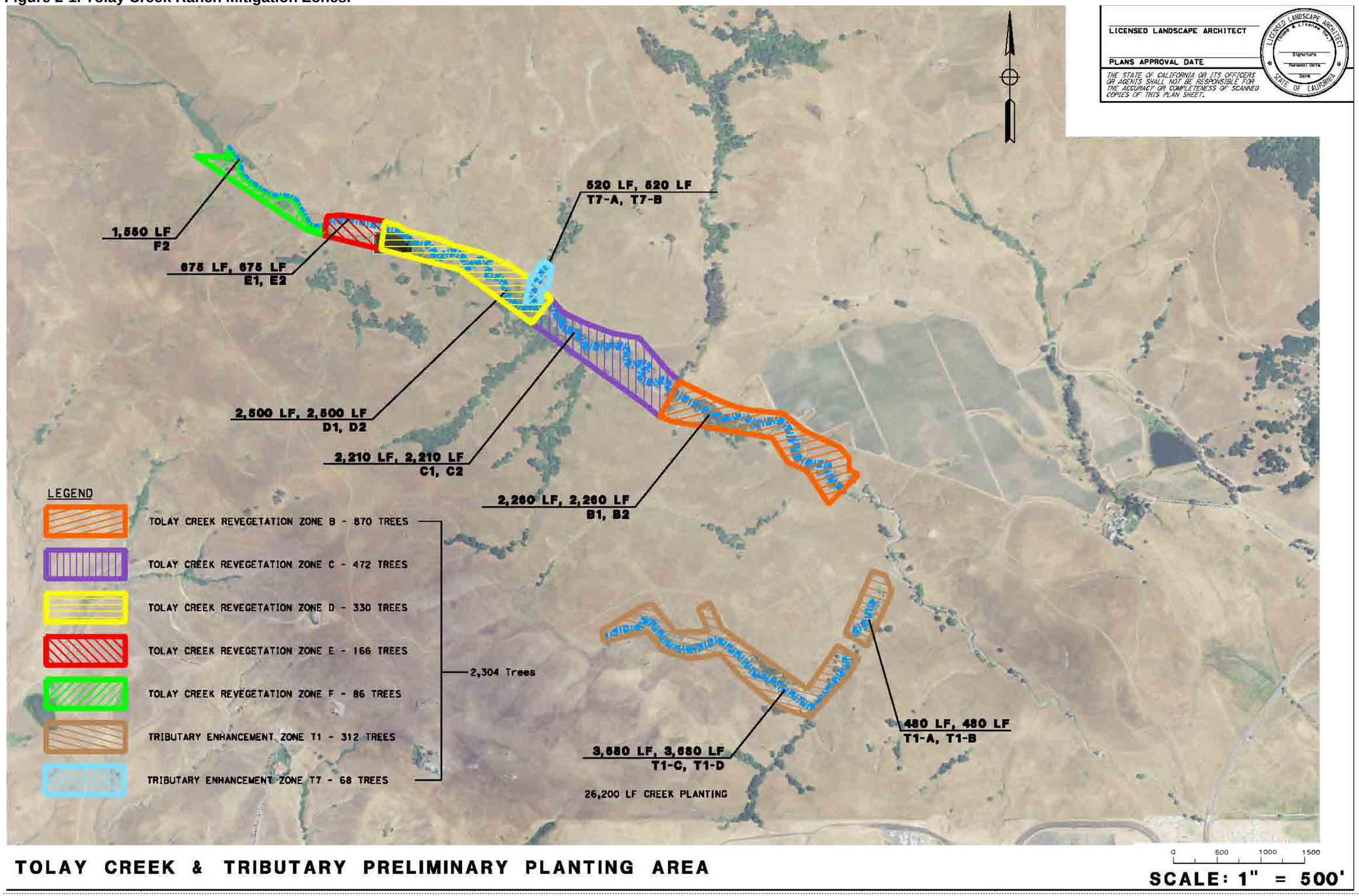


MARIN-SONOMA HIGH OCCUPANCY VEHICLE WIDENING PROJECT
IN MARIN AND SONOMA COUNTIES
FROM 0.5 MILE SOUTH OF SAN ANTONIO CREEK NORTH TO KASTANIA ROAD
04-MRN-101 (PM 27.1/27.6),
04-SON-101 (PM 0.0/1.8)

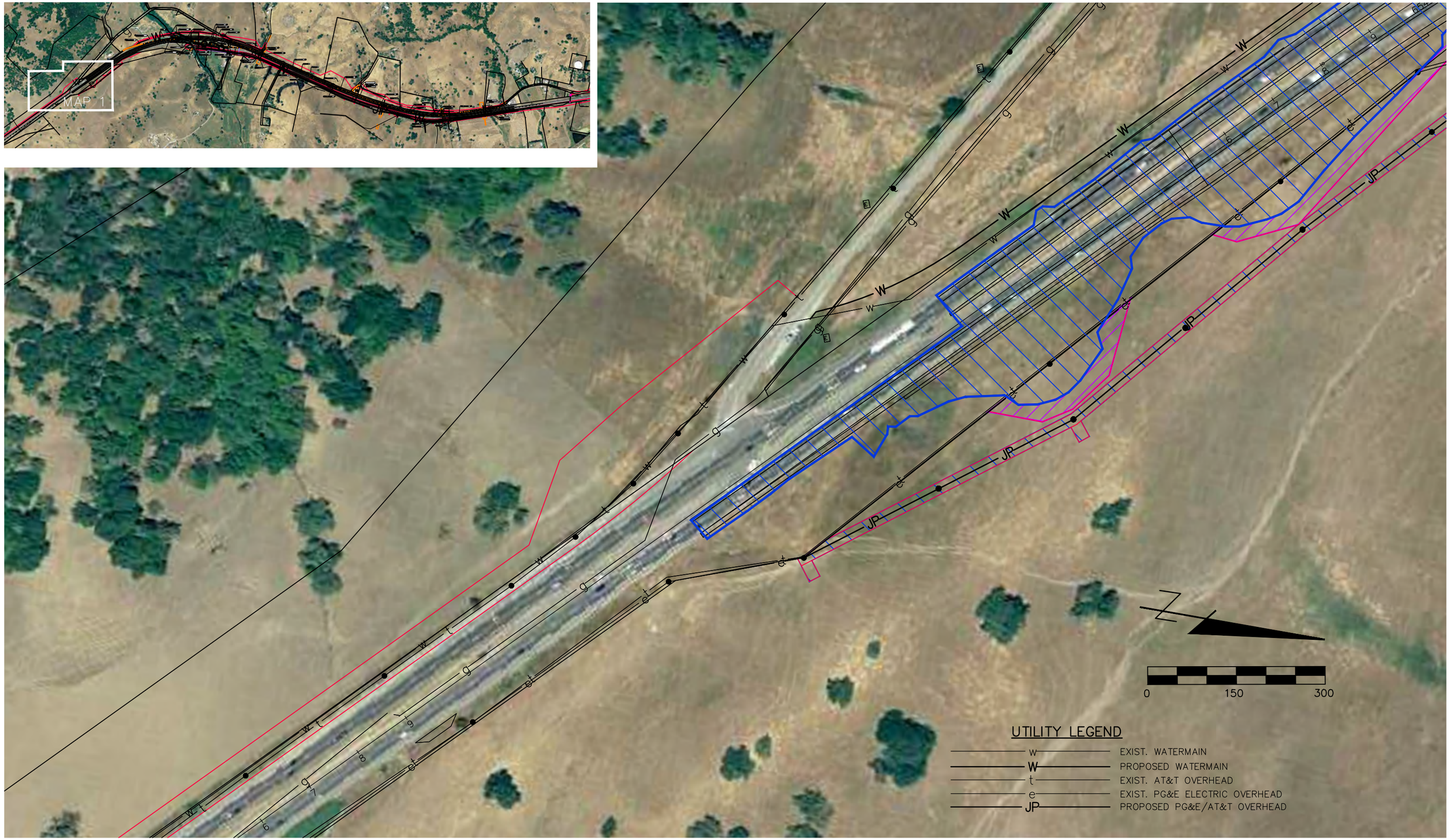
PROJECT VICINITY MAP

SCALE: 1:50,000

Figure 2-1. Tolay Creek Ranch Mitigation Zones.



TOLAY CREEK & TRIBUTARY PRELIMINARY PLANTING AREA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

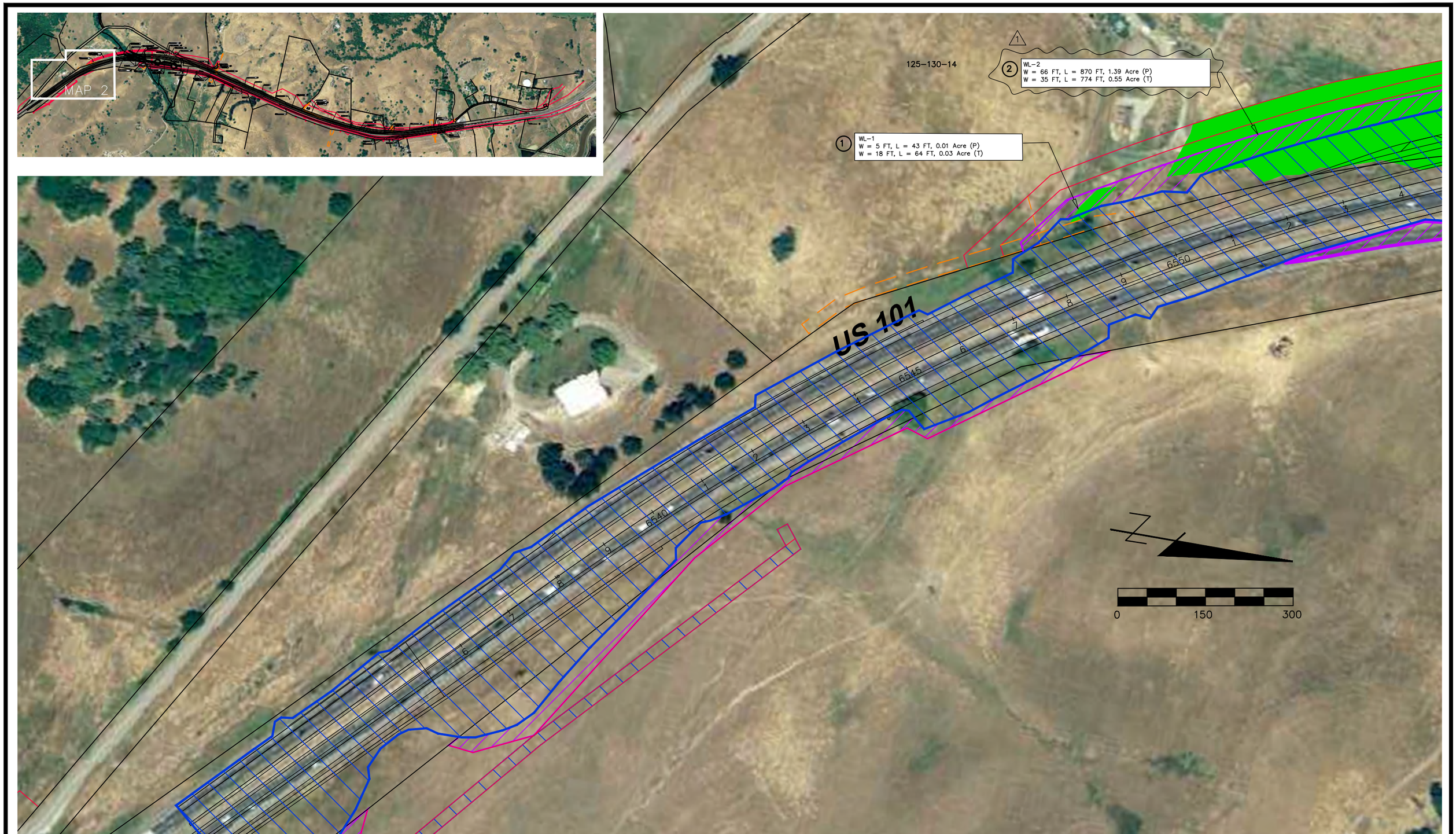
SHEET 1 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = –	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- + Trees to be removed
- Non-jurisdictional Waters – US/State

FIGURE 2
MAP 1 OF 7
MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: DEC 2013
FILE: 58-0095B-141

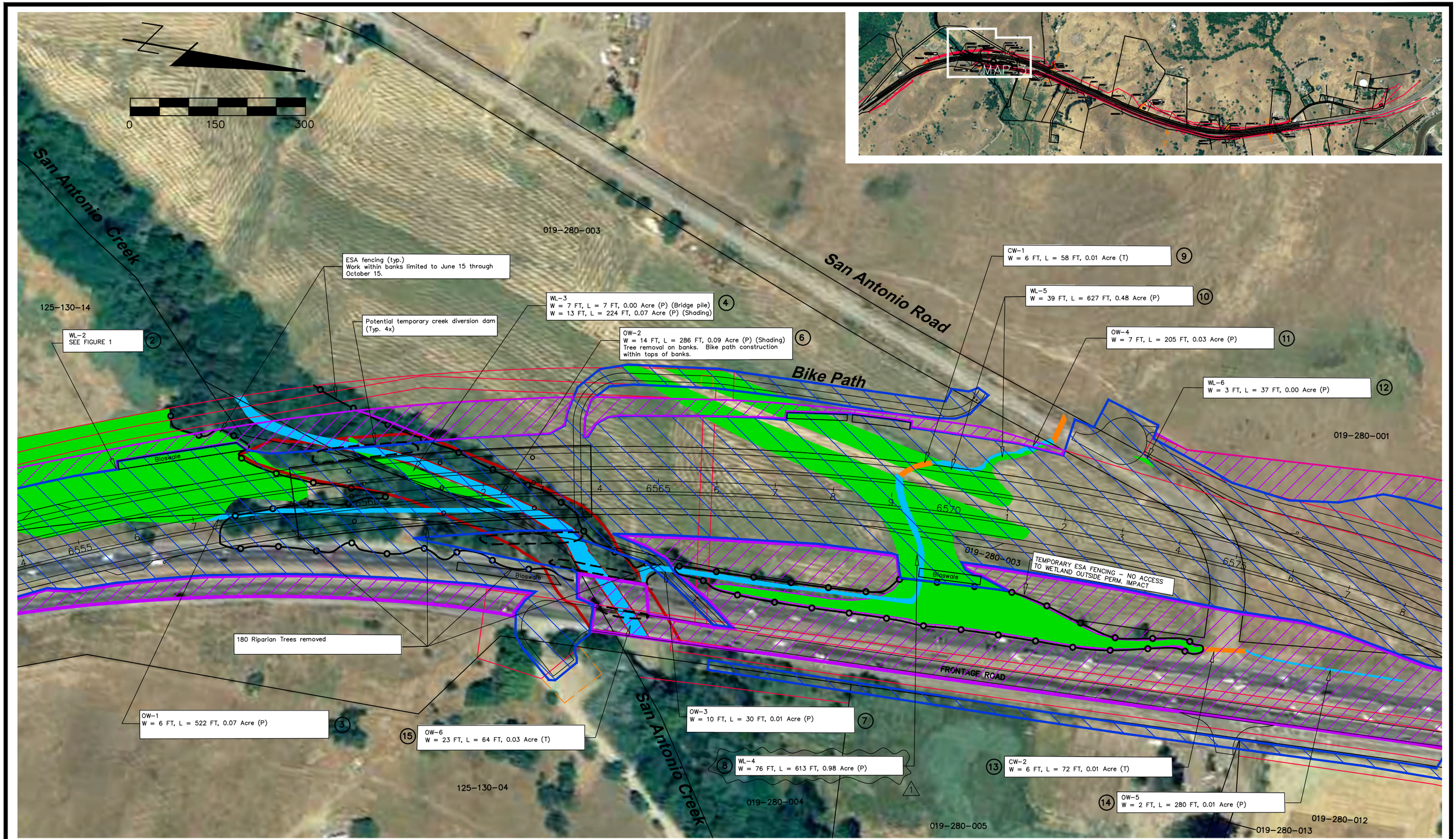
SHEET 2 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = 0.58 ac.	TEMPORARY = –	TEMPORARY = –
PERMANENT = 1.40 ac.	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Non-jurisdictional Waters – US/State
- Potential temporary check dam, creek diversion

FIGURE 3
MAP 2 OF 7
MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: DEC 2013
FILE: 58-0095B-141

SHEET 3 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = 0.03 ac.	TEMPORARY = –
PERMANENT = 1.53 ac.	PERMANENT = 0.21 ac.	PERMANENT = 0.01 ac.

1

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- ESA fencing
- Trees to be removed
- Non-jurisdictional Waters – US/State
- Potential temporary check dam, creek diversion

FIGURE 4
MAP 3 OF 7
MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA

3 non-riparian trees removed

OW-8
W = 5 FT, L = 184 FT, 0.02 Acre (P)
17

40 Riparian trees removed

CW-3
W = 12 FT, L = 143 FT, 0.04 Acre (T)
19

019-290-001

OW-9
W = 7 FT, L = 794 FT, 0.13 Acre (P)
21

6 non-riparian trees removed for PG&E pole line

16
OW-7
W = 3 FT, L = 12 FT, 0.00 Acre (P)

019-280-008

5 Riparian trees removed

14 Riparian trees removed

8 non-riparian trees removed for PG&E pole line

Skinner Road

20
CW-4
W = 8 FT, L = 133 FT, 0.03 Acre (T)

9 non-riparian trees removed for PG&E pole line

019-280-011

0 150 300

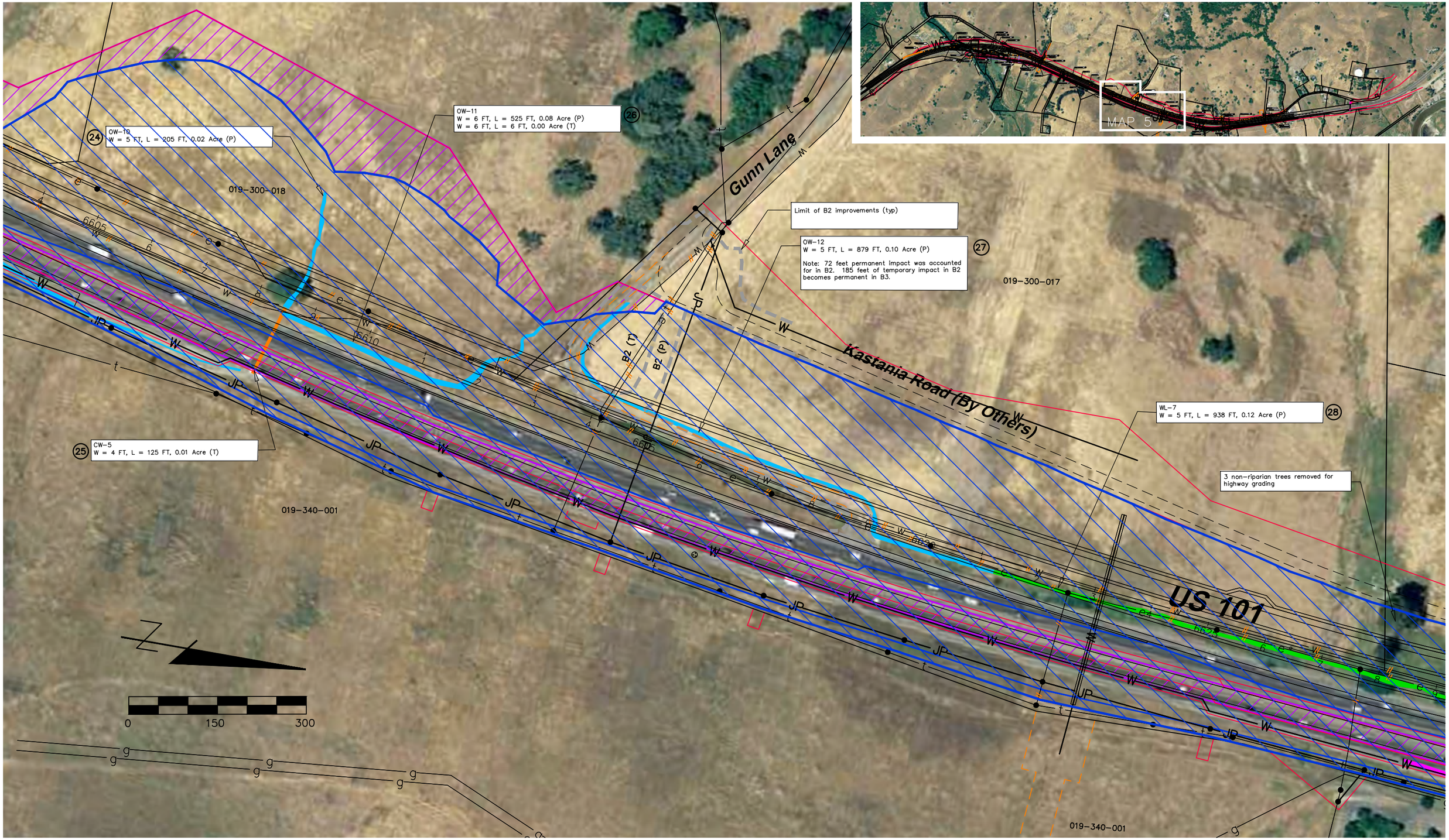
SCALE: 1" = 150'	SHEET 4 SUBTOTAL		
DATE: JUNE 2013	WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
FILE: 58-0095B-141	TEMPORARY = –	TEMPORARY = –	TEMPORARY = 0.07 ac.
	PERMANENT = –	PERMANENT = 0.15 ac.	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Non-jurisdictional Waters – US/State

FIGURE 5
MAP 4 OF 7

MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

SHEET 5 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = 0.00 ac.	TEMPORARY = 0.01 ac.
PERMANENT = 0.12 ac.	PERMANENT = 0.20 ac.	PERMANENT = –

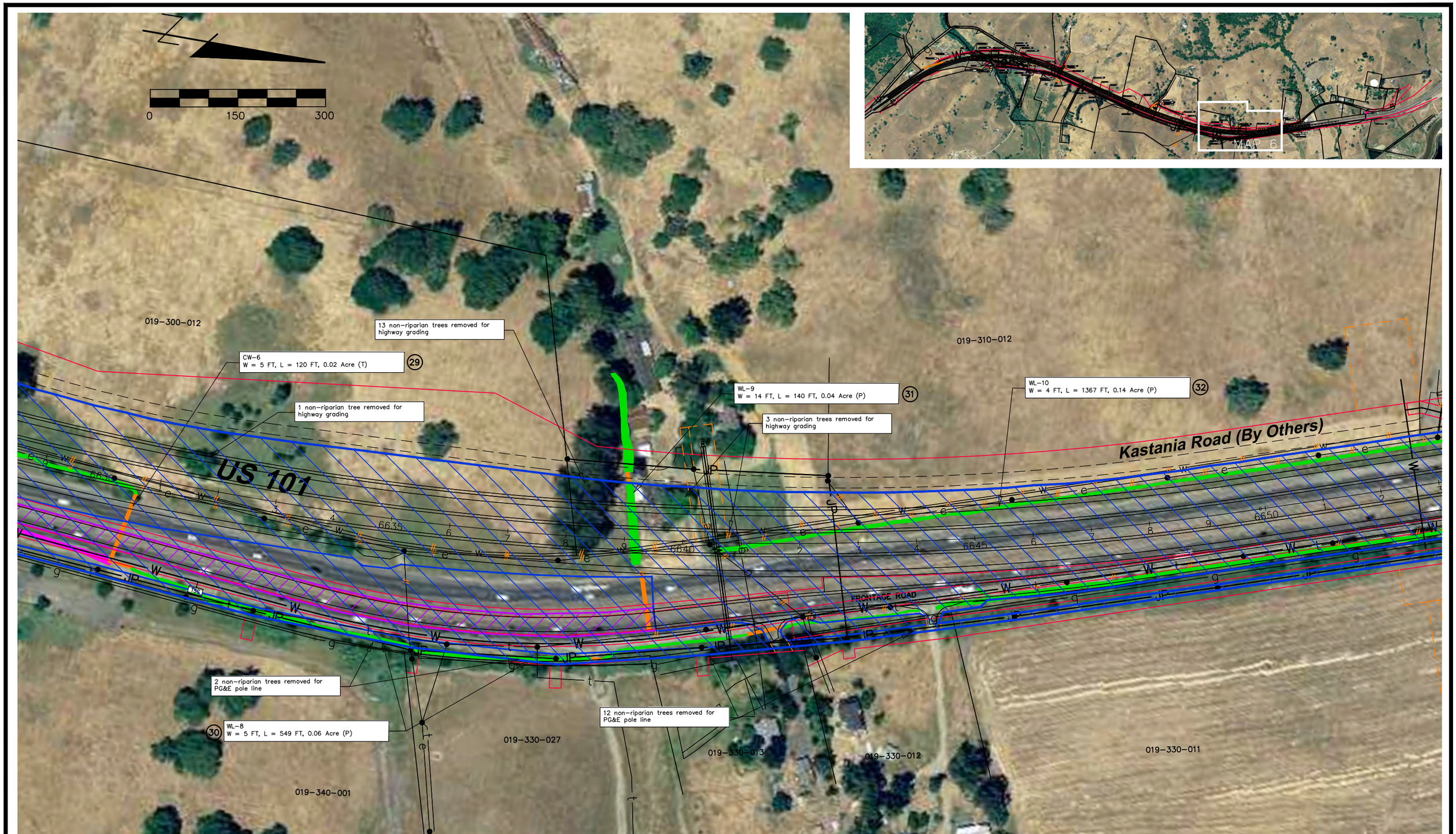
LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Non-jurisdictional Waters – US/State

FIGURE 6

MAP 5 OF 7

MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

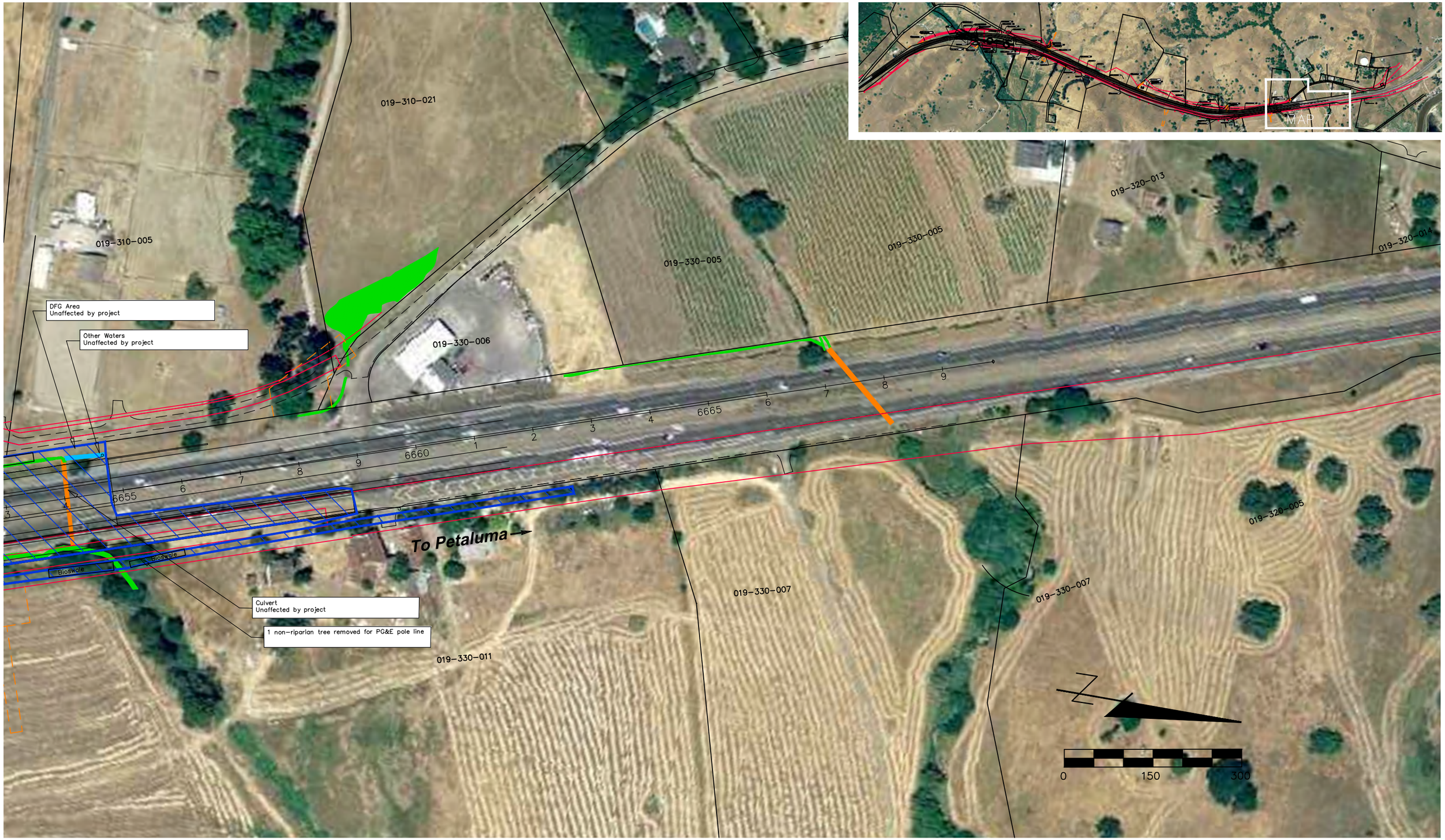
SHEET 6 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = –	TEMPORARY = –
PERMANENT = 0.24 ac.	PERMANENT = –	PERMANENT = 0.02 ac.

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- + Trees to be removed
- Non-jurisdictional Waters – US/State

FIGURE 7
MAP 6 OF 7
MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

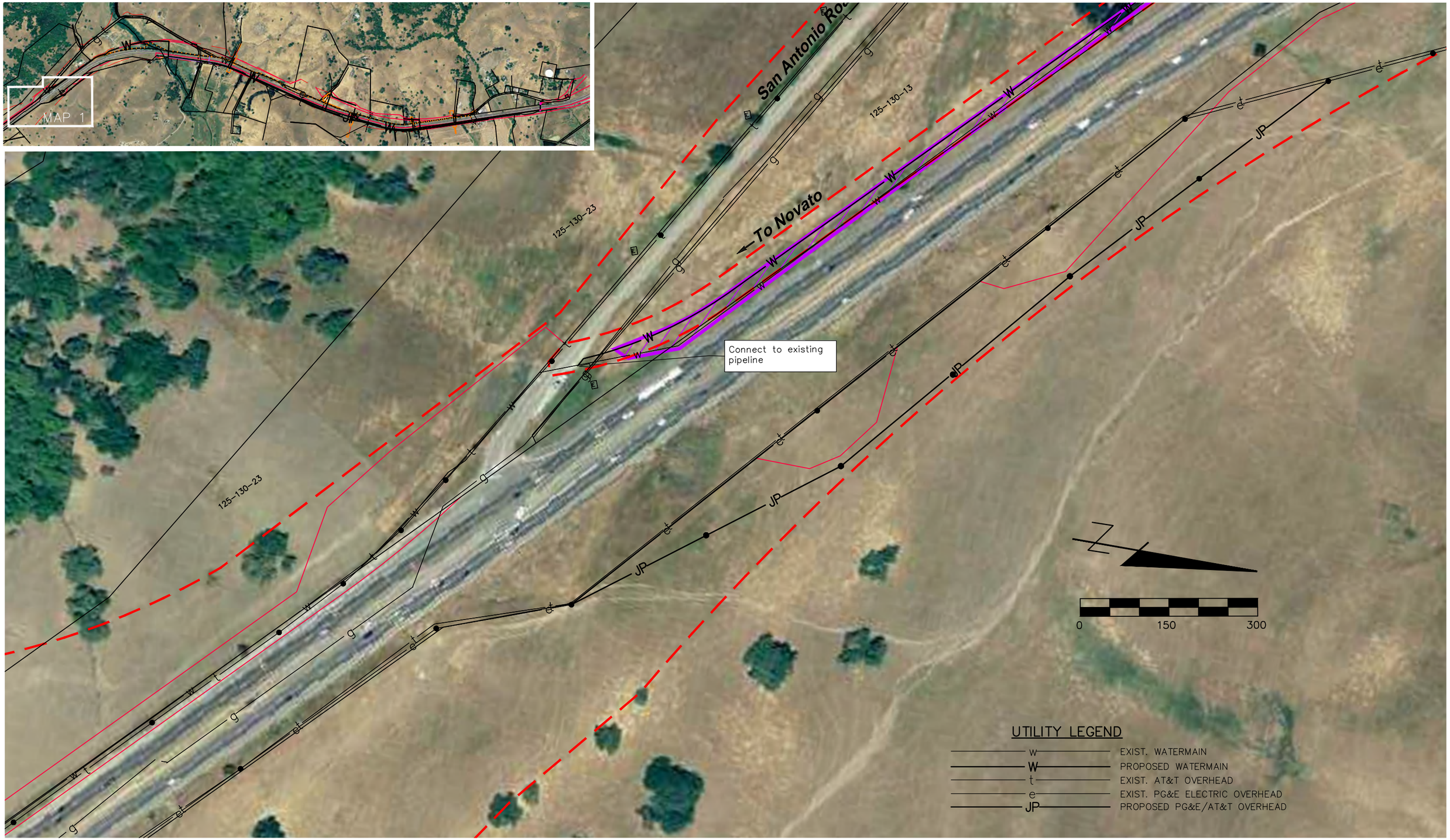
SHEET 7 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = –	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Non-jurisdictional Waters – US/State
- Potential temporary check dam, creek diversion

FIGURE 8
MAP 7 OF 7
MARIN SONOMA NARROWS
SEGMENT B3 – HIGHWAY
SONOMA & MARIN COUNTY, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

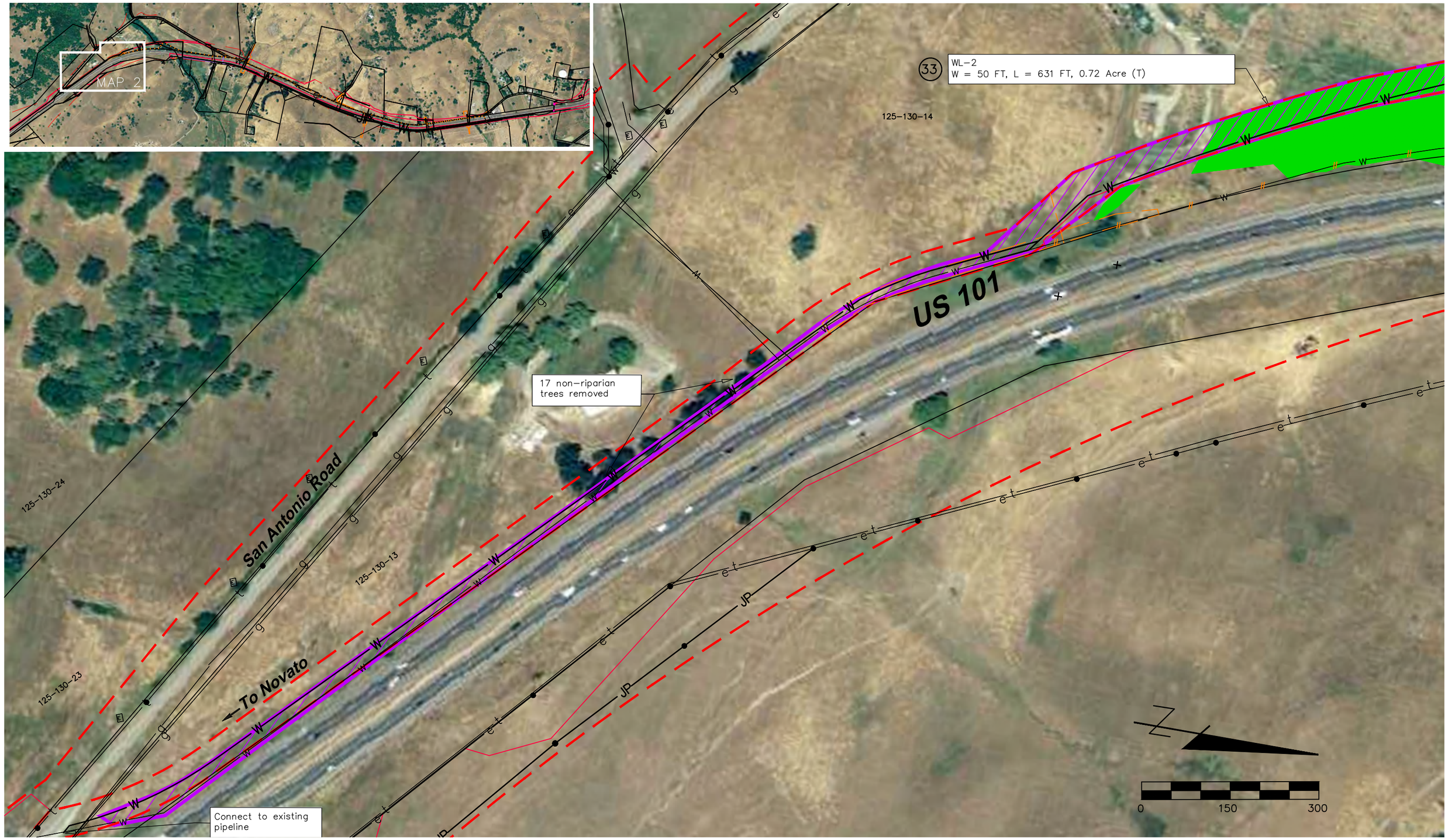
SHEET 1 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = –	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 9
MAP 1 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141

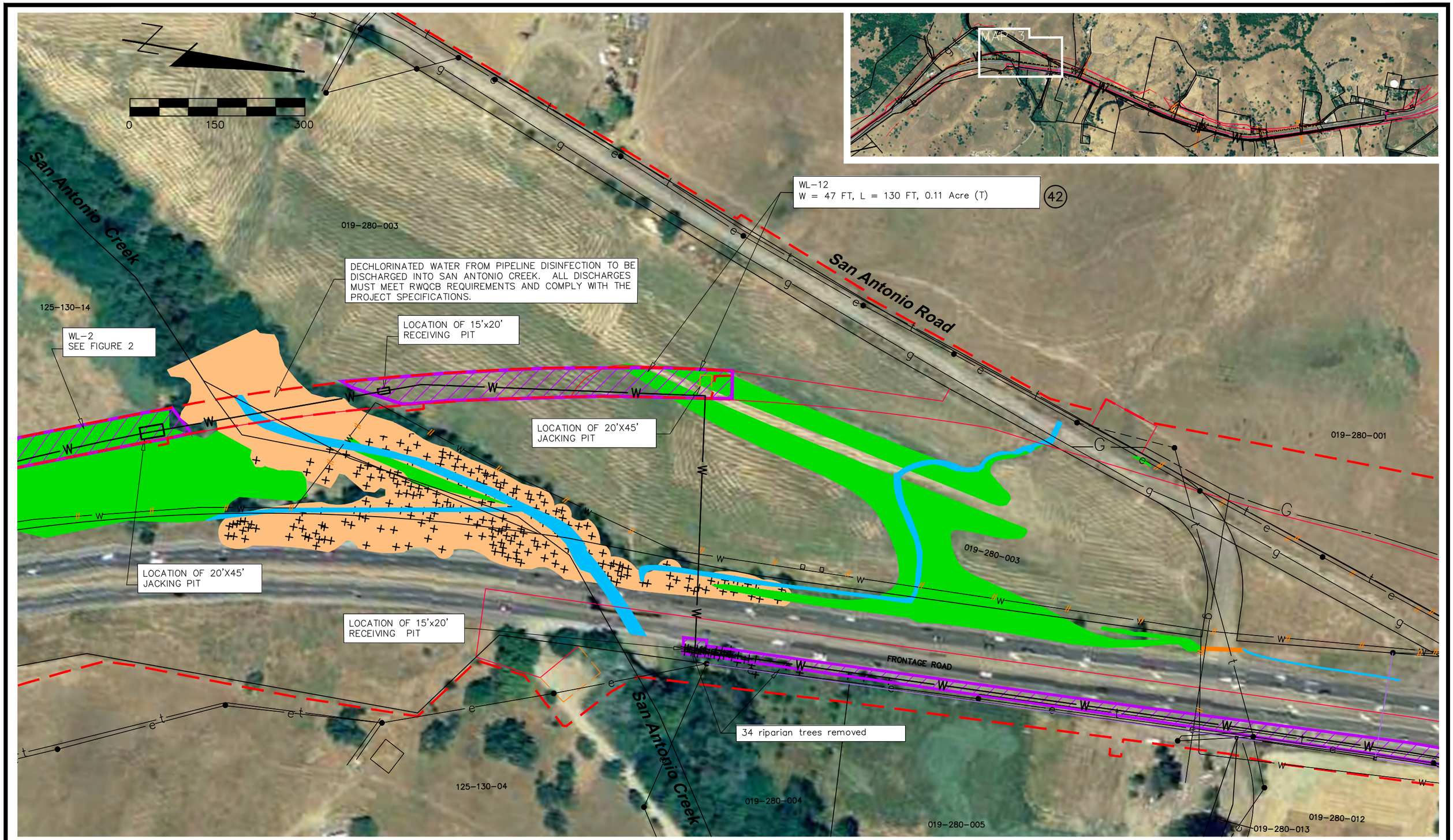
SHEET 1 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = 0.72 ac.	TEMPORARY = –	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 10
MAP 2 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141N

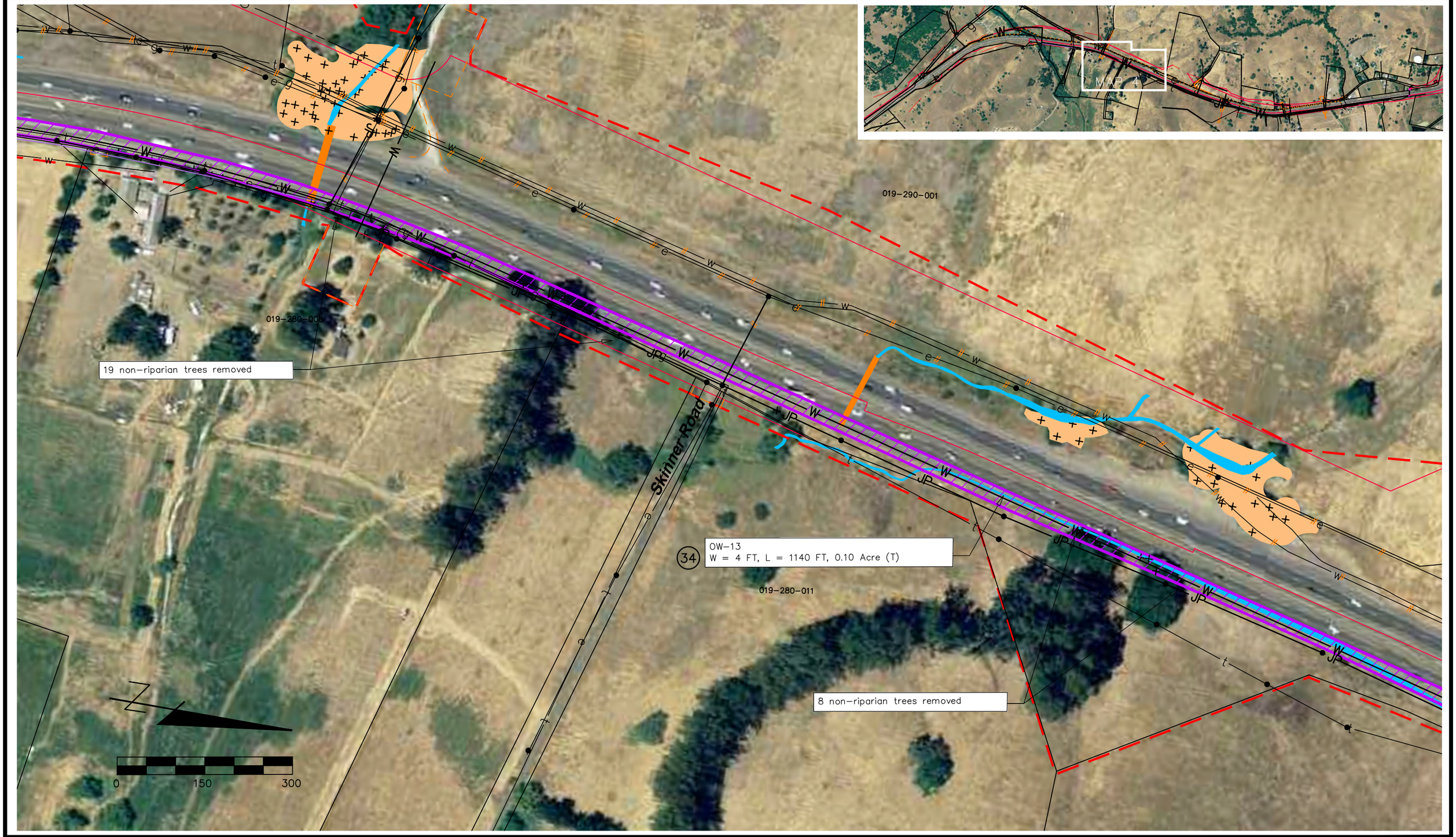
SHEET 2 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = 0.11 ac.	TEMPORARY = –	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- + Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 11
MAP 3 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141N

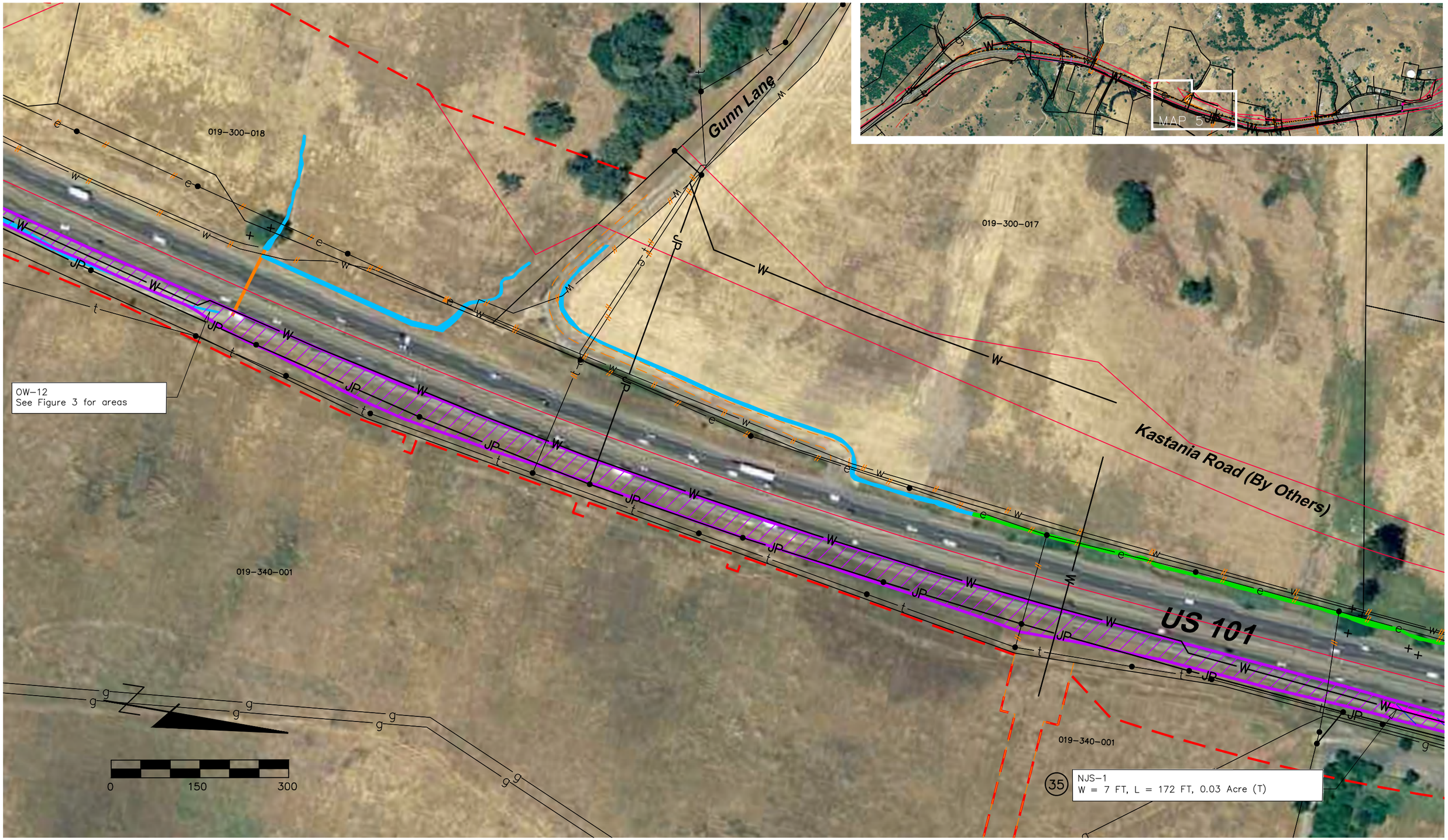
SHEET 3 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
TEMPORARY = –	TEMPORARY = 0.103 ac.	TEMPORARY = –
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 12
MAP 4 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141N

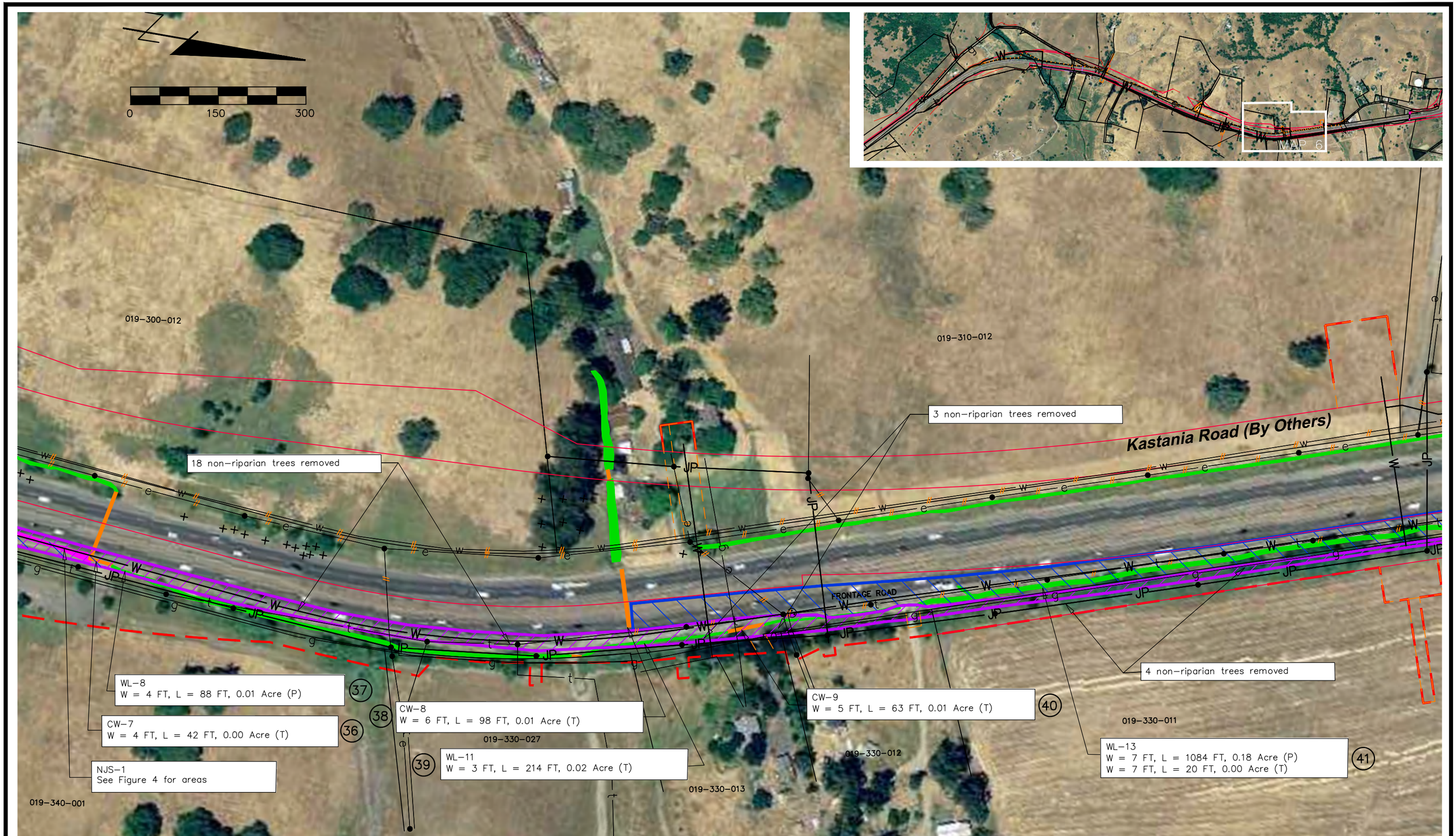
SHEET 4 SUBTOTAL

WETLAND IMPACT	OTHER WATERS IMPACT	NON-JURISDICTIONAL WATERS
TEMPORARY = –	TEMPORARY = –	TEMPORARY = 0.029 ac.
PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- + Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 13
MAP 5 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA



SCALE: 1" = 150'
DATE: JUNE 2013
FILE: 58-0095B-141N

SHEET 5 SUBTOTAL

WETLAND IMPACT	NON-JURISDICTIONAL WATERS	CULVERTED WATERS IMPACT
TEMPORARY = 0.019 ac.	TEMPORARY = –	TEMPORARY = 0.025 ac.
PERMANENT = 0.185 ac.	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 14
MAP 6 OF 7
MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA

SCALE: 1" = 150'	SHEET 6 SUBTOTAL		
DATE: JUNE 2013	WETLAND IMPACT	OTHER WATERS IMPACT	CULVERTED WATERS IMPACT
FILE: 58-0095B-141N	TEMPORARY = –	TEMPORARY = –	TEMPORARY = –
	PERMANENT = –	PERMANENT = –	PERMANENT = –

LEGEND

- Permanent Impacts
- Temporary Impacts
- W = Width
- L = Length
- Waters of the US (wetlands)
- Waters of the US (other waters)
- Waters of the US (culverted)
- Environmental Study Limit
- Trees to be removed
- Dept. of Fish & Wildlife Jurisdiction
- Non-jurisdictional Waters – US/State

FIGURE 15

MAP 7 OF 7

MARIN SONOMA NARROWS – B3
NORTH MARIN WATER DISTRICT
SONOMA & MARIN COUNTIES, CA

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

MARK THOMAS & CO., INC.
3000 OAK RD, SUITE 650
WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTES:

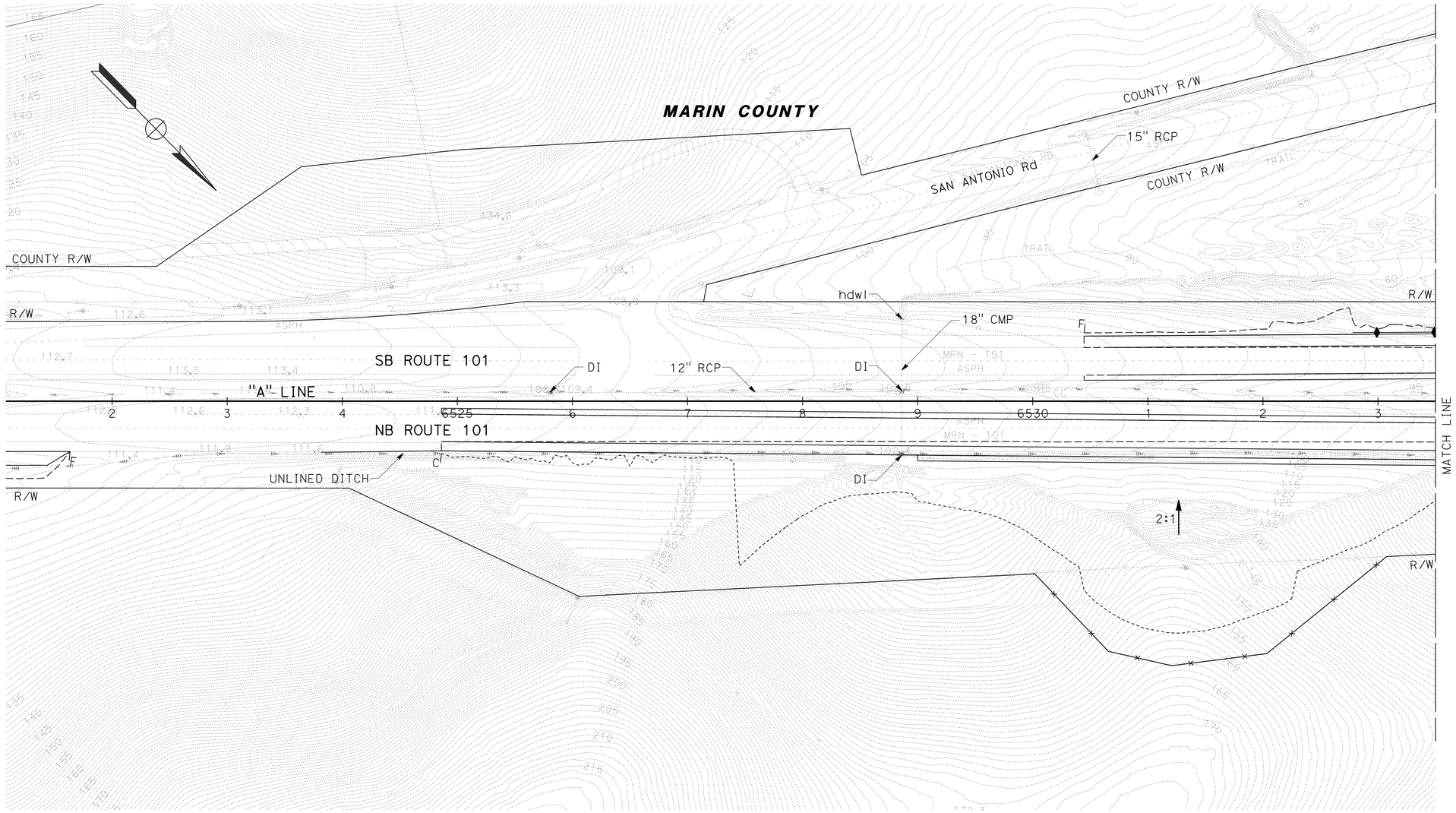
1. Exist DRAINAGE LOCATIONS ARE Approx ONLY. VERIFY LOCATION AND ELEVATION BEFORE MODIFYING Exist DRAINAGE FACILITIES.
2. FOR INLETS ADJACENT TO DIKE OR CURBS, TG IS AT THE FLOW LINE OF THE GUTTER. FOR FIELD INLETS OUTSIDE OF ROADBED, TG IS AT THE CENTER OF GRATE.
3. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
4. FOR BIOFILTRATION SWALE DETAILS SEE SHEETS DD-3 THRU DD-7.
5. FOR DITCH DEPTHS AND PROFILES SEE SHEETS DP-56 THRU DP-91.
6. GUTTER DEPRESSIONS SHALL BE PCC PER STD PLAN D78B. PCC SHALL BE 8" THICK. THE USE OF ISOLATION JOINTS IS NOT REQUIRED.

LEGEND:

- DRAINAGE SYSTEM NUMBER
- DRAINAGE ITEM
- ALTERNATIVE FLARED END SECTION
- ROCK SLOPE PROTECTION (RSP)
- DITCH FLOW LINE
- BIOFILTRATION SWALES (SEE DRAINAGE DETAILS)
- GRADE TO DRAIN

ABBREVIATIONS:

HMAOD	HMA OVERSIDE DRAIN
Rem	REMOVE
SO	SIDE OPENING
w/	WITH
SGD	STANDARD GUTTER DEPRESSION
SCSP	SACKED-CONCRETE SLOPE PROTECTION
DI (G2)	DRAINAGE INLET (TYPE G2)



DRAINAGE PLAN

SCALE: 1" = 50'

D-1

APPROVED FOR DRAINAGE WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION 00-00-00

DATE PLOTTED => 29-JAN-2014
TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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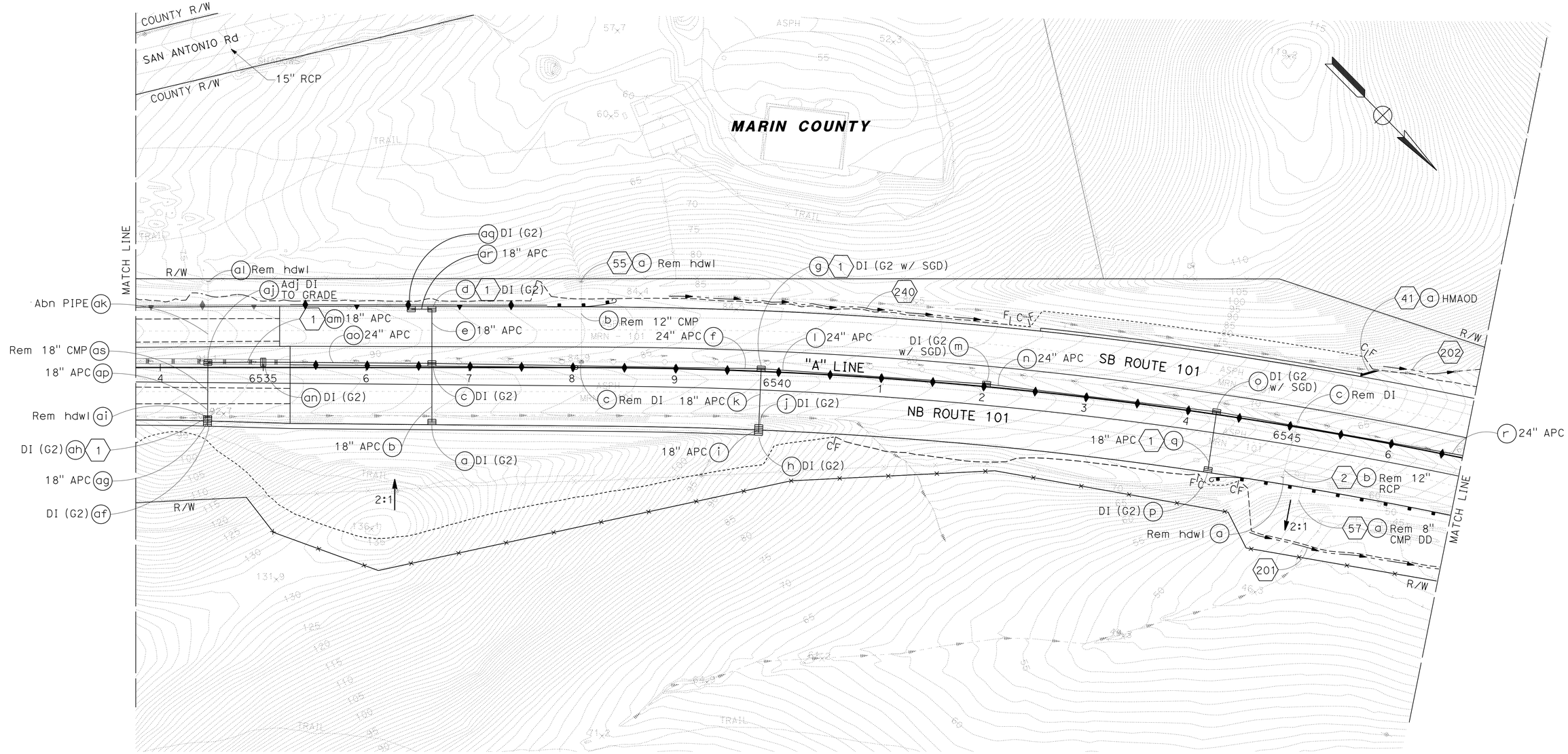
WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAINAGE PLAN

SCALE: 1" = 50'

D-2

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CALCULATED- DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION: 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTE:

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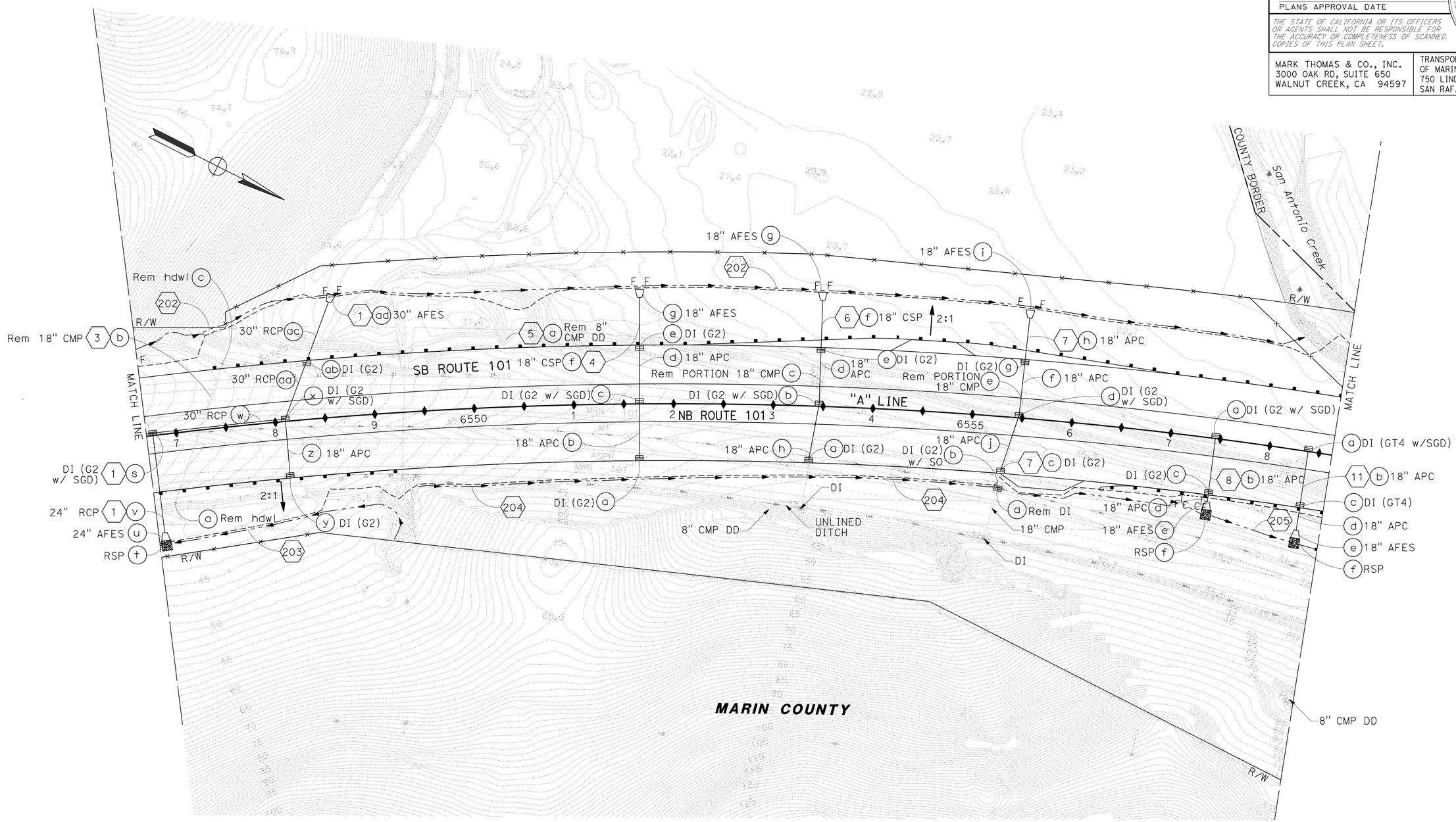

APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTE:

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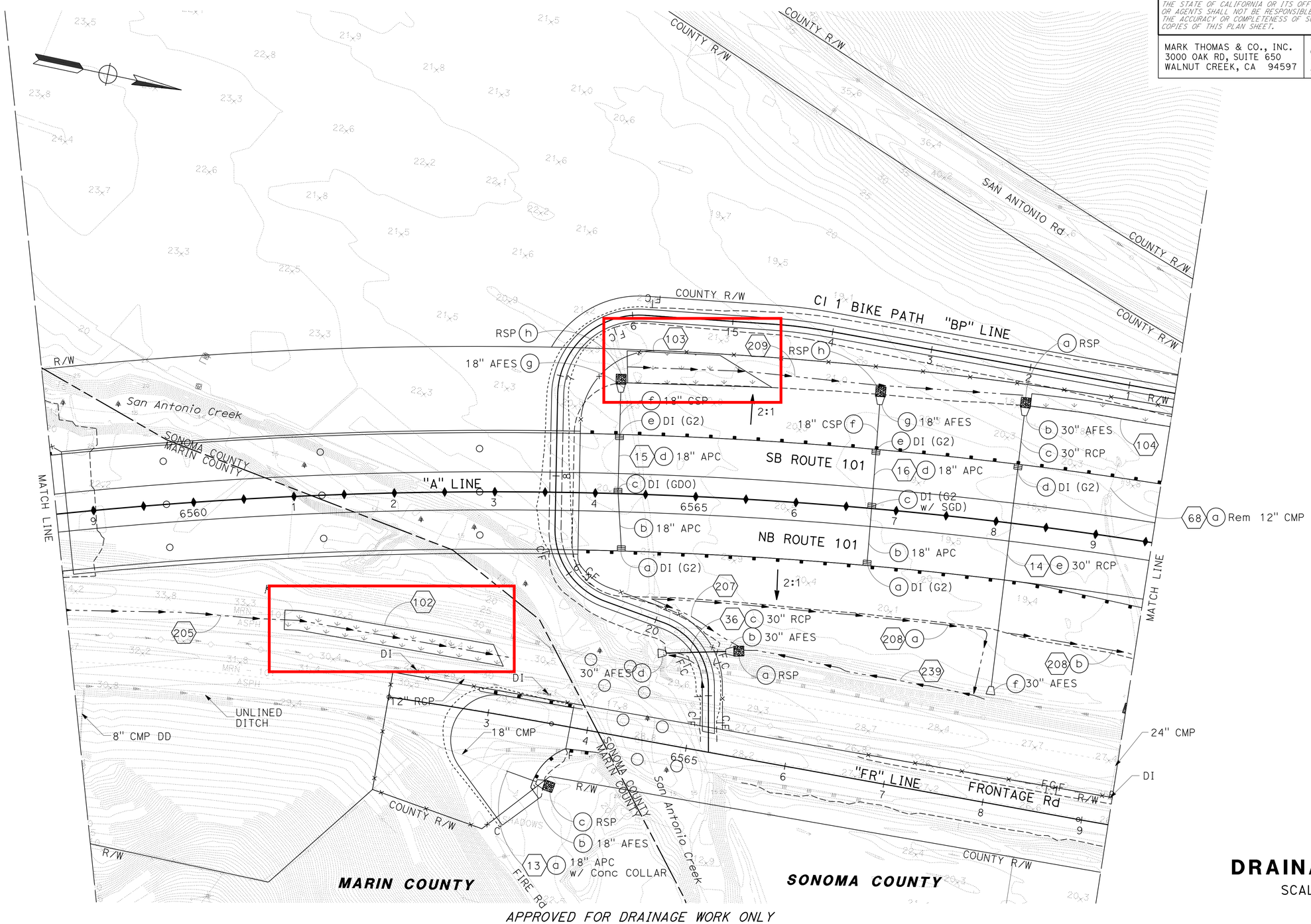

APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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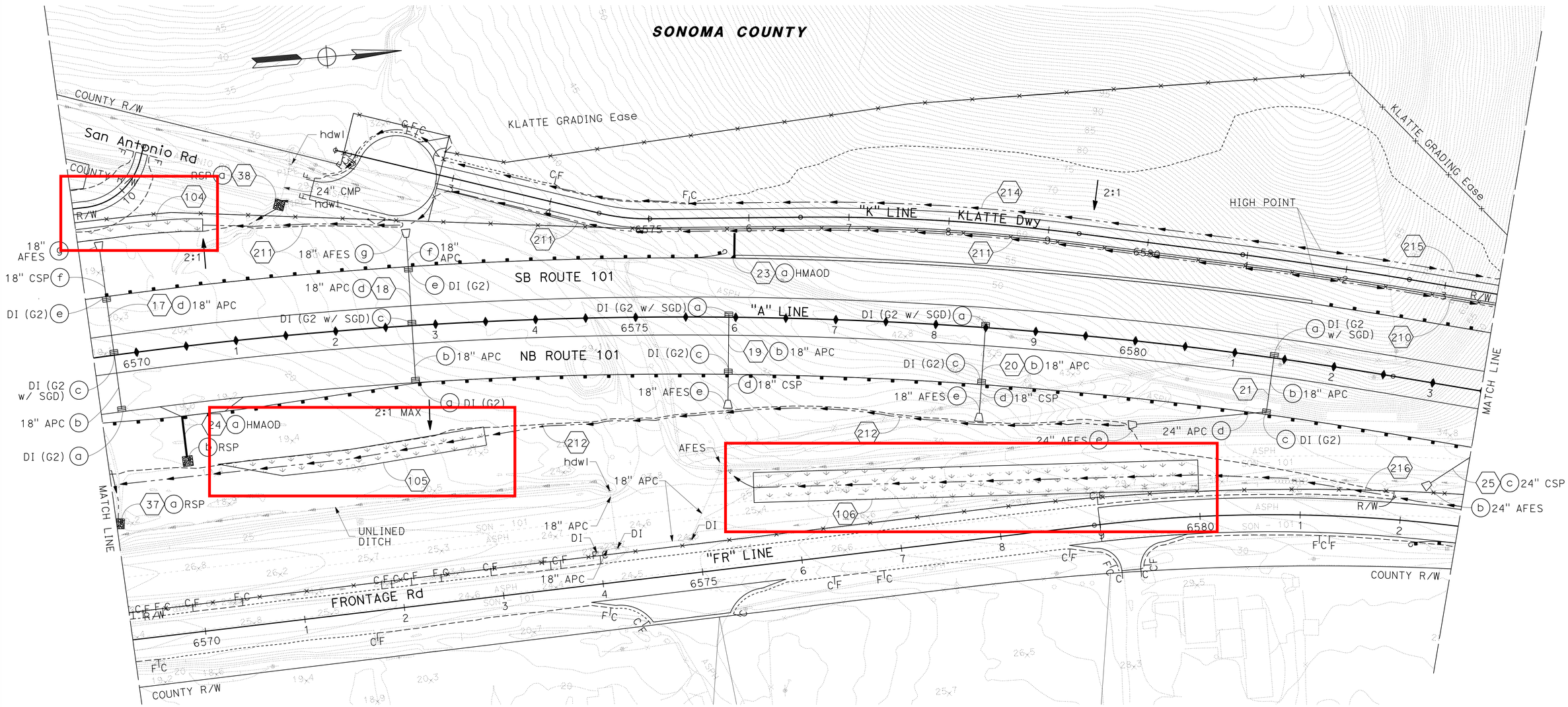
MARK THOMAS & CO., INC.
3000 OAK RD, SUITE 650
WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAINAGE PLAN

SCALE: 1" = 50'

D-5

APPROVED FOR DRAINAGE WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

BORDER LAST REVISED 7/2/2010

USERNAME => cbriana

DGN FILE => 04000007351a005.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0761

PROJECT NUMBER & PHASE 04000007351

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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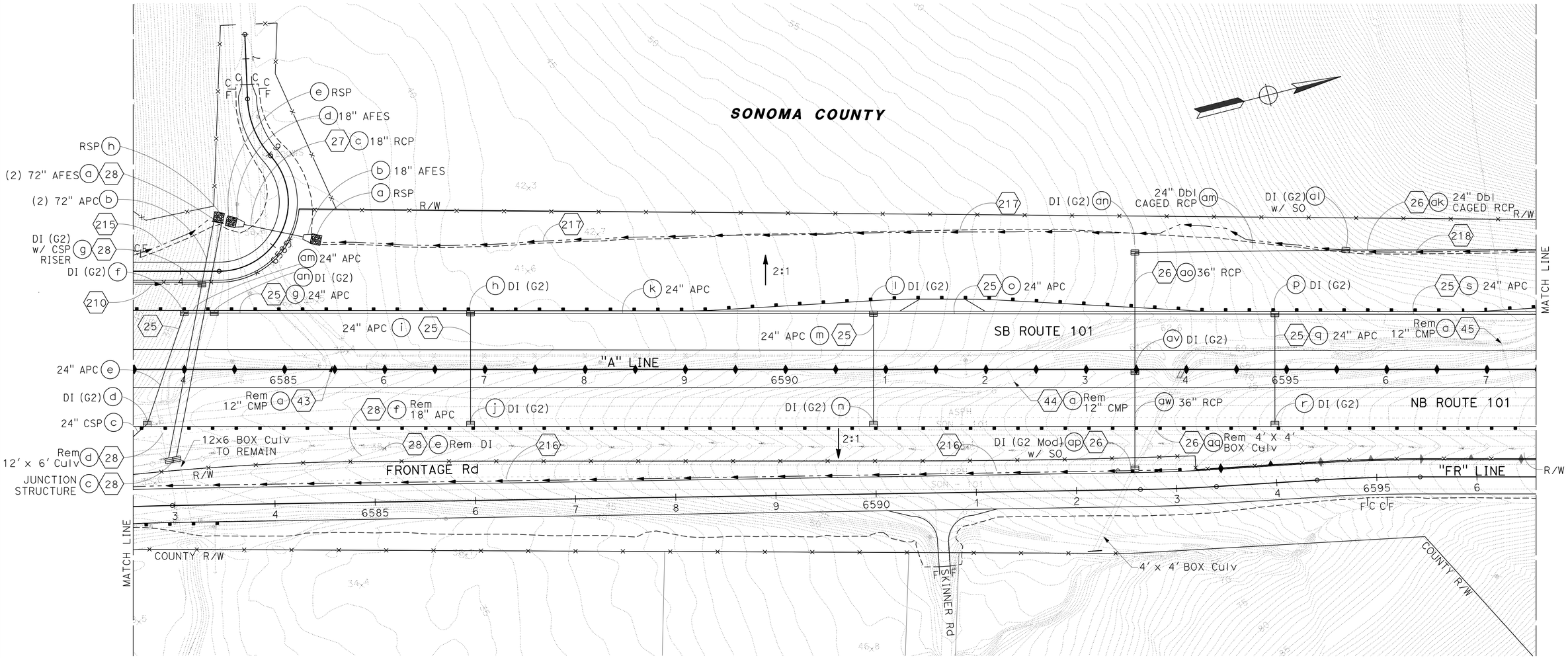
3000 OAK RD, SUITE 650
WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	CONSULTANT FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY
Caltrans	MICHAEL LOHMAN	CHECKED BY	DATE REVISED
		CHRIS BRIANA	CB
		TOM CONNELL	4/30/12

LAST REVISION 00-00-00 | DATE PLOTTED => 29-JAN-2014 | TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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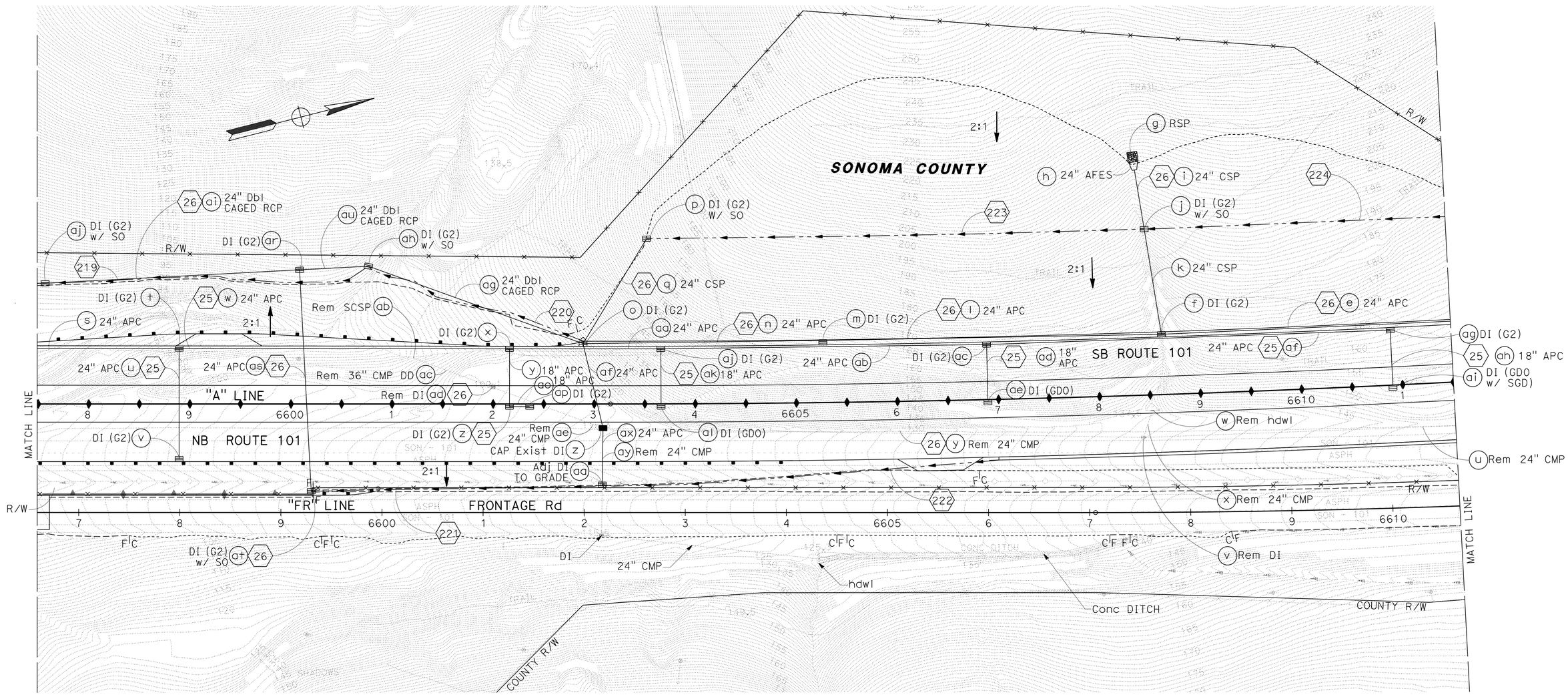
SAN RAFAEL, CA 94901

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAINAGE PLAN

SCALE: 1" = 50'

D-7

APPROVED FOR DRAINAGE WORK ONLY

REVISED BY	CB
DATE REVISED	4/30/12
CALCULATED-DESIGNED BY	CHRIS BRIANA
CHECKED BY	TOM CONNELL
CONSULTANT FUNCTIONAL SUPERVISOR	MICHAEL LOHMAN

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 29-JAN-2014 | TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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3000 OAK RD, SUITE 650
WALNUT CREEK, CA 94597

TRANSPORTATION AUTHORITY OF MARIN
750 LINDARO ST, SUITE 200
SAN RAFAEL, CA 94901

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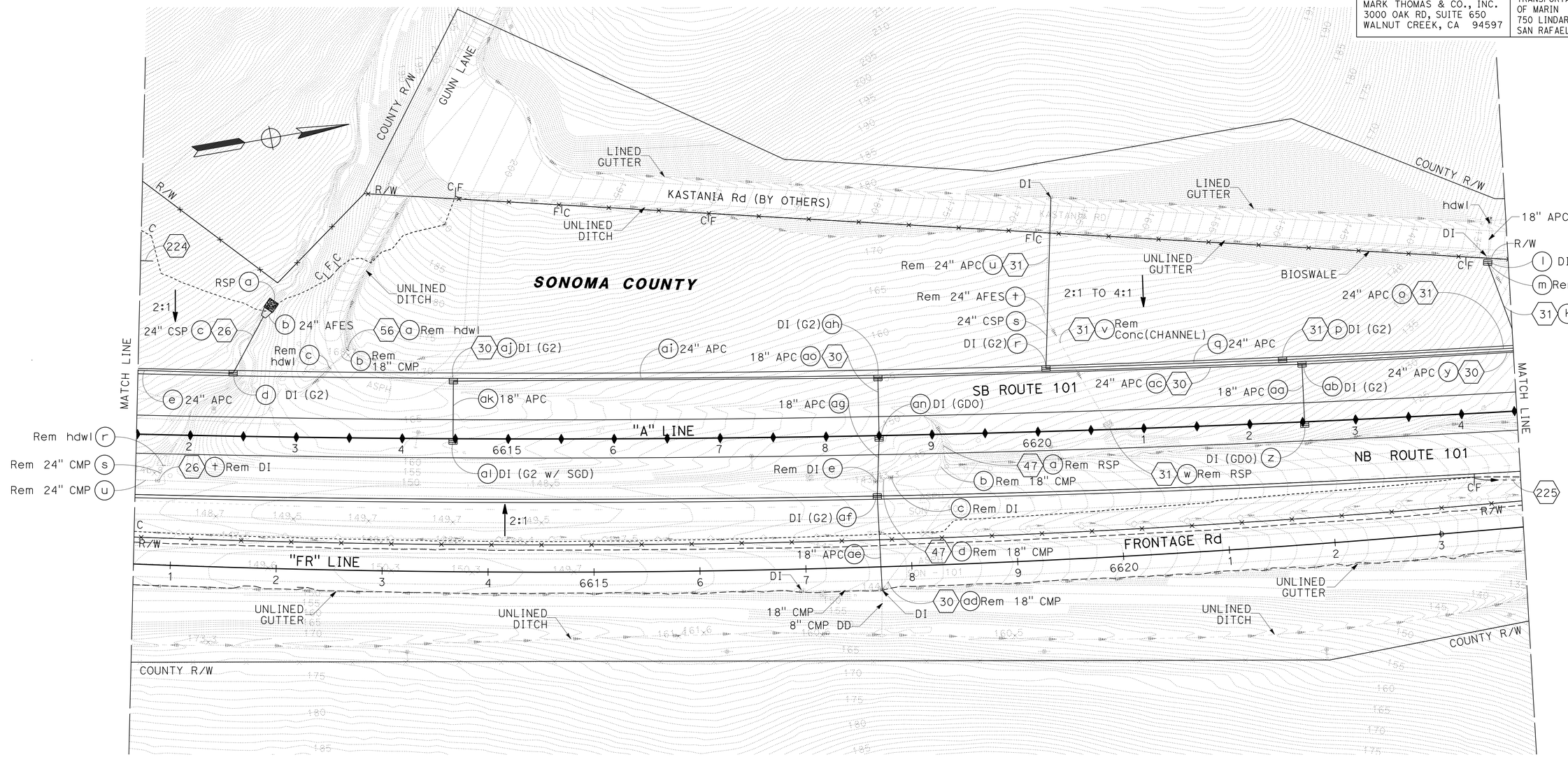

APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-8

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

BORDER LAST REVISED 7/2/2010

USERNAME => cbriana

DGN FILE => 04000007351a008.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0761

PROJECT NUMBER & PHASE 04000007351

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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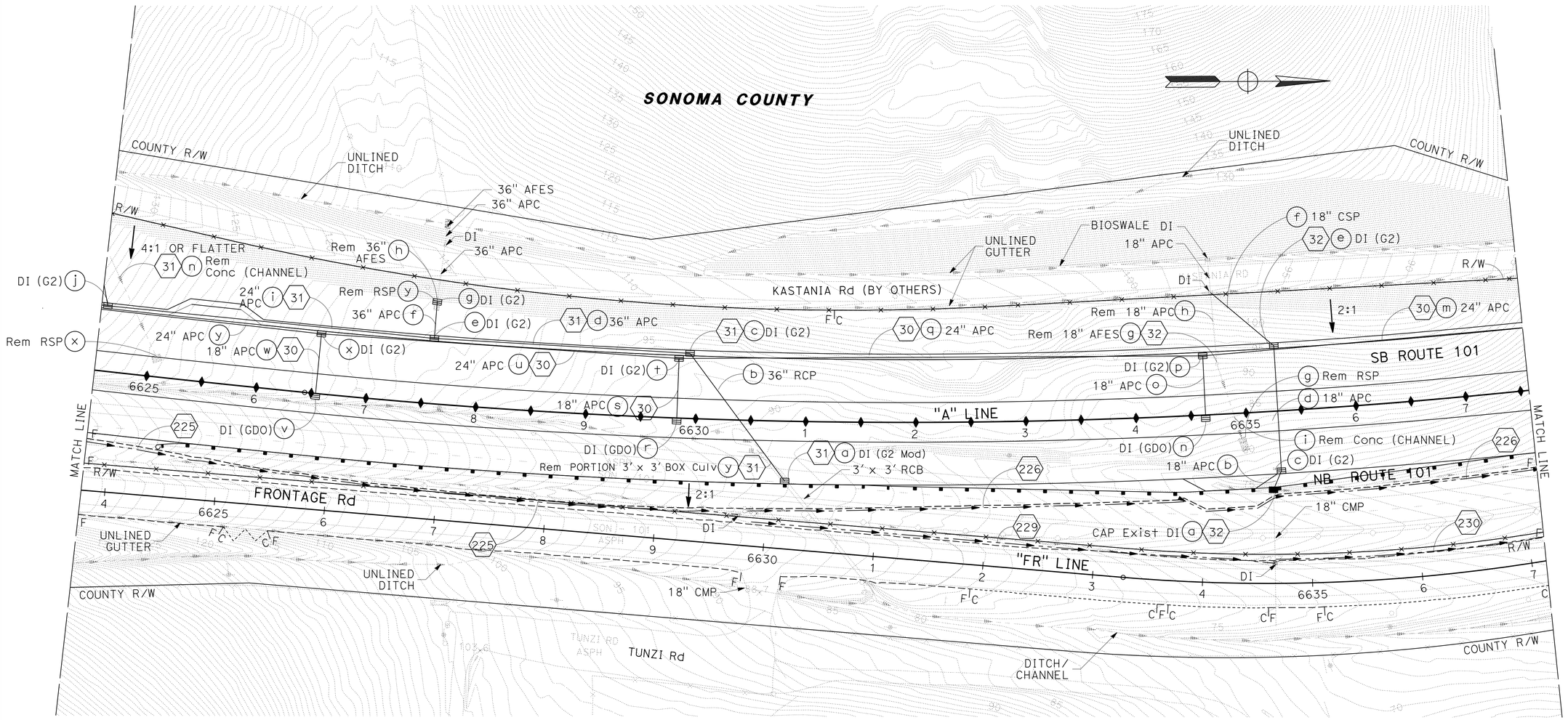

APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-9

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION: 00-00-00

DATE PLOTTED => 29-JAN-2014

TIME PLOTTED => 09:09

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

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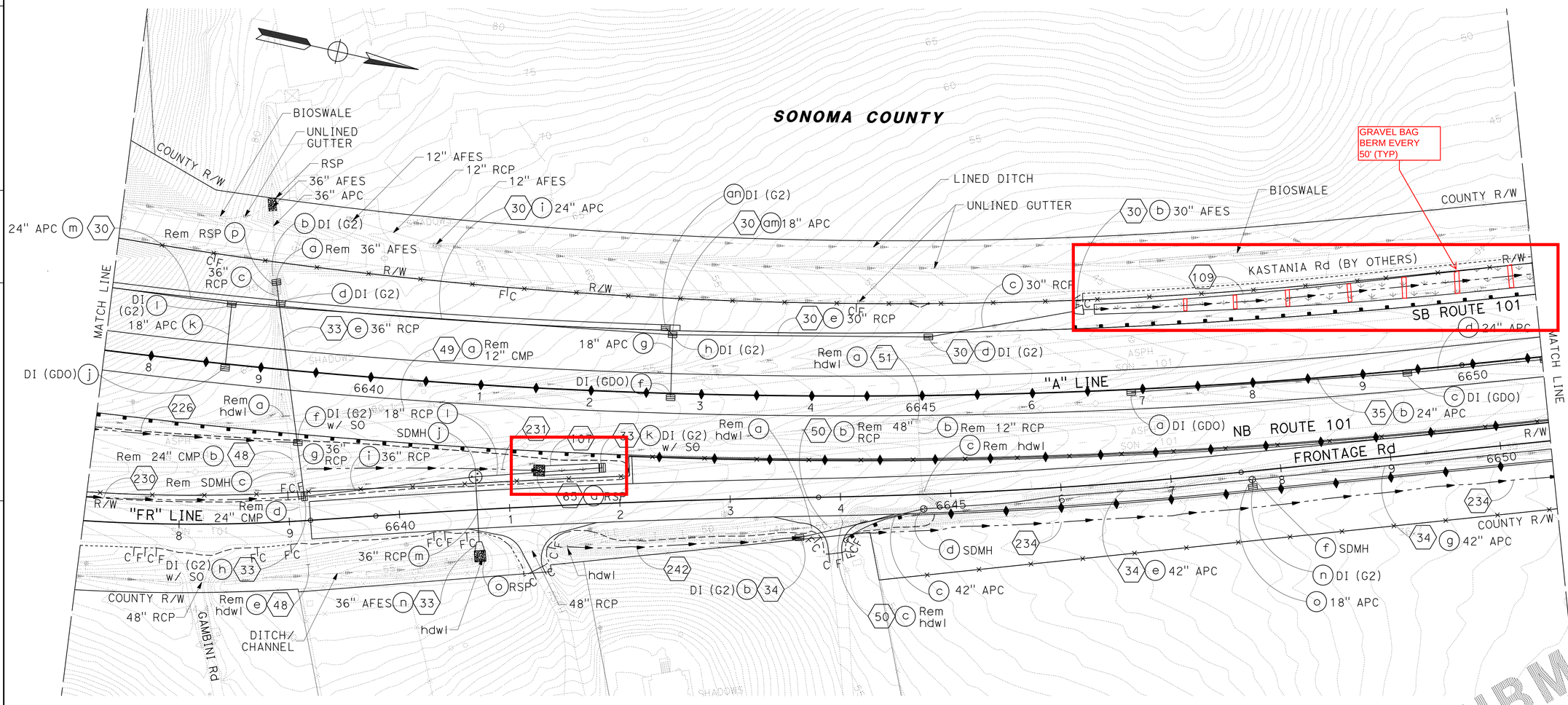

100% SUBMITTAL 08/05/13

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DRAINAGE PLAN

SCALE: 1" = 50'

D-10

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION: 00-00-00

DATE PLOTTED => 21-JAN-2014

TIME PLOTTED => 16:47

BORDER LAST REVISED 7/2/2010

USERNAME => acroskey

DGN FILE => 04000007351ia010.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0761

PROJECT NUMBER & PHASE 04000007351

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Son	101	27.0/27.6, 0.0/1.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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SAN RAFAEL, CA 94901

NOTE:

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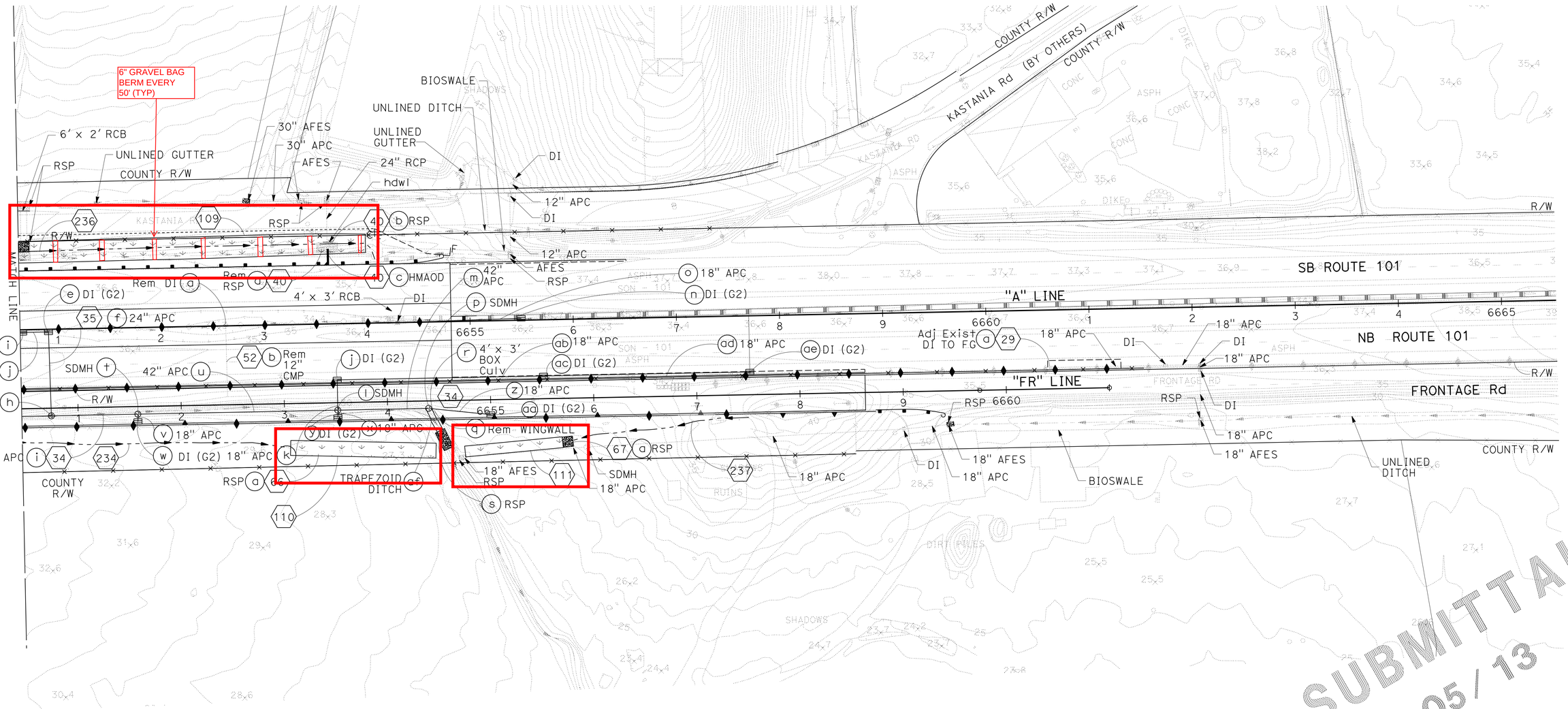
SONOMA COUNTY



APPROVED FOR DRAINAGE WORK ONLY

DRAINAGE PLAN

SCALE: 1" = 50'

D-11

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: MICHAEL LOHMAN

CALCULATED-DESIGNED BY: CHRIS BRIANA

CHECKED BY: TOM CONNELL

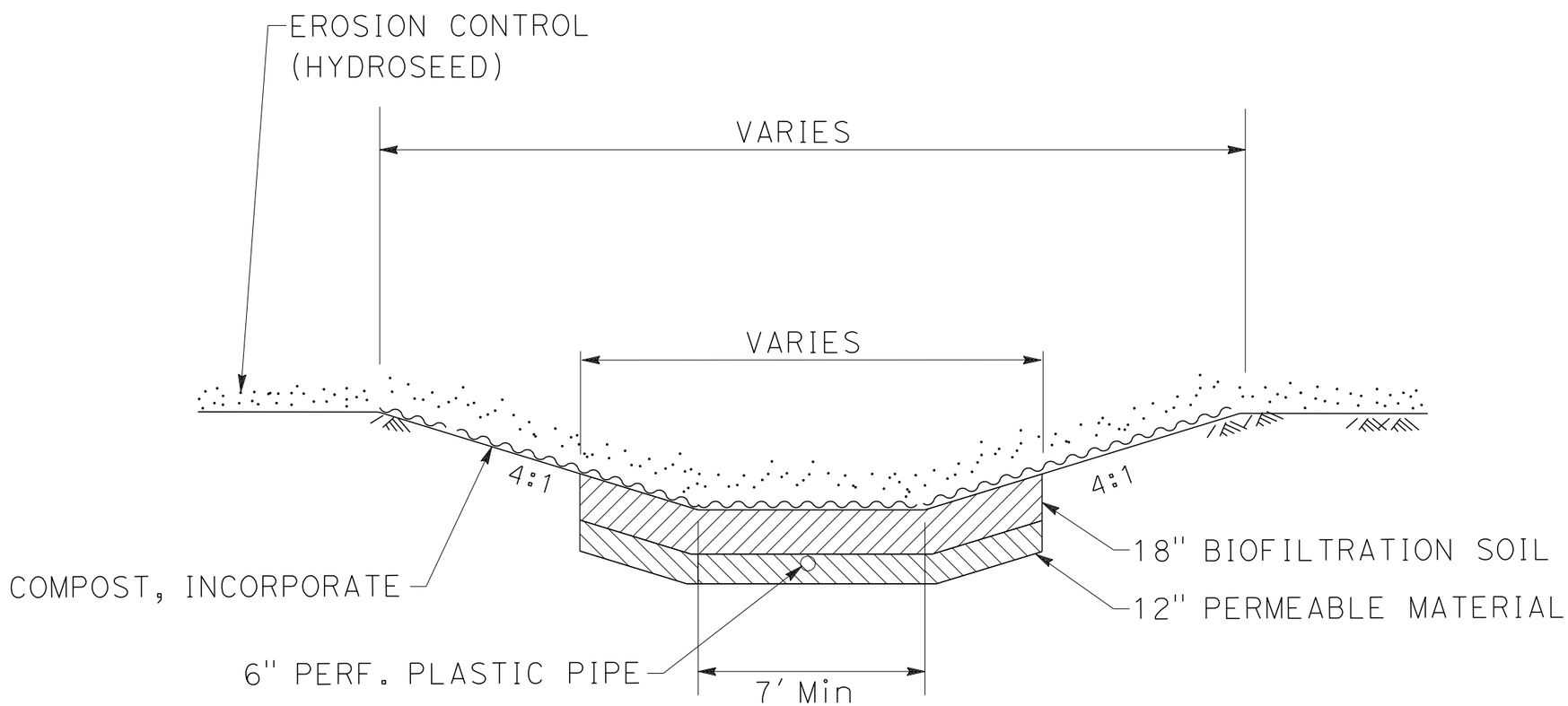
REVISED BY: CB

DATE REVISED: 4/30/12

LAST REVISION: 00-00-00

DATE PLOTTED => 21-JAN-2014

TIME PLOTTED => 16:47



TYPICAL BIOFILTRATION SWALE

BEES item 200105A: Format, style, and editorial changes.
Add BEES item to SSP 1-1.01

{ XE "21-2_N04-13-12" }

4/16/12 GCS**
New nSSP, based on (and as required) per standards for RWQCB bio soil. As recommended by Stormwater Coordination Branch (Norman Gonsalves/Brian Rowley).

Add section 21-2:

21-2 IMPORTED BIOFILTRATION SOIL

21-2.01 GENERAL

21-2.01A Summary

Section 21-2 includes specifications for furnishing and applying imported biofiltration soil mix.

21-2.01B Submittals

Submit a certificate of compliance from the soil supplier.

Submit the compost producer's *Compost Technical Data Sheet* including test results and *Seal of Testing Assurance* certificate before mixing compost with sand and soil.

21-2.01C Quality Control and Assurance

Saturated hydraulic conductivity for imported biofiltration soil must be at least 5 inches per hour.

21-2.02 MATERIALS

21-2.02A General

Imported biofiltration soil consists of a uniform mixture of sand, compost, and topsoil. The ratio of the components of imported biofiltration soil by volume must consist of two-parts sand; one-part compost; 0.5-part topsoil.

21-2.02B Sand

Sand must be free of wood, waste, coating such as clay, stone dust, carbonate, or any other deleterious material. All aggregate passing No. 200 sieve size must be non-plastic. Sand must be graded within the following limits:

Sieve Sizes	Percentage Passing
3/8"	100
No. 4	90 - 100
No. 8	70 - 100
No. 16	40 - 95
No. 30	15 - 70
No. 40	5-55
No. 100	0 - 15
No. 200	0 - 5

Grain size analysis results of the sand component must be performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.

21-2.02C Compost

Compost must comply with section 21-1.02M.

21-2.02D Topsoil

Soil must be free of wood, waste or other deleterious material. The soil texture must be loamy. Overall dry weight percentages must be 60 to 90 percent sand, with less than 20 percent passing the No.200 sieve, less than 5 percent clay, and no gravel.

21-2.03 CONSTRUCTION

Site preparation must comply with section 21-1.03B.

Place imported biofiltration soil after all other earthwork in an area is complete.

Place imported biofiltration soil in lifts of 8 to 12 inches and spread to a uniform thickness. Lifts are not to be compacted.

21-2.04 PAYMENT

Not Used

Missing cover memo (2 pages).

BIOLOGICAL OPINION

ACTION AGENCY: California Department of Transportation

ACTION: Marin Sonoma Narrows Highway 101 High Occupancy Vehicle Lane Widening Project: Novato to Petaluma

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

TRACKING NUMBER: 2007/08320

DATE ISSUED: January 26, 2009

I. CONSULTATION HISTORY

NOAA's National Marine Fisheries Service (NMFS) has been involved with the Marin Sonoma Narrows (MSN) Highway 101 Lane Widening Project since the 2002 preliminary planning stages. The pre-consultation and technical assistance began in May of 2002. During this time, affected habitat was discussed and salmonid presence was evaluated in the project areas.

In accordance with the National Environmental Policy Act/404 Memorandum of Understanding agreement (April 2006) between the Federal Highways Administration (FHWA) and California Department of Transportation (Caltrans), the MSN Project passed through a Checkpoint and Comment process during its planning inception which allowed other participating agencies to comment on some pivotal decisions regarding environmental and construction issues.

On November 1, 2007, NMFS responded to a Caltrans' request for agreement on the purpose and need and range of alternatives for the MSN Project pursuant to the NEPA/404 MOU with a letter stating that NMFS supported the decisions for project designs that would reduce impacts to aquatic resources; including bridge designs using the least amount of piles in watered channels and recommended free spanning bridges wherever feasible.

On May 7, 2008, NMFS participated in a Caltrans sponsored meeting in Oakland, California, to discuss the Least Environmentally Damaging Preferred Alternative (LEDPA) and conceptual mitigation under the NEPA/404 MOU. These discussions resulted in reducing impacts to wetlands and Highway 101 near the Redwood Landfill, and to incorporate 2:1 grading of slopes in order to further reduce project impacts. NMFS responded to these decisions with a letter that supported the LEDPA 12b, including the realignment and access point control in segment B, as the preferred alternative of reaching the goals set by Caltrans in easing traffic flow. In that letter, NMFS also offered a commitment to work alongside Caltrans staff in developing plans that will meet their construction goals while minimizing impacts to these protected resources.

On August 7, 2008, NMFS received a consultation request letter from Caltrans asking to initiate consultation under section 7 of the Endangered Species Act (ESA) and to concur with Caltran's determination of "May Effect, Not Likely to Adversely Affect" for the threatened Central California Coast (CCC) steelhead (*Onchorynchus Mykiss*) Distinct Population Segment (DPS), the Southern DPS of North American green sturgeon (*Asipenser medirostrius*), CCC steelhead critical habitat, and North American green sturgeon proposed critical habitat. The letter also requested Essential Fish Habitat (EFH) consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Under the MSA, Caltrans determined that there would be minimal adverse affect on fall-run Central Valley Chinook salmon (*O. tshawycha*) EFH in the Petaluma River within the action area, but did not mention the location in the project area where these affects would occur.

On August, 22, 2008, NMFS contacted Caltrans to update the progress made in the consultation process. NMFS reported that some of the project activities would likely involve the capture and relocation of CCC steelhead and that this action would trigger take of a listed species under the ESA, and, therefore, NMFS would not concur with the initial determination and that the determination would need to be changed to "May Affect, Likely to Adversely Affect".

On August 18, 2008, and September 24, 2008, NMFS received written consultation requests from the FHWA for the MSN Project. The August 18th letter stated that the FHWA also determined a "may effect, not likely to adversely affect" for project activity impacts to listed species, and that the project activities would not destroy or adversely modify steelhead critical habitat in the project area. The letter also stated the project would have minimal adverse affect on fall-run Central Valley Chinook salmon EFH and that the informal consultation responsibilities had been previously delegated to Caltrans who would be consulting with NMFS for EFH. In the September 24th letter, the FHWA changed their determination from a "not likely to adversely affect" to a "likely to adversely affect" for section 7 of the ESA. The FHWA did not change the EFH determination for fall-run Chinook in this letter. In an email dated October 28, NMFS confirmed with Caltrans that the FHWA was the lead agency for the MSN Project.

II. DESCRIPTION OF THE PROPOSED ACTION

Under agreement with and funding from the FHWA, Caltrans proposes to fund the building of the MSN Project, which will widen 17.2 miles of Highway 101 in both the southern and northern directions to alleviate severe traffic increase in Marin and Sonoma counties. High Occupancy Vehicle (HOV) lanes and associated structures will be built starting south of State Route 37 in the City of Novato and ending north at the Corona Road overcrossing in the City of Petaluma. The MSN Project will be constructed in multiple phases over consecutive construction seasons with all work below Ordinary High Water (OHW) to occur between the dates of June 15 to October 31 at the creek crossings, with the exception of the proposed year-round pile driving activities in the Petaluma River. Bridge crossings other than the Petaluma River Bridge will likely be completed within one-to-two construction seasons, while the Petaluma River Bridge may take as many as four construction seasons. Construction will occur within the next five years from issuance of this biological opinion.

The MSN Project was initially planned as three separate projects, denoted as segments A, B, and C, with independent utility and logical termini.[1] These segments were combined into a single project area to address cumulative effects in the preliminary Environmental Impact Statement/ Environmental Impact Report. In this biological opinion, NMFS periodically refers to the A, B, and C format to relate the location of project activities within the action area.

In addition to the HOV lane widening, Caltrans has also proposed road improvement activities that include modifying and constructing Highway 101 bridge crossings, constructing new interchanges, upgrading drainage systems, constructing new frontage roads and bikeways, and relocating the flood prone "Segment B" of Highway 101 to the west.

Over the last 15 years, significant commercial and residential growth has led to severe traffic increases through this corridor of Highway 101. The project's intention is to convert Highway 101 from a freeway and partial expressway to a complete freeway in order to alleviate the traffic congestion by improving mobility through this corridor between Marin and Sonoma counties. The conversion will be accomplished by providing additional traffic lanes and interchange ramps.

A. Description of the Proposed Work

The new HOV lanes will be the standard 12 feet in width with 10-foot inside shoulders and a concrete median barrier. Road widening will occur at six bridge crossings over five creeks and one river. Caltrans has determined that the road widening at these six crossings may adversely affect steelhead and green sturgeon, and all other project activities for this project will have no effect to listed species and critical habitat. There are additional project activities in the MSN Project that are not directly over or around waterways, having varying distances between one to four miles from the creeks and river discussed in this biological opinion. Based on NMFS' familiarity with road and bridge projects, all other project activities involve upland road work that are far enough away from the waterways in NMFS' judgment to avoid effects to listed salmonids, green sturgeon, and their habitats. NMFS is concerned with the project activities at the bridge sites that will impact listed species and designated critical habitat and, therefore, will analyze the potential impacts at these six crossings. Widening over these crossings will either be accomplished by creating a center bridge that will effectively "fill in the gap" between north and southbound lanes and extend the outside shoulders, or with the construction of new bridges. As part of the construction in Segment B, two additional bridges will be constructed on San Antonio Road, located to the west of Highway 101.

Modifications to, or construction of, these crossings are to occur at the following five creeks and one river: Novato Creek, Rush Creek, San Antonio Creek, Washington Creek, Lynch Creek, and the Petaluma River. There are also two blind end tide channels off of the Petaluma River that are

[1] Segment A is the southern segment that extends 4.3 miles - from just south of State Route 37 to north to the Atherton Avenue Interchange in the City of Novato in Marin County; Segment B is the central segment, called the "narrows", that extends 8.2 miles between Atherton Avenue Interchange to the south and crossing over the Marin-Sonoma County line and ending at State Route 116 (East) to the north; and Segment C is the northern Segment, extending 4.7 miles from State Route 116 (East) to north of the Corona Overcrossing in the City of Petaluma (Sonoma County).

near construction activities. The two blind end tide channels are connected to the Petaluma River and could potentially provide seasonal rearing habitat for steelhead and green sturgeon; however, the extent of the project activities near the terminus of these channels is limited to equipment staging that, in NMFS' judgment, would not impact steelhead and green sturgeon.

If water is present at creek crossings, construction sites will be isolated from surface flow using temporary cofferdams for constructing bridge supports. The cofferdams will be constructed of interlocking sheet pilings, using a vibratory hammer and an impact hammer if difficult driving is encountered. Cofferdams will only be installed or removed between June 15 to October 31. Any water present in the creeks will be pumped or bypassed through pipes, using fish screens at both pipe ends. Flows in the Petaluma River will remain continuous through the project area via a minimum 60-foot navigable passage and will be maintained at all times under the bridge regardless of project activities. Where water diversion is necessary, the contractor will comply with Caltrans' Storm Water Pollution Prevention Plan (SWPPP), Best Management Plans (BMPs) NS-5, Clear Water Diversion.

Fish relocation activities will be conducted at the Petaluma River, Lynch, and Novato Creek locations.[2] Prior to the dewatering, a biologist will survey the area and seine and dip net for fish, prior to pumping. There are no set number of passes with the seines and dip nets, and the biologist will keep seining until no more fish are captured in several passes. Salmonids are expected to be captured first, with the rest of the time spent catching other fish species (Michael Fawcett, personal communication, October 15, 2007). Water will be drawn down to a level where fish are accessible and can be removed. Multiple draw downs of water and collections may be necessary to effectively remove fish from some of the dewatered areas. Dip nets will be used in the remaining small pools of water. All pumps will be monitored by a biologist to ensure that no fish are impinged on the intake end during the dewatering process. Fish will be located to similar or better suited habitat, either upstream or downstream and away from the construction area.

Temporary falsework will be used to provide structural support during the bridge building process, and will either be hung from the pier walls via metal hook systems or built up from timber pads. Wherever feasible, timber pads will be placed out of the wetted channel, along the banks with the use of construction machinery for setting up and/or dismantling the falsework. If the temporary falsework will require piles for proper support, then all pile driving activities will be conducted out of the channel and completely removed after construction is complete.

The other construction activities in the MSN Project will include the following: replacement of and improvements to the Highway 101 culvert drainage configuration[3]; shifting and straightening the 8.2 miles of Segment B and converting it from an expressway[4] to a freeway; and the construction of and modifications to interchanges, frontage roads, overcrossings (state

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[2] Listed salmonids or green sturgeon are not anticipated to be present at the other bridge locations during in-water construction work as described below in the *Environmental Baseline*.

[3] Stormwater will be directed to existing highway drainage systems and use existing outfalls with updated storm water quality control systems.

[4] The stretch of Segment B is currently an expressway which includes four traffic lanes and narrow shoulders of varying widths, seven locations with limited sight distance, two locations with recurring flooding, and at-grade intersections and driveway access that adversely impact mainline operations.

roads) and undercrossings (county roads) along the entire MSN corridor. These MSN construction activities are in upland areas that are not near any waterways and, therefore, are not expected to affect listed species and critical habitat and therefore will not be analyzed in this biological opinion. For further detailed information on these activities please refer to Caltrans' biological assessment – *Marin Sonoma Narrows Widening Project: Biological Assessment for Central California Coast Steelhead, Southern Distinct Population Segment North American Green Sturgeon and Essential Fish Habitat for Chinook Salmon.*

Following is a discussion of site specific details:

1. Novato Creek Bridge Crossing in Segment A

The existing parallel bridges crossing Novato Creek are two independent five-span continuous reinforced concrete decks that measure 58.5 meters (m) (192 feet) each. The decks are supported by 44 octagonal piles in the center that measure 18 inches in diameter and two diaphragm type abutments at the ends on reinforced concrete piles. The Novato Creek Bridges accommodate six 3.6 m (12 foot) lanes, with 3.6 m (12 foot) inside shoulders and 2.4 m to 3.0 m (8 feet to 10 feet) outside shoulders.

The project would widen the bridge by constructing a center deck in the gap between the Novato Creek bridges - creating an additional 3.6 m (12 foot) lane with 3.0 m (10 foot) shoulders. Lane barriers would also be upgraded to the current standards. Modification of the supporting substructure will require Class 625 driven precast concrete piles at the abutments (end supports) and use Cast in Steel Shell (CISS) piles to construct the columns for the piers (middle supports). The new abutments and piers will match the alignment of the existing abutments and piles.

Four 600 millimeters (mm) (2 foot) diameter CISS piles will be used at each of the four piers; resulting in a total of 16 CISS piles. CISS piles will be driven into the ground, cleared of dirt, reinforced with steel bar, and filled with concrete. All concrete pouring will occur from a concrete pump truck staged on the creek bank. Existing piles in the area will either be removed with vibratory hammers or left in place and cut off below the ground. Cofferdams will be installed and made watertight at the pier locations to dewater the area of surface and subsurface flow.

Two additional platforms will be built within the gap areas on each bank to provide a work surface for the pile rig equipment to drive piles at the Pier 3 and 4 locations. The platforms will employ a closed-fill system to protect it from tidal influences in the creek, and will be constructed from interlocking sheet piles to form an enclosed area that will be back filled with gravel. Sheet piles will be placed with either a vibratory or impact hammer and gravel fill will be washed prior to use.

Both platforms will extend 39 feet at each end of the bridge to the creek banks. The platform on the south bank will use 11,360 cubic feet of backfill to create 1,698 square feet of work surface, and the platform on the north bank will use 12, 285 cubic feet of backfill to create 1,800 square feet of work surface. In the event that the platform does extend into the creek channel then fish

relocation and dewatering plans have been proposed prior to the back filling process and construction of the platforms will be performed no earlier than June 15.

Following construction the closed-fill system and the falsework will be removed. A 20-foot wide road along one side of the bridge at each abutment will be constructed to move materials into and out of the work area. After the construction materials are retrieved, the creek banks will be stabilized and erosion control methods will be employed.

2. San Antonio Creek Bridges (frontage and mainline) in Segment B

Currently there are two bridges crossing San Antonio Creek: a crossing at Highway 101 (or mainline) consisting of two independent parallel bridge crossings; and a crossing at San Antonio Road (or frontage) to the west of Highway 101 consisting of a single bridge with two lanes. As part of the transition from an expressway to a freeway in Segment B, these two bridges will be modified and reassigned to traffic crossings at new frontage roads that will run parallel and flank the east and west sides of Highway 101. The 8.1 miles of Highway 101 will then be moved west, away from its existing configuration which is a flood prone area. Two new bridges will be constructed at the new Highway 101 and San Antonio Road crossing locations – resulting in a total of four bridge crossings over San Antonio Creek. Riparian and non-riparian tree loss will occur at the San Antonio Creek and Highway 101 locations as a result of the two new bridges and access roads.

If subsurface flow is present in the creek then cofferdams will be placed around the footing locations to dewater the area. Steelhead presence is not expected at these locations (as described below in the *Environmental Baseline*), and, therefore, fish relocation activities will not be conducted. Water will be pumped from the cofferdams to a truck or sediment basin and sealed from the inside to make watertight. The precast concrete piles will then be driven inside the cofferdams using an impact hammer, followed by the pouring of concrete over the piles to form the footings.

a. The Current Mainline Crossing (San Antonio Creek)

The southbound Highway 101 crossing will be removed, and the northbound crossing will be reconnected to a new frontage road that will run on the east side parallel to Highway 101. The southbound bridge on Highway 101 will be removed following the construction of the new Highway 101 Bridge to the west, and will involve the breaking and removing of the existing concrete. The bridge section will be dropped over land onto filter fabric or similar materials and removed. BMPs will be employed to prevent falling debris from entering the creek.

b. The New Mainline Crossing (San Antonio Creek)

The new mainline crossing will be built on the raised and realigned portion of Highway 101 that will run west of the existing highway. The bridge will be a cast in place concrete pre-stressed box girder with reinforced pier caps and abutments. The bridge will either be a five span structure at 192.5 m (635 feet) long by 35.11 m (116 feet) wide, or a three span structure at 130.5

m (431 feet) long by 35.11 m (116 feet) wide. The three span bridges would include a Mechanically Stabilized Earth wall at abutment 1 which will result in the shorter bridge.

The five span bridges would use four columns per pier for a total of 16 columns for the four piers, and the three span bridge alternatives would also use four columns per pier for a total of eight columns for the two piers. Each concrete column will measure 1.68 m (5.5 feet) in diameter and placed on a concrete footing measuring 6.7 m by 6.7 m by 1.8 m deep (22 feet by 22 feet by 6 feet). For the five span bridge option, twenty-five precast concrete piles will driven, using vibratory and impact hammers, into the creek bed and banks for each of the four footings - totaling 100 piles. If the three span bridge option is used then 50 concrete piles will be driven for the two footings using the same methods. The precast concrete piles will measure 380 mm by 380 mm (15 inches by 15 inches).

c. The Current Frontage Crossing (San Antonio Creek)

The existing historic San Antonio Creek Bridge is approximately 30.8 m (101 feet) long and 7.0 m (23 feet) wide. The existing structure is not wide enough to provide adequately sized lanes and shoulders, and the historic nature of the bridge does not allow for it to be modified. Therefore, a new bridge crossing will be constructed to service traffic on San Antonio Road, and the current bridge will be reconnected to a frontage road running north from San Antonio Road where it will terminate at a cul-de-sac. There will be no alterations made to this bridge for connecting it to the frontage road.

d. The New Frontage Crossing (San Antonio Road) Creek

The new frontage crossing will be constructed for two-way vehicular and bicycle/pedestrian traffic, and will accommodate traveling to and from destinations to the west of Highway 101. There are two bridge alternatives for the new frontage bridge crossing San Antonio Creek; the first alternative is proposed as a cast-in-place concrete slab with reinforced concrete pier caps and abutments. This bridge will consist of seven spans at approximately 69.3 m (227.5 feet) long and 12.90 m (42 feet) wide. The substructure will use Class 625 driven precast concrete piles at the abutments and driven CISS piles at the piers. Five CISS piles, measuring 600 mm (24 inches) in diameter, will be required per pier for a total of 30 CISS piles for the six piers.

A second alternative proposed is a two span cast-in-place concrete pre-stressed box girder bridge with reinforced concrete pier caps and abutments that would measure 71.5 m (235 feet) long and 12.90 m (42 feet) wide and use two reinforced concrete columns at 1.22 m (4 feet) in diameter and abutments both supported on a concrete pile cap with driven precast concrete piles. The column footings will measure 8.5 by 8.5 by 1.8 m deep (28 feet by 28 feet by 6 feet) with each column footing requiring 25 driven CISS piles to construct – for a total of 50 piles. The pile size required for the footings is 380 mm by 380 mm (15 inches by 15 inches).

For the first alternative, grading of the banks around the abutments will be required to raise the abutment profile followed by pile driving the concrete piles for the abutments and construction of the concrete abutments. CISS piles will be driven into the ground, cleared of dirt, reinforced

with steel bar, and filled with concrete. These foundation piles will extend as columns into the deck slab.

3. Petaluma River Bridge in Segment C

The existing Petaluma River Bridge consists of two separate structures, each measuring 270 m (885 feet) long and 9.6 m (31 feet) wide. The original bridges were built in 1955 and have had been modified over the years to accommodate future traffic conditions, including additional 3.6 m (12 feet) lane and 3.0 m (10 feet) inside and outside shoulders.

The project is scheduled for three to four construction seasons, starting with construction of a new center bridge between the existing bridges in the first season. The following seasons will consist of demolition and removal of the southbound bridge followed by the removal of the northbound bridge, including bridge pilings, followed then by construction of the new bridges within the old bridge footprints. Pile driving for the column footings will occur year-round. Other construction activities that will occur year-round on land include: bridge demolition, vegetation clearing and planting, and road construction for site access, removal of existing piles, falsework removal and cleanup, and concrete pouring (which may involve some work over water using appropriately sealed forms). Access to the work areas will occur from the north using an existing secondary road and from the south using Petaluma Boulevard South.

Two structure alternatives are currently proposed for the new 260.5 m (855 feet) long and 35.110 m (115 feet) wide, five-span bridge: Alternative 1 would consist of a reinforced concrete box girder superstructure; and Alternative 2 would consist of a Precast/Prestressed Concrete Bulb "T" girder superstructure.

The new bridge will be supported on four piers along the spans and two abutments at either bank. The Piers (2, 3, 4, and 5) will be comprised of three-to-five columns seated on a column footing. Each footing will measure 10.67 m (35 feet) by 8.5 m (28 feet) by 2.0 m (7 feet) deep. Either 762 mm (30-inch) diameter Cast In Drilled Hole (CIDH) or CISS piles will be used to construct the footings. The amount of footings and piles required at the center, southbound and northbound decks was determined and summarized below by Caltrans engineers:

1. Center deck - Number of permanent piles will range from 100 piles (1 footing/bent x 4 bents x 25 piles/footing) to 160 piles (1 footing/bent x 4 bents x 40 piles/footing).

2. Southbound deck - Number of permanent piles will range from 160 piles (1 footing/bent x 4 bents x 40 piles/footing) to 200 piles (2 footings/bent x 4 bents x 25 piles/footing).

3. Northbound deck - Number of permanent piles will range from 160 piles (1 footing/bent x 4 bents x 40 piles/footing) to 200 piles (2 footings/bent x 4 bents x 25 piles/footing).

In summary, a final 3-column bent structure will require approximately 480 permanent piles at the bents. A final 5-column bent structure will require approximately 500 permanent piles at the bents.

Piers 3 and 4 are located within the wetted channel below OHW and will require cofferdams for footing construction, while Piers 2 and 5 are located on either bank above OHW, but will use cofferdams if subsurface flows are present during the footing construction.

Two to 20 of the CISS piles can be installed per day, with vibratory and impact hammers, and are estimated to receive from 200 to 600 strikes, with the impact hammer, until they extend into bedrock. Pile driving will be within the confines of the cofferdams and will occur for a minimum of 60 days over an 18-month timeframe.

A 300 m (1000-foot) by 11 m (36 foot) trestle bridge will be built in the river to provide a platform for working on the new piers, removing the old piers, and constructing temporary falsework, temporary erection towers, and fender piles. An 18 m (60-foot) wide channel will be maintained for navigation past the Petaluma River Bridge throughout the entire construction seasons. The trestle and fenders will use either H-piles or steel pipe piles. These piles will be approximately 510 mm (20 inches) to 610 mm (24 inches) in diameter. Piles will initially be driven with a vibratory hammer, followed with between five to 20 strikes with an impact hammer to confirm bearing. Three hundred piles are anticipated for building the trestle and the fenders and will take between 20 and 75 days, at two to ten piles per day, over a three year period, and stay within the June 15 to October 31 timeframe. A barge may be used in lieu of the trestle and consequently reduce some need to pile drive.

Cofferdams will be placed at the old and new locations for Piers 3 and 4. The configuration of the cofferdams will be determined by the contractor and depend on the current conditions in the river and construction season, but it will either be anticipated to be one cofferdam for each pier location that would encompass the old piers and new pier locations, for a total of two cofferdams, or up to one cofferdam per pier for a total of six cofferdams.

Additional cofferdams could also be used at Piers 2 and 5 if ground water is present. The locations for Piers 2 and 5 are out of the flood prone zone and will not require dewatering. Four additional 39-foot long by 22-foot wide cofferdams will be required for the demolition and removal of the existing columns and footings at Piers 5 and 6, resulting in a net dewatered area of 3,432 feet^2 of additional dewatered area.

The total dewatered area including all cofferdams at Piers 3, 4, 2, and 5, regardless of configuration, will result in 26,232 feet^2; however, the 60-foot wide channel requirement will likely determine the number of cofferdams that can be installed at a given time, hence all areas are not likely to be dewatered at once.

Some cofferdams will use intermediate walls that will aid in dewatering particular sections within the cofferdam and mitigate in fish escapement and dewatering activities. All cofferdams that are required for pile driving will be installed from June 15 to October 31, regardless of pile driving schedules, over any of the three to four construction seasons. Once cofferdams are installed, pile driving activities are proposed to occur year-round within the cofferdams. When pile driving is completed, cofferdams will be removed between June 15 and October 31.

4. Lynch Creek Crossing in Segment C

The existing Lynch Creek Bridge is comprised of two independent bridges with four lanes for north and southbound traffic measuring 3.6 m (12 feet) with 0.6 m (2 feet) inside shoulders and a 1.2 m (4 feet) outside shoulders. Both of the existing three spans decks were built in 1955 and are constructed of reinforced concrete slabs measuring 24.1 m (79 feet) in length with reinforced concrete pile piers and reinforced concrete "U" open abutments.

The Lynch Creek Bridge will be widened to accommodate an additional 3.6 m (12 feet) lane, 3.0 m (10 feet) shoulders and ramp taper. Widening will consist of connecting the two existing bridges in the center median and widening both outside shoulders. Caltrans also proposes to replace the existing bridge barriers with current standard barriers.

The location and bearing for the new abutments and piers will match with the alignments of the existing abutments and piers. A sound wall will be constructed on the southbound side of the structure and supported on a bridge barrier. Access to the existing Lynch Creek channel will be required for pile driving and falsework construction. The piles will extend into the superstructure.

The widening of the existing bridge requires the construction of a new cast-in-place reinforced concrete slab superstructure including new concrete pier caps and abutments. The substructure consists of class 625, 305 mm by 305 mm (12 inch by 12 inch) diameter driven precast concrete piles. It is anticipated that there will be 10 new driven precast concrete piles per pier for a total of 20 for the two piers.

Access to the existing channel will be required for construction. It is anticipated that the contractor will primarily access the site from the center median and along the shoulders of the existing highway. A crane will be positioned at the abutment locations and reach out to drive pilings.

Falsework will be used at this location to support construction loads, including falsework bents using braced timber posts supported on timber pads placed on top of existing ground or braced steel piles driven into the ground.

A cofferdam and dewatering system may be constructed for the pier construction using a vibratory hammer if water is present in the area. Following construction the temporary falsework material will be removed.

5. Road Drainage Improvements

Currently, in all three segments of the 17.2 mile project area, water drains to the depressed median between the north and south bound lanes where it enters drainage inlets at low points and is transferred via cross culverts to swales along the outside of Highway 101 and then drains into adjacent water courses. There are currently 35 cross culverts in segment A, and 15 in segment C of Highway 101; all of which will either be reconditioned, decommissioned, or replaced. The

median between the north and southbound lanes will be raised and filled to construct the two HOV lanes and modifications will be made to the current drainage inlets and cross culverts.

Improvements to the current road drainage system will incorporate bio-filtration strips and swales to receive storm water discharges from the highway or other impervious surfaces. The project will also likely include offsite storm water treatment. Other measures to reduce pollutants carried by storm water runoff include bio-filtration strips, bio-filtration swales, and Austin sand filters.

6. Staging Locations

Staging locations will be used for temporary storage of heavy construction equipment and construction materials, equipment maintenance shops, stockpile areas, and field offices.

The primary staging area in Segment A will be located within the interchange at the South Novato overcrossing. Section B staging will be located within the new interchange at the Sanitary Landfill Road, at the new interchange off of Kastania Road, and below and along the sides of the Petaluma River Bridge. Section C staging will be located within the interchange at State Route 116.

Other staging areas will be located within the State Right-of-Way and subject to approval of the contractor's submitted SWPPP. Contractors may independently seek off-site staging locations. Off-site staging locations will be subject to the requirements of resource agencies and will be the responsibility of the contractor.

7. Best Management Practices (BMPs)

The following BMPs are incorporated into the proposed MSN Project for minimizing effects to federally-listed species and salmon habitat:

1. Work will be restricted in Novato, San Antonio, and Lynch creeks to low-flow periods between June 15 and October 31 to avoid effects to steelhead or green sturgeon or any life stages of steelhead during their migratory seasons. This window can be increased based on creek and river conditions, if approved in writing by NMFS. Work from the banks and from trestle, falsework and inside closed cofferdams can occur year-round.

2. The amount and duration of pile driving will be minimized. For any pile driving occurring in wetted areas that may be occupied by adult and juvenile steelhead (or green sturgeon in the Petaluma River), sound pressure levels generated from pile driving activities will be restricted to levels below thresholds that result in injury to fish.

   Pile-driving activities will be conducted only during daylight hours to allow movement of steelhead or green sturgeon that may be present in the project vicinity to pass the construction area during night time hours. Monitoring of acoustic levels will confirm that pile driving activities are not harmful to steelhead or green sturgeon. Caltrans will monitor underwater sound levels during pile driving that occurs during the steelhead migration season

(November 1 through June 14). A hydrophone device will be used to hydroacoustically monitor sound levels. If the current thresholds (above 206 dB peak Sound Pressure Level (SPL) and 187 accumulated dB Sound Exposure Level (SEL) at 10 m from the pile being installed) that cause death or injury to fish are exceeded, Caltrans will stop the pile driving activities until sound levels can be maintained under the prescribed thresholds. In addition, if pile driving in the Petaluma River begins in the summer, Caltrans will monitor underwater sound levels for a period of two weeks at the beginning of pile driving activities and further attenuate sound if necessary.

3. All equipment will be stored outside of all waterways, including wetlands. Per the SWPPP for the project, a silt fence will be installed around the perimeter of these locations. The staging areas will also be situated 15.2 m (50 feet) from existing drainages.

4. Silt fences will be installed. The silt fencing will be delineated on the final plans and fences will be installed and remain on-site until the project is completed. Silt fences and/or coir rolls will be installed on the slopes adjacent to the work area to prevent silt from entering the watershed.

5. Appropriate temporary cofferdams will be used to dewater the construction sites and divert water through the action area during the construction period to prevent impeding creek flow or water flow through the work areas. If dewatering at a site is required, a qualified Caltrans biologist will be present during the dewatering period to inspect and ensure that sensitive aquatic species will not be trapped within the temporary cofferdams.

   If steelhead or green sturgeon are found within the cofferdams, a NMFS-approved biologist will capture, and relocate these fish to an appropriate area away from the construction site. Caltrans will submit for approval the dewatering and fish capture and relocation plans to NMFS once the design plans are finalized.

6. Erosion controls will be maintained throughout the demolition and construction periods.

7. All construction materials will be removed from the streambed at the completion of the construction project to maintain flow through the action area during the construction period, including cofferdams, pipes, filter fabric, and gravel.

8. All excess soil will be disposed at an approved upland site.

9. All project-introduced material will be removed once the work is complete.

10. Water trucks and dust controlling agents will be used to control dust in excavation and fill areas, rocking temporary access road entrances and exits will be rocked, and temporary stockpiles will be covered.

11. Any disturbed stream channel areas will be recontoured to pre-project conditions to the extent practicable.

12. Potential pollutants will be limited or reduced at their source before they come in contact with project receiving waters during construction. These BMPs are also known as "good housekeeping practices" and will be in place throughout the bridge construction phases.

    The measures include but are not limited to BMPs for: water conservation; vehicle and equipment cleaning, fueling and maintenance; dewatering; paving and grinding; temporary stream crossing; concrete finishing and curing; clear water diversion; and material and equipment use over water.

13. Demolished material will be prevented from entering waterways; water will be away from work areas; construction equipment will use attachments to catch debris; approved covers or platforms will be used to collect debris; accumulated debris and waste generated during demolition will be stockpiled away from watercourses; and wildlife will be ensured safe passage, as necessary.

14. Reflectors on portable light trees will be used to focus the light on the work area and minimize the amount of light spilling over to adjacent areas during any night work. In addition, noise-reducing enclosures will be used around noise-generating equipment. Equipment will be located as far as possible away from noise-sensitive areas, and sound control devices such as mufflers will be used on construction equipment to dampen noise as much as possible.

8. Riparian Enhancement

Caltrans will use the riparian mitigation plan developed by the California Department of Fish and Game. The requirements in this mitigation plan include the following:

> Each native riparian tree greater than 4 inches Diameter at Breast Height (DBH) that is removed or damaged will be replaced with native trees in a riparian area at a minimum 3:1 ratio. For each non-native riparian tree that is removed or damaged, trees will be replaced with native riparian trees at a minimum 1:1 ratio. Temporarily impacted riparian understory will be replaced at a 1:1 ratio. Oak trees in the riparian zone will be replaced at a 5:1 ratio.

Caltrans is also exploring several options for implementing riparian enhancement around the creeks where construction will occur to compensate for effects to riparian habitat. Additional riparian enhancement or compensation may be achieved outside of the project area using a combination of the following:

1. Purchasing of credits at a resource agency-approved mitigation bank servicing the action area.

2. Purchasing of conservation easements at or as close to the project site as practical within Marin and/or Sonoma counties.

3. Purchasing of fee title and preserving the land with riparian vegetation as close to the project site as practical within Marin and/or Sonoma counties.

B. Description of the Action Area

The action area includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR § 402.02). The action area includes the lineal extent (upstream to downstream) of bridge crossings (both current and proposed) over five creeks, one river, and two tide channels along the Highway 101 corridor between PM 18.6/27.6 in Marin County and PM 0.0/7.1 in Sonoma County. These areas are located at the following Highway 101 crossings: Novato Creek, Rush Creek, San Antonio Creek, the Petaluma River, Washington Creek, and Lynch Creek. The action area also extends to the east of Highway 101 to include the tide channels stemming from the Petaluma River and terminating at Redwood Landfill to the south, and west of Highway 101 in segment B out to the proposed new bridge crossing at San Antonio Road. The action area also extends 500-feet upstream from the crossing in each creek and river to account for fish relocation and 200 m (656 feet) downstream of each crossing to include temporary effects from equipment staging and turbidity. The action area extends laterally to encompass the riparian corridor to the top of the banks of all creeks and the river.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

1. Threatened CCC steelhead Distinct Population Segment (DPS) (January 5, 2006; 71 FR 834).

2. Threatened Southern DPS of North American green sturgeon (April 7, 2006; 71 FR 17757).

3. Designated critical habitat for CCC steelhead (September 5, 2005; 70 FR 52488).

4. Proposed designated critical habitat for the southern DPS of North American green sturgeon (September 8, 2008; 73 FR 52084).

Fall-run Central Valley Chinook salmon are not listed under the ESA, but are a species of concern, and use the Petaluma River, and possibly Novato Creek, for part of their life history stages. Provisions are made under the Pacific salmon Fisheries Management Plan for this species and, in accordance with the MSA, project activities were evaluated for impacts to EFH as described in the transmittal letter. Since they are not listed as threatened or endangered under the ESA, fall-run Chinook salmon will not be mentioned further in this biological opinion.

Genetic analysis has identified two DPSs of green sturgeon that qualify as species under the ESA: (1) a northern DPS consisting of populations in coastal watersheds northward of and including the Eel River; and (2) a southern DPS consisting of coastal and Central Valley populations south of the Eel River, with the only known spawning population in the Sacramento River. On April 6, 2005, NMFS reaffirmed its earlier determination that the northern DPS does not warrant an ESA listing (70 FR 17386). Because of substantial loss of spawning habitat, the concentration of a single spawning population in one section of the Sacramento River, and

multiple other risks to the species, NMFS listed as threatened the southern DPS of North American green sturgeon on April 7, 2006 (70 FR 17757).

A. Species Description and Life History

1. CCC Steelhead

Steelhead are anadromous fish, spending some time in both fresh and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles are all found in freshwater. Juvenile steelhead rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. For detailed information on steelhead life history, see Busby *et al.* (1996). Although variation occurs, steelhead usually live in freshwater for 1 to 2 years in Central California, then spend 2 or 3 years in the ocean before returning to their natal stream to spawn. Steelhead may spawn 1 to 4 times over their life.

Typically, adult steelhead immigrate to Coastal California streams from December through April, peaking in January and February, and juveniles emigrate as smolts to the ocean from January through June, with peak emigration occurring in April and May (Fukushima and Lesh 1998). Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger (Busby *et al.* 1996). Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation. Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4 degrees Celsius (°C) and have an upper lethal limit of 23.9°C. They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids.

Although variation occurs, CCC steelhead usually live in freshwater for 2 years, then spend 1 or 2 years in the ocean before returning to their natal stream to spawn. Steelhead may spawn 1 to 4 times over their lifespan. Steelhead from the Russian River system typically immigrate to freshwater between October and April, peaking in January and February, and migrate to the ocean from January through June, with peak emigration occurring in April and May (Fukushima and Lesh 1998).

2. Southern DPS of North American Green Sturgeon

The green sturgeon is the most widely distributed and most marine-oriented of the sturgeon species. Like all sturgeon, they are an anadromous, long-lived, and slow growing species (Adams *et al.* 2002). The largest fish have been aged at 42 years, but this is probably an underestimate and maximum ages of 60-70 years or more are likely (Moyle 2002). Green sturgeon are known to range in near shore marine waters from Mexico to the Bering Sea, and are commonly observed in bays and estuaries along the western coast of North America. First spawning occurs at 15 years for males, and 17 years for females.

Adult green sturgeon return to freshwater to spawn every two to five years, and generally show fidelity to their spawning site. Adults typically migrate into freshwater beginning in late February, spawning occurs from March to July, with peak activity from April to June. Confirmed spawning populations in North America occur in the Rogue, Klamath, and Sacramento rivers. Green sturgeon may migrate long distances upstream to reach spawning habitat. Spawning occurs in deep turbulent areas of large rivers. Eggs are likely broadcast over large cobble substrate where they settle into the spaces between the cobbles. Like salmonids, green sturgeon require cool water temperatures for egg and larvae development, with optimal temperatures ranging from 15 °C to 19°C..

Green sturgeon larvae first feed at 10 days, and grow rapidly, reaching 300 mm (12 inches) in one year. Juvenile and adult green sturgeon are benthic feeders (Moyle 2002). Juvenile green sturgeon in the San Francisco Estuary feed on opossum shrimp (*Neomysis mercedie*) and amphipods (*Corophium spp.*) (Moyle 2002). Adults captured in the Sacramento-San Joaquin Delta feed on invertebrates, including shrimp, mollusks, amphipods, and even small fish (Adams *et al.* 2002). Juvenile green sturgeon spend from one to three years in freshwater before they enter the ocean (Adams *et al.* 2002).

The southern DPS of North American green sturgeon spawn in the deep turbulent sections of the upper reaches of the Sacramento River. As juvenile green sturgeon age, they migrate downstream and live in the lower delta and bays, spending from three to four years there before entering the ocean. Adult green sturgeon return from the ocean every one to five years to spawn, and generally show fidelity to their upper Sacramento River spawning sites. Patterns of telemetry data suggest that Southern DPS fish use oversummering grounds in coastal bays and estuaries along northern California, Oregon, and Washington, and overwintering grounds between Vancouver Island, BC and southeast Alaska (Lindley *et al.*, 2008).

B. Status of Species and Critical Habitat

1. CCC Steelhead

Historically, approximately 48 populations[5] of steelhead existed in the CCC steelhead DPS (Bjorkstedt *et al.* 2005). Many of these populations (about 20) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (Bjorkstedt *et al.* 2005, McElhaney *et al.* 2000).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to

[5] Population as defined by Bjorkstedt *et al.* 2005 and McElhaney *et al.* 2000 as, in brief summary, a group of fish of the same species that spawns in a particular locality at a particular season and does not interbreed substantially with fish from any other group. Such fish groups may include more than one stream. These authors use this definition as a starting point from which they define four types of populations (not all of which are mentioned here).

spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River – the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997). Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vincente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). For more detailed information on trends in CCC steelhead abundance, see: Busby *et al.* 1996, NMFS 1997, and NMFS 2005a.

Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). Reduced population sizes and fragmentation of habitat in San Francisco streams has likely also led to loss of genetic diversity in populations from those streams.

CCC steelhead have experienced serious declines in abundance, and long-term population trends suggest a negative growth rate. This indicates the DPS may not be viable in the long term. DPS populations that historically provided enough steelhead strays to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that is likely to slow their decline relative to other salmonid species in worse condition. The most recent status review concludes that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (NMFS 2005a). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

2. Southern DPS of North American Green Sturgeon

The population size of the southern green sturgeon DPS is unknown, but is clearly much smaller than in the northern green sturgeon DPS and is, therefore, more vulnerable to catastrophic events (Adams *et al.* 2002). Recent habitat evaluations conducted in the upper Sacramento and Feather rivers suggest that, as for anadromous salmonids, large amounts of potential spawning habitat were made inaccessible or altered by dams (BRT 2005). Current spawning habitat for green sturgeon has been reduced to a limited area of the upper Sacramento River.

Data on the entrainment of juvenile sturgeon from the Sacramento-San Joaquin Delta pumping facilities of the Central Valley Project and State Water Project provide an indication of how green sturgeon abundance has changed since 1968. The estimated average number of green sturgeon entrained each year at California's John Skinner Fish Facility prior to 1986 was 732; from 1986 on, the average number decreased to 47. At the Federal Tracy Fish Collection Facility, the average prior to 1986 was 889; from 1986 on, the average number also decreased to 47 (April 6, 2005, 70 FR 17386). This substantial decrease in numbers is also consistent with decreases in entrainment of white sturgeon within the same time periods. Decreases in numbers of green sturgeon entrained in these facilities occurred while water export levels at both facilities have increased substantially (*i.e.*, more water was pumped, but fewer green sturgeon were entrained).

The most recent status review update concluded that the southern green sturgeon DPS is likely to become endangered in the foreseeable future due to the substantial loss of spawning habitat, the concentration of a single spawning population in one section of the Sacramento River, and multiple other risks to the species (BRT 2005). Based on this information, the southern population of North American green sturgeon was proposed as threatened on April 6, 2005 (70 FR 17386). NMFS published a final rule on April 7, 2006 (71 FR17757), listing the southern population of North American green sturgeon as threatened, which took effect June 6, 2006.

3. Factors Responsible for Status of Steelhead/Southern DPS of North American Green and Salmonid Critical Habitat/Proposed Green Sturgeon Critical Habitat

Threats to naturally reproducing steelhead and green sturgeon are numerous and varied. Among the most serious and ongoing threats to their survival in these DPSs are changes in hydrology, and habitat degradation and loss. The following discussion provides an overview of the types of activities and conditions that adversely affect steelhead and green sturgeon DPSs and their habitats.

a. Habitat Degradation and Destruction

A major cause of the decline of salmon, steelhead, and green sturgeon is the loss or severe decrease in quality and function of essential freshwater and estuarine habitat. Most of this habitat loss and degradation has resulted from anthropogenic watershed disturbances caused by agriculture, logging, urban development, water diversion, road construction, erosion and flood control, dam building, and grazing. Most of this habitat degradation is associated with the loss of essential habitat components necessary for steelhead and green sturgeon survival. For example, the loss of deep pool habitat as a result of sedimentation and stream flow reductions has reduced rearing and holding habitat for juvenile and adult salmonids. The alteration of the estuaries in conjunction with increased sediment loads in the watersheds from land use activities and lower stream flows due to water diversions and other watershed changes, have delayed sandbar breaching in the fall, delayed adult steelhead migration into streams, reduced and degraded estuary rearing habitat for both juvenile steelhead and green sturgeon, and created a significantly altered freshwater-saltwater transition zone for steelhead smolts (CDFG 1998). North American green sturgeon populations are currently considered to be more susceptible to the quality declines in spawning habitat over other habitat types (September 8, 2008; 73 FR 52084).

b. Natural Stochastic Events

Natural events such as droughts, landslides, floods, and other catastrophes have adversely affected steelhead and green sturgeon populations throughout their evolutionary history. The frequency of, and the resulting effects of these events are now often increased and exacerbated by anthropogenic changes to watersheds such as logging, road building, and water diversion. The ability of these species to rebound from natural stochastic events has been limited as a result of these and other anthropogenic factors which have degraded the freshwater and estuarine habitats upon which these species depend, and thus abundance of these populations have been depressed to critically low levels.

c. Ocean Conditions

Variability in ocean productivity has been shown to affect steelhead and green sturgeon survival both positively and negatively. Beamish and Bouillion (1993) showed a strong correlation between North Pacific salmon production from 1925 to 1989 and their marine environment. Beamish *et al.* (1997) noted decadal-scale changes in the production of Fraser River sockeye salmon (*O. nerka*) that they attributed to changes in the productivity of the marine environment. They (along with many others) also reported the dramatic change in marine conditions occurring in 1976-77, at the beginning of an El Niño event. El Niño conditions, which occur every 3-5 years, negatively affect ocean productivity for salmonids. It is unclear to what extent ocean conditions have played a role in the decline of these species; however, ocean conditions have likely affected steelhead and green sturgeon population abundances throughout their evolutionary history.

d. Water Conveyance

Depletion and storage of natural flows have drastically altered natural hydrological cycles in many California rivers and streams. Alteration of streamflows has increased juvenile salmonid mortality for a variety of reasons: migration delay resulting from insufficient flows or habitat blockages, loss of usable habitat due to dewatering and blockage, stranding of fish resulting from rapid flow fluctuations, entrainment of juveniles into unscreened or poorly screened diversions, and increased juvenile mortality resulting from increased water temperatures (Chapman and Bjornn 1969, Berggren and Filardo 1993, 61 FR 56138). Important elements of water quality include water temperatures within the range that corresponds with migration, rearing, and emergence needs of fish and the aquatic organisms upon which they depend (61 FR 56138). Green sturgeon, which are benthic feeders exposed to high suspended sediment concentrations as they forage on the bottom, would likely not be affected by elevated levels of suspended sediment in the action area. Juvenile green sturgeon have been routinely entrained at pumping facilities along the Sacramento-San Joaquin Delta from rapid changes in flow and are also susceptible to suction dredging practices.

e. Harvest

There are few good historical accounts of the abundance of salmon and steelhead harvested along the California coast (Jensen and Swartzell 1967). Early records did not contain quantitative data by species until the early 1950s. In addition, the confounding effects of habitat destruction, drought, and variable ocean conditions on steelhead survival make it difficult to assess the degree to which recreational and commercial harvest have contributed to the overall decline of salmonids in West Coast rivers. Green sturgeon harvest consists of bycatch that is exclusive to two white sturgeon fisheries – the Klamath tribal and other Tribal salmon gill-net fisheries (Adams *et al.* 2002). The numbers of green sturgeon caught in these fisheries has declined substantially from 6,466 fish in 1985-1989 to 1,218 fish in 1999-2000.

f. Artificial Propagation

Releasing large numbers of hatchery fish can pose a threat to wild salmon and steelhead stocks through genetic impacts, competition for food and other resources, predation of hatchery fish on wild fish, and increased fishing pressure on wild stocks as a result of hatchery production (Waples 1991). The genetic impacts of artificial propagation programs are primarily caused by the straying of hatchery fish and the subsequent hybridization of hatchery and wild fish. Artificial propagation threatens the genetic integrity and diversity that protects overall productivity against changes in environment (61 FR 56138). The potential adverse impacts of artificial propagation programs are well documented (Waples 1991, Waples 1999).

g. Marine Mammal Predation

Predation is not known to be a major factor contributing to the decline of West Coast salmon and steelhead populations relative to the effects of fishing, habitat degradation, and hatchery practices. Predation may have substantial impacts in localized areas. Harbor seal (*Phoca vitulina*) and California sea lion (*Zalophus californianus*) numbers have increased along the Pacific Coast (NMFS 1999).

h. Reduced Marine-derived Nutrient Transport

Reduced marine-derived nutrient (MDN) transport to watersheds is another consequence of the past century of decline in salmon abundance (Gresh *et al.* 2000). Salmon may play a critical role in the survival of their own species in that MDN from salmon carcasses has been shown to be vital for productive invertebrate prey communities in streams providing for the growth of juvenile salmonids (Bilby *et al.* 1996, Bilby and Bisson 1998). The return of salmon to rivers makes a significant contribution to the flora and fauna of both terrestrial and riverine ecosystems (Gresh *et al.* 2000). Evidence of the role of MDN and energy in ecosystems infers this deficit may indicate an ecosystem failure that has contributed to the downward spiral of salmonid abundance (Bilby *et al.* 1996).

i. Invasive Species

A potential major factor affecting the species in the action area is the introduction of non-native or invasive species. As native fishes in the San Francisco Bay estuary became depleted in the late 19th century, non-native fishes were brought to the bay including American shad, striped bass, common carp, and white catfish. As their populations boomed, those of native fishes declined further, due to competition and predation. Introduction of non-native species accelerated in the 20th century through unintended introductions of fish and invertebrates from the release of ballast water from cargo ships entering the estuary from foreign ports. Several invasive species, including the yellowfin goby, shimofuri goby, and the overbite clam are now ubiquitous in San Francisco Bay's tidal marshes; these three species comprised the majority of the fish and invertebrates entrained during 2006 dredging at the mouth of the Petaluma River. Establishment of invasive species was probably facilitated by altered hydrologic regimes and reduction in habitats for native species. The spread of invasive species throughout the San Francisco Bay region has potentially affected many native species, including listed salmonids,

through predation and competition for food and habitat (Cohen and Carlton 1995). Prey selection by green sturgeon, which feed on benthic invertebrates, has likely been affected as well, as the native species populations have been replaced by invasive species. It is not known how well the green sturgeon has adjusted to its available diet in response to the altered benthic community.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is the analysis of the effects of past and ongoing human and natural factors leading to the current status of the species in the action area. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02).

Table 1: Steelhead, Green Sturgeon, and Critical Habitats in the streams and river affected by the proposed project:

Creek or River	Steelhead Present	Steelhead Critical Habitat	Green Sturgeon Present	Proposed Green Sturgeon Critical Habitat
Petaluma	Yes	Yes	Yes**	Yes
Novato	Yes*	No	No	No
Lynch	Yes*	Yes	No	No
San Antonio	No	Yes	No	No
Rush	No	No	No	No
Washington	No	No	No	No

* Steelhead are unlikely to be present in the portion of the action area in Novato and Lynch creeks (see below).
** Green sturgeon are unlikely to be encountered during project construction (see below).

A. Steelhead Critical Habitat and Proposed Green Sturgeon Critical Habitat within the Action Area

The portions of Novato and Lynch creeks, and the Petaluma River, within the action area are corridors for adult steelhead upstream migration to spawning and rearing habitat and corridors for steelhead smolt to rearing habitat and the Pacific Ocean. As shown in Table 1, San Antonio Creek, the Petaluma River, and Lynch Creek are designated critical habitat for CCC steelhead (70 FR 52488). Novato Creek is not designated as critical habitat for CCC steelhead. Rush and Washington creeks are not designated as critical habitat for listed salmonids, nor do they contain steelhead (as described below). All tidally influenced areas in the Petaluma River are proposed as critical habitat for green sturgeon (73 FR 52084). No other waterways within the action area are proposed as critical habitat for green sturgeon.

Critical habitat for CCC steelhead within the Petaluma River Hydrologic Sub-area (HSA) was described by NMFS' Critical Habitat Analytical Review Team (CHART) (NMFS 2005b). The CHART defined critical habitat for CCC steelhead on the stream-reach scale based on the quantity, quality, and distribution of Primary Constituent Elements (PCEs), which are the principle biological or physical constituent elements of habitat needed for the completion of the salmonid life-cycle, and include migration, spawning, rearing, and estuarine. For example, one PCE is spawning habitat; a component of the stream environment that must be present in sufficient quantity, quality, and distribution for salmonids to successfully reproduce.

Essential features of critical habitat in the action area include the estuarine water column, foraging habitat, and food resources used by these salmonids as part of their juvenile downstream migration or adult spawning upstream migration. PCEs of designated critical habitat for CCC steelhead in the action area include migration areas free from obstruction and excessive predation with: (1) water quality, water quantity and salinity conditions supporting juvenile and adult physiological transitions between freshwater and saltwater; (2) natural cover such as submerged and overhanging large wood, and aquatic vegetation; and (3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (69 FR 71880).

1. Novato Creek

The creek reach in the action area is channelized with a generally trapezoidal shape possibly formed by flood control practices. The channel width averages 100 feet in the action area. Riparian canopy is absent on both sides of the Novato Bridge crossing, including the gap, and the riparian undergrowth is regularly removed from the stream banks during flood control maintenance. The portion of channel in this maintained area has a soft and muddy bottom that holds heat during the daytime.

Streamflow in Novato Creek is perennial and typically ranges from one-to-five cubic feet per second (cfs) during the summer months. Most if not all water in the area is tidally influenced; reaching approximately 4,000 feet above the Highway 101 crossing to Diablo Avenue (Caltrans 2008). Also during the summer some water is released from the North Marin Water District facilities upstream of the action area. Novato Creek water temperatures measured in May 1996 ranged from 19-26°C (60-73 degrees Fahrenheit (°F)) and ranged from 19-24°C (60-70°F) in June 1996. Although water temperatures have not been recorded in the period of July through September, Rich (1997) estimates water temperatures are considerably higher than optimal for steelhead during its rearing life stage.

The stream channel is dominated by low gradient areas and the streambed is mostly composed of sand and silt. In general, instream cover for juvenile steelhead is lacking. Some instream cover is provided by undercut banks and walls, concrete, and small amounts of emergent vegetation. Large instream woody debris, boulders, and other features for structural complexity are lacking in this portion of the action area. Overwinter habitat conditions are poor because the channel lacks habitat complexity and velocity refuge. Oversummering conditions are marginal due to the lack of habitat complexity and high water temperatures (Rich 1997).

2. San Antonio Creek

San Antonio Creek is a tributary of the Petaluma River. Overall San Antonio Creek is well-established containing high quality habitat that could potentially provide seasonal rearing habitat for juvenile steelhead (Hamaker, *et al.* 2003). The substrate is predominately large cobble, although the area beneath the Highway 101 crossing contains a deep layer of silt. There is also little to no riparian vegetation under the Highway 101 bridge; however, the upstream reaches contain riparian cover dominated by California buckeye (*Aesculus californica*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), California black walnut (*Juglans californica*), coast live oak (*Quercus agrifolia*), valley oak (*Q. lobata Née*), and bay laurel (*Umbellularia californica*).

Most of the creek is ephemeral during the summer with the exception of the tidally influenced lower reach east of Highway 101 where it connects to the Petaluma River. The creek bed within the action area is dry in the summer and into the winter in most years, which creates an effective migration barrier for steelhead between the reach at the Highway 101 crossing and the creek's terminus at the Petaluma River. San Antonio Creek may provide some salmonid habitat at the mouth, where there is a tidal influence from the Petaluma River.

3. The Petaluma River

The Petaluma River, for most of its course, is more of an elongated, tidal estuary than an actual river. It drains and 130-square-mile watershed, extending to the 2,300-foot summit of the Sonoma Mountains. Most of the river's tributaries join around the City of Petaluma. From there the waters flow along a broad, 18-mile long estuary moving past hayfields and an extensive marsh and terminating at the north-west end of San Pablo Bay.

Historically, the tidal marshes located within San Pablo Bay and the tidally-influenced reaches of the Petaluma River provided a highly productive estuarine environment for juvenile anadromous salmonids. During the course of their downstream migration through San Pablo Bay, juvenile salmon and steelhead may still utilize the estuary for seasonal rearing, although recent data suggest that migration to the sea is rapid, as compared with migration in estuaries located at higher latitudes (MacFarlane and Norton 2001). Returning adult salmon and steelhead navigate their way through San Pablo Bay as they seek upstream spawning grounds of their natal streams.

Within the action area the Petaluma River is highly channelized with little habitat complexity. The channel is broad with low summer and high winter flows ranging from zero to 65 cfs (US Geological Survey gage station 11459000). The river is fully tidal 11 miles (18 kilometers) from its mouth. The high range of tidal influence is due in part to the low gradient and low elevation through the marshes below Petaluma

As water velocity in the Petaluma River increases with storm events, adult salmon may use off channel areas, such as the marina and tide channels below the bridge, for refuge. Riparian cover is lacking through the area both upstream and down, likely due to urban encroachment and flood control maintenance. Vegetation persisting along the banks consists predominately of pickleweed and other low lying herbaceous vegetation.

The water depth throughout the Petaluma River has been maintained by annually dredging to a minus eight foot depth for 100 feet of channel width from the river mouth to Western Avenue in Petaluma. The need for dredging is a consequence of the high sedimentation rates, a result of high suspended sediment loads in the Petaluma River and adjacent San Pablo Bay. Water depths around the bridge vary between 20 to 30 feet.

These dredging activities have degraded the benthic habitat by removing prey organisms which form the diet of green sturgeon. NMFS is currently conducting a study to determine the recovery rate of the benthic community in the nearby marina, just south of the Petaluma River Bridge. Although the data have yet to be analyzed, it is likely that the benthic community does not fully recover prior to the subsequent dredging episodes. A reduction in this benthic community has likely resulted in minimal effect regarding loss of prey items for salmonids because benthic organisms at these depths (20-30 feet) are not typically part of their diet. Past dredging activities exposed juvenile salmonids to a risk of potential entrainment to upland disposal sites, from which there are no outlets back to the marina or the Petaluma River.

4. Lynch Creek

Lynch Creek is a small perennial tributary to the Petaluma River. At the Highway 101 crossing, Lynch Creek has been highly modified to a trapezoidal channel with earthen and concrete stabilized banks. The creek is dry during the summer months in the action area. Downstream, it is tidally influenced where it meets the Petaluma River. To either side of Highway 101 and within the gap between the bridge, there is little woody riparian vegetation and reduced shading of the channel, which leads to higher water temperatures during the summer months. Upstream riparian vegetation becomes dense with adequate canopy cover for shade and blackberry that provides some stability to the banks. The substrate throughout Lynch Creek is composed of sand and small gravels contributed by eroding upstream banks.

B. Status of Species within the Action Area

Given the proposed in-water construction period, June 15 through October 31, and the life history of steelhead, only juvenile steelhead are likely to be present in some of the creek portions of the action area during in-water construction. In addition to juvenile steelhead, NMFS also anticipates impacts to steelhead adults and smolts in the Petaluma River as a consequence of proposed year-round pile driving

As shown in Table 1, Rush Creek, Washington Creek, and San Antonio Creek are not currently thought to contain steelhead (Caltrans 2008), due in part to poor habitat quality and ephemeral flow in the reaches at the crossings. San Antonio Creek may provide some habitat at the mouth, where there is a tidal influence from the Petaluma River; however, the reach at the Highway 101 crossing is dry during most of the year, and migration into the creek is blocked as described above. Steelhead are not anticipated to occur in the action area in San Antonio Creek.

1. Novato Creek

NMFS is unaware of any rigorous estimates of steelhead abundance from Novato Creek. However, there have been several limited fish surveys undertaken in Novato Creek in recent years (Rich 1997, Fawcett Environmental Consulting 2000, Leidy *et al.* 2005, Fawcett Environmental Consulting 2006); all of these surveys encountered steelhead. One of the surveys, Fawcett Environmental Consulting (2006), was conducted wholly in the proposed project area. That survey was conducted during a previous sediment removal project; in that survey biologists collected 12 juvenile steelhead from a reach within a larger 6,130 feet area of Novato Creek that included the bridge site. Collections upstream of the project area have encountered steelhead throughout the watershed. More recent surveys conducted by Fawcett on July 9 and 10 of 2008 (Michael Fawcett, personal communication, January 20, 2009) covered a distance of approximately 3 miles, from Diablo Avenue above the Highway 101 crossing to the Northern Pacific Railroad Bridge downstream from the Highway 101 crossing, and caught 63 steelhead in Novato Creek and five in Warner Creek, upstream from the project site. All fish were aged as young of the year and collected from suitable habitat for summer rearing juvenile steelhead. Rearing conditions are absent at the Highway 101 crossing, where the water temperatures and salinity levels are high and little cover is provided from both instream and overwater sources. Based on this information, NMFS believes the current habitat conditions in Novato Creek within the action area are unsuitable for supporting juvenile steelhead and, therefore, they are unlikely to be present in this portion of the action area during construction.

2. San Antonio Creek

Although Skinner (1962) reported that San Antonio Creek was historically used by steelhead; subsequent reports indicated that CCC steelhead are now extirpated from that watershed. In the July 1968 California Department of Fish and Game (CDFG) surveys, San Antonio Creek was visually surveyed from the San Antonio Slough upstream to Chileno Valley Road. No steelhead were observed and the creek's fishery value was deemed poor due to intermittent summer flows, scarce spawning gravel, and suspected dairy effluent (Michaels and Thomson 1968a). In September 1981, Leidy (1984) electrofished three sites on San Antonio Creek between Highway 101 and Chileno Valley Road, and steelhead were not found.

3. Petaluma River

Between 1962 and 2005, the Petaluma River and its tributaries were sampled for steelhead or resident rainbow trout at several locations within the Petaluma River watershed. Skinner (1962) indicated that the mainstem Petaluma River was lightly used as steelhead habitat. Thomson and Michaels (1968) surveyed portions of the Petaluma River accessible by automobile from the upstream limit of tidal influence to the headwaters in July 1968 without observing steelhead. In July 1993, Leidy (2002) electrofished the Petaluma River upstream from the Corona Road crossing and did not find salmonids. Contrary to these findings are reported observations of migrating adult steelhead spawning pairs in the Petaluma River (David Woodbury, NMFS, personal communication, October 2008) with estimates believed to be approximately 60 fish (David Woodbury, NMFS, personal communication, October 2008).

NMFS has determined that green sturgeon presence will not occur in any of the creeks mentioned in this biological opinion due to lack of suitable habitat for this species. Green sturgeon presence is possible in the Petaluma River due to suitable water conditions for this species and its connectivity to the San Pablo Bay. Juvenile green sturgeon are known to inhabit San Pablo Bay, into which the Petaluma River flows.

NMFS was able to find only one account of green sturgeon in the Petaluma River. In 1997, a tagged adult green sturgeon was netted at the mouth of the Petaluma River where it was determined to have been holding for an eleven hour period during its migration to the Sacramento River (David Woodbury, NMFS, personal communication, October 2008). Between 1980 and 1995, stations within San Pablo Bay were sampled each month using midwater and bottom trawls (Baxter *et al.* 1999). The data show that green sturgeon collected by trawls in San Pablo Bay ranged from 328 to 733 mm in length. Given that the trawls are not designed to adequately sample sturgeon, the data cannot be used to accurately estimate green sturgeon abundance. Juvenile green sturgeon are year-round residents in San Pablo Bay and likely forage in the Petaluma River, as their relative, the white sturgeon, are commonly caught there and feed on similar prey.

Local fisheries experts are unaware of any observations of green sturgeon presence in the action area at the Highway 101 crossing upriver to Washington Street (Bill Cox, CDFG, personal communication, October 2, 2008; Michael Fawcett, personal communication, October 3, 2008). Thus, the available information indicates that adult green sturgeon neither spawn in the Petaluma River nor use it as a migratory pathway. Because the lower section of the Petaluma River is tidal, juvenile green sturgeon likely enter the river. Although they are most likely to remain near the mouth because of locality to San Pablo Bay (a known feeding area) it is possible they could be found as far upstream as the Petaluma River crossing. Due to the lack of observations and overall dwindling numbers of the southern DPS of North American green sturgeon, NMFS reasons encountering one in the action area during the construction of the new crossing over the Petaluma River is unlikely.

4. Lynch Creek

A few of the tributaries to the Petaluma River may continue to support small spawning populations of CCC steelhead, including Lynch Creek (Leidy *et al.* 2005). These streams are generally short, low gradient streams that have poor quality summer rearing habitat, but in which a few steelhead may spawn annually.

During the summer months, the habitat conditions at the Lynch Creek Bridge crossing are not conducive for salmonids, and although juvenile steelhead do rear in the watershed during these months, suitable habitat for rearing only exists in the tidally influenced reaches of Lynch Creek downstream from the Highway 101 bridge crossing. Therefore, it is unlikely that steelhead will be present at the project work sites during the instream construction period between June 15 and October 31.

V. EFFECTS OF THE PROPOSED ACTION

Construction of and modifications to bridges and crossings will result in the capture and relocation of juvenile steelhead at the crossings over Novato Creek and the Petaluma River, prior to dewatering the work areas. Steelhead have not been observed in San Antonio Creek for some time and are currently considered to be extirpated from the system as described above.

In Novato Creek and the Petaluma River, steelhead collection and relocation activities will occur during the summer low-flow period after smolts have emigrated and before adults have immigrated to the proposed project site, and NMFS expects that only juvenile steelhead will be present and effected by relocation activities. Those juvenile steelhead that are not collected in Novato Creek and the Petaluma River will be exposed to the effects of dewatering and pile driving. In addition to juvenile steelhead, adults and smolts will also be affected in the Petaluma River by exposure to sound pressure stemming from the year-round pile driving activities.

Both adult and juvenile green sturgeon have access to the Petaluma River Bridge construction site, which is tidally influenced. Although NMFS did not find evidence from prior surveys and literature sources to verify any green sturgeon within the action area of the Petaluma River, there is still the possibility of juvenile presence for at least part of the year due to the river's connection to the San Pablo Bay. The lack of observations in the Petaluma River as a whole would likely make encountering a green sturgeon during the project activities low enough to discount any effect to this species as a result of project activities.

Aquatic habitats and steelhead may also be exposed to turbidity and toxic chemicals. Small areas of aquatic habitat are expected to be permanently lost in the action area once the project is complete. Temporary impacts include turbidity and toxic chemical impacts to water quality and riparian loss. Shading increases from closing gaps between crossings will create permanent impacts, while habitat loss will have both temporary and permanent impacts.

A. Fish Relocation

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities will be conducted by qualified fisheries biologists following both CDFG and NMFS guidelines, direct effects to and mortality of juvenile salmonids during capture will be minimized. Based on similar relocation efforts NMFS is familiar with, approximately 1.5 percent of the fish relocated may be injured or killed.

Fish relocation efforts will take place prior to or concurrent with the dewatering of waterways. No areas will be dewatered prior to June 15. The potential does exist for juvenile steelhead injury or mortality to occur during relocation. NMFS has not found evidence of any green sturgeon occupying the action area or reaches above the action area and does not expect any green sturgeon to be encountered during relocation activities. Fish relocation attempts will occur

one time following the construction of each constructed coffer dam at all locations where dewatering is necessary. The amount of fish relocations per crossing is dependant on the number of cofferdams needed at each crossing. Capture and relocation of juvenile steelhead is anticipated for the Petaluma River, where multiple relocations over multiple seasons will occur due to the placement of cofferdams over multiple seasons, from as few as six to as many as ten cofferdams, depending river conditions. Regardless of cofferdam configuration in the Petaluma River, the square footage of dewatered area will remain equal; however, in the scenario where cofferdams will be built for individual piers, there is the possibility that juvenile steelhead that have been previously relocated may enter the action area between relocations and consequently be relocated multiple times.

Based on the recent survey efforts conducted in Novato Creek for sediment removal activities just upstream from the action area, NMFS does not believe that juvenile steelhead will likely to be encountered in this portion of the action area. In the Petaluma River, although there are an estimated 60 adult spawning pairs passing through the action area during the winter and early spring months, there are no recent surveys of juvenile numbers in or near this portion of the action area. Thus, the number of juvenile steelhead in the Petaluma River subject to capture and relocation subsequent to construction of cofferdams cannot be reliably estimated. Given the timing of the project and quality of the habitat within the action area, NMFS anticipates only a small number of juvenile steelhead will likely be present during the proposed action.

Therefore, NMFS will assume that all juvenile steelhead present within the portion of the action area at the bridge site in the Petaluma River will be exposed to capture and relocation efforts that will occur between June 15 and October 31. NMFS expects that juvenile steelhead mortality associated with capturing, handling, and relocation for this project will be equal to 1.5 percent of the fish relocated, and when added with the potential for multiple relocations of the same individual fish, would equate to 3 percent total mortality of juvenile steelhead in the portion of the action area in the Petaluma River.

Caltrans will use qualified fishery biologists who will take appropriate precautions during fish relocation activities to minimize adverse affects to juvenile steelhead. Captured fish are planned to be relocated to areas of similar habitat located either downstream or upstream of the Highway 101 crossings.

Relocated fish may also endure stress from crowding at the relocation sites and increased competition for available resources such as food and habitat. This may reduce the survival chances of some fish. Some of the fish at the relocation sites may leave the site, and move to areas either upstream or downstream that have greater availability of habitat and less fish density. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS does not believe this impact will cascade through the watershed population of steelhead based on the small area that will likely be affected. Fish relocation efforts are expected to minimize project impacts to steelhead in both locations by removing them from areas where they would have experienced high rates of injury and mortality. Furthermore, fish will be relocated to areas that possess similar habitat and water quality parameters (*e.g.*, temperature) to their original locations, and will be distributed appropriately to prevent overcrowding.

B. Dewatering

Cofferdams installed in Novato Creek and the Petaluma River will narrow the water flow through the areas. Flow is not expected at the San Antonio Creek or Lynch Creek locations, but if cofferdams are required for these creeks, only subsurface flow would be pumped out. The streamflow within the project vicinity is expected to be close to normal seasonal conditions except through the areas where cofferdams are installed. The cofferdam footprint in the Petaluma River will be much greater than other locations, although these dewatered areas will not be expected to cause volatile fluctuations in the flow regime. Maintaining the minimum 60-foot passage in the Petaluma River through the cofferdams will further suppress any flow effects associated with dewatering.

All cofferdams will be installed between June 15 and October 31 for all of the three to four construction seasons in the Petaluma River and over one season at the other creek locations and likely be placed during the lowest tide levels. Most fish are anticipated to follow receding tides out of the construction area. Some cofferdams will be left in place for extended periods of time in the Petaluma River. These cofferdams are not expected to hinder or prevent passage of salmonids due to the maintained 60-foot area of passage described in the *Description of the Proposed Action*. However, cofferdams will reduce rearing habitat for steelhead in the action area. Based on the project information available to date, NMFS assumes that any cofferdams in the creeks will be installed and removed during one summer construction season (June 15 to October 31), although not all cofferdams in the creeks will be installed during the same construction season. In the Petaluma River, NMFS assumes that once cofferdams are installed, they will be left in the river until completion of pile driving in the Petaluma River, which may occur outside of the summer construction season. NMFS assumes that whenever pile driving ends in the Petaluma River, cofferdams will only be removed between June 15 and October 31.

Stream flow diversion and work space dewatering is also expected to cause temporary loss, alteration, and reduction of aquatic habitat within the action area. Stream flow diversions could harm individual steelhead by concentrating or stranding them in residual wetted areas (Cushman 1985) before they are relocated, or causing them to move to adjacent habitats (Clothier 1953, Clothier 1954, Kraft 1972, Campbell and Scott 1984).

Steelhead could be killed or injured if crushed beneath the cofferdams during installation, though direct mortality is expected to be minimal because of the small number of steelhead in the action area and due to relocation efforts prior to installation of the diversion system. In addition to the initial fish capture and relocation at each cofferdam, a fisheries biologist will remain in the cofferdam to net and rescue any additional fish that may become stranded throughout the dewatering process at each coffer dam.

Steelhead not removed from the work area will die during dewatering activities. However, NMFS anticipates the number of juvenile steelhead killed as a result desiccation from the dewatering activities to be very low due to the low numbers of steelhead expected to be present within the action area. NMFS has not found evidence of any juvenile green sturgeon occupying the action area or reaches above the action area and does not expect any juvenile or adult green

sturgeon to be encountered during dewatering activities. NMFS expects that juvenile steelhead mortality associated with dewatering for this project will be similar to the unintentional mortality rate from capturing, handling, and relocation procedures. This amount of mortality would equate to 1.5 percent of juvenile steelhead that are encountered in the Petaluma River during capture and relocation efforts between the months of June 15 and October 31. In the Petaluma River, relocation mortality (3 percent described above) is likely higher than dewatering mortality because of the potential of capturing a steelhead juvenile multiple times, which would increase the stress levels and the likelihood of death.

Benthic macroinvertebrates may be temporarily lost or their abundance reduced when individual organisms are stranded or when creek habitats are dewatered (Cushman 1985). Effects to macroinvertebrates resulting from stream flow diversions and dewatering will be temporary because construction activities will be relatively short-lived, and rapid recolonization (about one to two months) of disturbed areas by macroinvertebrates (Cushman 1985, Thomas 1985, Harvey 1986) is expected following rewatering. In addition, the effect of macroinvertebrate loss on juvenile steelhead is likely to be negligible because food from upstream sources (via drift on the water surface) would be available downstream of the dewatered areas since stream flows will be maintained outside of the cofferdam. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely affect salmonids.

C. Turbidity

Increased turbidity is anticipated to occur during the construction and removal of the cofferdams and dewatering. Research with salmonids has shown that high turbidity concentrations can reduce feeding efficiency, decrease food availability, reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and also cause fish mortality (Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Mortality of very young coho salmon and steelhead fry due to increased turbidity has been reported by Sigler *et al.* (1984). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival.

Based on the effects described above, it is anticipated that rearing juvenile steelhead downstream of the work areas may be affected by short-term increases in turbidity caused during the construction and removal of the cofferdams, dewatering, bank grading, and the addition and removal of gravel fill. These pulses of turbidity may cause fish to move downstream to avoid the turbidity. Pulses of increased turbidity are not anticipated to reach lethal levels with preventative BMPs in place. However, pulses of increased turbidity may result in juvenile steelhead temporarily vacating preferred habitat areas and/or temporarily reducing their feeding efficiency. This impact will extend into the beginning of the first storm events of each construction year. However, due to the timing of the project and the limited habitat within the action area, only low numbers of juvenile steelhead are anticipated to be affected and the minimal nature of the turbidity levels are not expected to have a detectable impact on the survival of individual fish. Road drainage improvements will lower future turbidity levels by incorporating new catchment devices into their design. New cross culverts will be incorporated with the existing culverts to

prevent severe flooding in wet years and to compensate for the increase of impermeable surface area created by the HOV lanes. The storm water shedding from the road surface will be drained in the existing swales on to the sides of Highway 101. While the volume of water draining the swales will increase, the storm water treatment structures incorporated into the system will improve the overall quality of water discharged from the roads and drainage system.

As a benthic dwelling species, green sturgeon are adapted to living in areas with fine sediment bottoms and, thus, are tolerant of high levels of turbidity. The project design and best management practices avoid or minimize localized turbidity; therefore, short-term impacts associated with turbidity during implementation of this project are expected to be insignificant for any green sturgeon within the action area of the Petaluma River.

D. Toxic Chemicals

Heavy construction equipment will be utilized within the dewatered creek channels during construction activities. Oils and similar substances from construction equipment can contain a wide variety of hydrocarbons, some of which evaporate rapidly while others adsorb to sediments and may persist for long periods of time. These polynuclear aromatic hydrocarbons can prove harmful to benthic communities (EPA 1993) which are a salmonid food source. Fluid leaking from construction equipment can also contain metals, which do not degrade in the environment. Some metals (*e.g.*, mercury, cadmium, lead, chromium) bioaccumulate in aquatic organisms inhabiting metals contaminated environments. Some of the sub-lethal effects that metals can cause in salmonids include: immobilization and impaired locomotion, reduced growth, reduced reproduction, and impairment of olfactory and brain functions (Eisler 2000).

Fluid leakage can occur during operation, refueling and during maintenance activities. There is a potential for leakage of toxic chemicals to occur during the project that may have the potential to affect salmonids. In order to minimize the potential adverse affects associated with using heavy equipment, heavy equipment will be operated primarily within the dewatered reach of the creek. NMFS anticipates that if there is a leak and Caltrans BMPs are followed, it will be contained and cleaned up prior to entering the flowing water, making it unlikely that salmonids will be adversely affected.

In addition to toxic chemicals associated with the heavy equipment, water that comes into contact with wet cement during construction of the new bridges can also adversely affect water quality and steelhead downstream of the work area. Water that comes in contact with wet cement can result in an imbalance of pH levels. Many authors have reported that an imbalance in pH can cause as much as 75 percent mortality of salmonids (Thut and Schmiege 1991). However, the work areas will be sufficiently isolated from watered areas making a contamination scenario unlikely.

E. Pile Driving Activities

As described above in the *Description of the Proposed Action*, pile driving will be restricted in Novato, San Antonio, and Lynch creeks to low-flow periods between June 15 and October 31 to

avoid effects to migrating steelhead (adults or smolts). Pile driving may occur year-round in the Petaluma River.

Available information indicates that fish may be injured or killed when exposed to elevated levels of underwater sound pressure generated from driving steel piles with impact hammers (Hastings and Popper 2005). Pathologies associated with very high sound levels are collectively know as barotraumas. These include hemorrhage and rupture of internal organs, including the swimbladder and kidneys in fish. Death can be instantaneous, occur within minutes after exposure, or occur several days later. High sound pressure levels can also result in hearing damage to fish. Dual metric criteria are currently used to correlate physical injury to fish from underwater sound pressure produced during the installation of piles (Agreement in Principal between NMFS and FHWA/Caltrans, June 2008). If either accumulated Sound Exposure Level (SEL) of 187 dB re one micropascal squared-second (183 dB for fish less than 2 grams) or a single strike peak sound pressure level (SPL) of 206 dB re one micropascal is received by a fish, then physical injury may occur. NMFS and FHWA/Caltrans are currently discussing updating the criterion used by NMFS (root mean squared of 150 dB re one micropascal) to assess potential sub-injurious levels of impact.

The degree to which an individual fish exposed to underwater sound from pile driving may be affected is dependent on a number of variables, including, but not limited to, size of the fish, hearing ability of fish, presence of swimbladder, lifestage, fish behavior, presence of predators, sound amplitude and frequency, and effectiveness of any sound attenuation technology. Also, sound wave forms are affected by the size and type of pile and installation equipment.

Caltrans is proposing to install piles for this project year-round in the Petaluma River. The installation of CISS piles with an impact hammer in the Petaluma River would be expected to result in adverse effects to listed adult, juvenile, and smolt steelhead present in the impact area during pile driving operations due to high levels of underwater sound that would be produced. In order to minimize potential effects to steelhead from exposure to elevated levels of underwater sound produced during pile driving at the other creek locations, Caltrans will only conduct pile driving with an impact hammer from June 15 to October 31 and also proposes to attenuate sound by using all means possible while pile driving within the cofferdams. All pile driving outside of the above mentioned timeframe in the Petaluma River will use a hydrophone device to monitor sound levels. If the current thresholds (above 206 dB peak SPL and 187 accumulated dB SEL at 10 m from the pile being installed) that cause death or injury to fish are exceeded, Caltrans will stop the pile driving activities until sound levels can be maintained under the prescribed thresholds.

Caltrans proposes a year-round pile driving schedule for the new Petaluma Bridge. The first construction season will result in the installation of approximately 100 to 160 CISS piles for the center deck of the bridge and 160 to 200 piles for each of the new southbound and northbound decks that will be built the over the following three to four construction seasons. The use of a vibratory hammer to set the CISS piles will not result in injury to fish in the surrounding area since this type of hammer produces sound waves that differ from those of impact hammers and are considered to not produce physical injuries. The estimated number of strikes needed to drive each CISS pile with the impact hammer to depth is 200 to 600 per pile for a maximum total of

4,000 to 12,000 strikes per day, if 20 piles are installed per day and 400 to 1,200 strikes if two piles are installed per day.

The underwater sound produced from driving CISS piles for this project was evaluated using the total number of hammer strikes per pile and an estimate of the single strike peak SPL and SEL at a given distance. This information was used in a mathematical model that estimates the distance from the pile where physical injury to exposed fish may occur. The distance to where physical injury may occur from 762 mm (30-inch) diameter CISS piles in the Petaluma River was determined to be 1,000 m (3,281 feet) for fish weighing over two grams, given a worst case scenario of 12,000 strikes per day. The "over two gram" criterion was used as juvenile steelhead in the action area are more likely to weigh more than two grams. Therefore, under the worst case open water pile driving scenario, without sound attenuation, any fish within 1,000 m of the piles driven in a given day could be physically injured.

Caltrans has incorporated several measures to minimize exposure of fish, and attenuate high levels of underwater sound during pile driving, such as pile driving within cofferdams and using wood blocks between the piles and the impact hammer.[6] Pile driving near water causes sound energy to radiate indirectly into the water as a result of ground borne vibration at the bottom beneath the river. The low-frequency ground borne vibration can cause localized sound pressure waves in the water that are radiated from the bottom of the river. A minimum water depth is required to allow sound to propagate through water in an area. For pile driving sounds, the minimum depth for this propagation is 3 to 6 feet, depending on frequency. Sound waves do not propagate through air as readily as water. All CISS pile driving will occur within dewatered cofferdams which will provide a source of attenuation by creating an air space between the pile and the water column. Hydroacoustic monitoring outside of the cofferdams will certify the attenuation and all pile driving activities will stop if sound levels are exceeded. Based on these measures that will be used for pile driving outside of the June 15 to October 31 timeframe in the Petaluma River, NMFS believes injury or mortality to migrating steelhead is unlikely.

Steelhead migrating through the action area in late December through mid-May may experience minimal delays during exposure to elevated levels of underwater sound produced during pile driving. The delays are expected to last less than 12 hours since pile driving will occur only during daylight hours. These delays are unlikely to affect spawning success because they are short and spawning grounds are within five miles of this portion of the action area. Adult steelhead may hold below the action area in response to noise levels and, as a consequence, may increase their chances to predation; however, adult steelhead predators (*e.g.*, seals and sea lions) have not been observed in the Petaluma River and are not expected in the area during adult migration. Smolts that may be delayed during migration would likely find cover if they do hold above the bridge, and then continue migration during the evening hours after pile driving has stopped. Nevertheless, a small number of these delayed smolts may be exposed to increased predation from birds or other fish. Overall, few smolts are likely to be delayed, and even fewer are likely to experience increased predation. Smolts rely on tidal cues during outmigration and prefer migration at night. Depending on the amount of sound produced and time intervals between pile driving activities in a given day of pile driving there may be no delays in adult and

[6] As stated above, if current thresholds that cause injury to fish are exceeded, Caltrans will stop the pile driving activities until sound levels can be maintained under the prescribed thresholds.

smolt migrations. The use of effective attenuation devices and hydroacoustic monitoring during pile driving activities will likely prevent physical injuries to steelhead while they are delayed from migrating through the area as levels will not exceed those thresholds that result in injuries or mortality to salmonids.

As described above, green sturgeon are unlikely to be present in the action area. NMFS notes that even if one was present, the proposed project would not likely result in physically injure to a green sturgeon if exposed to underwater sound pressure produced during pile driving due to the attenuation devices.

The trestle platforms at the Petaluma River Bridge will only be constructed between June 15 and October 31 and use H-piles that will be placed mainly with the use of a vibratory hammer. Sound levels produced by vibratory hammers are not only lower, but generate different sound wave forms and lower sound frequencies that are believed to be less injurious than those produced by impact hammers. Injuries or mortalities to salmonids are not anticipated. Driving of piles with an impact hammer for trestle platforms in all waterways will be limited to 5-20 strikes per pile to confirm the strength of the pile to support the trestle platforms. This limited number of strikes is not expected to exceed injury thresholds.

Sheet piles will be used to construct the cofferdams and small piles will be used to construct falsework in all waterways. Only vibratory hammers will be used to construct the cofferdams and falsework. Based on data collected during the installation of steel sheet piles with a vibratory hammer at the Port of Oakland (Anderson and Reyff, 2006), peak sound pressure levels generated during this project are not expected to exceed thresholds for physical injury.

A small number of juvenile steelhead may be present in and around the portions of action area outside of the cofferdams in the Petaluma River. These fish will be foraging and rearing prior to outmigration as smolts. In the Petaluma River, most juvenile steelhead are expected to inhabit areas upstream of the bridge where freshwater and better habitat conditions are available. This would be especially true during the winter seasons when storm events occur and water quality and quantity increase. Nevertheless, a very small number of juvenile steelhead may be present near the cofferdams in the Petaluma River in the summer. Because Caltrans will monitor during the first two weeks of pile driving during the summer as noted in the *Description of the Proposed Action*, and take the necessary steps to further attenuate sound levels if necessary, NMFS expects that injury or mortality to juvenile steelhead is unlikely. NMFS assumes that pile driving during the summer that occurs after Caltrans has monitored sound levels during the adult and smolt migration seasons would incorporate any additional sound attenuation that may have been found necessary during this monitoring. Therefore, pile driving in the summers after the first season of pile driving during adult and smolt migration is not expected to injure or kill juvenile salmonids near the cofferdams in the Petaluma River.

NMFS cannot precisely quantify the small number of juvenile steelhead that may be present in the Petaluma River near pile driving activities during the summer but expects that the number will be small based on habitat conditions in the Petaluma River at this location.

The pile driving schedule in Novato Creek is expected to take one season (June 15 – October 31) and will use 16 – 600 mm (24-inch) CISS piles, with each pile requiring between 200 to 600 hammer strikes to achieve proper depth. Using the upper limit of 600 strikes each to drive 16 piles would result in 9,600 strikes if all the CISS piles were installed in a single day. Analysis using the same approach, as described in the above Petaluma River pile driving scenario, would require a minimum safe distance of 736 m (2,429 feet) for fish weighing over two grams from the impact site without the use of attenuation devices. This distance exceeds the size of cofferdams in Novato Creek; however, it is unlikely that this level of impact will be realized, given the small amount of piles that will be driven at this location and the amount of days available to conduct pile driving. The safe distance calculation is dependant on the number of strikes per day and it is unlikely that all 16 piles will be driven in a single day. The safe distance required from the impact site will also be reduced because Caltrans will drive piles within cofferdams, which NMFS expects will provide some sound attenuation.

Because of the uncertainty regarding the level of sound attenuation, NMFS will use the worst case scenario above to determine the maximum distance that could result in injury or death to juvenile steelhead in Novato Creek. With a safe distance of 736 meters (2,429 feet) upstream and downstream of piles being driven, NMFS has determined that juvenile steelhead are not likely to be found inside of this area.[7] Juvenile steelhead in Novato Creek are expected to be farther up in the watershed where water quality conditions are suitable for rearing over the summer months. The reaches where steelhead have been found in the summer were well beyond the distance determined for sound impacts that can injure or kill fish during pile driving, and based on the limited amount of pile driving needed at this crossing and the few amount of days that will be needed to finish this construction element of the project, NMFS does not believe there will be any pile driving related impacts to juvenile steelhead in Novato Creek.

Twenty pre-cast concrete piles will be driven into Lynch Creek. Available information indicates that the installation of concrete piles generates sound wave forms that are less injurious than steel piles of similar size. A study conducted at the Port of Oakland (Abbott *et al.* 2005) revealed that several species of fish which were held in cages 10 meters from the pile were not physically injured when exposed to several hundred underwater sound pulses during the installation of 24-inch octagonal concrete piles with an impact hammer. Based on these observations and the dry conditions over the summer months, impacts to steelhead are not anticipated from driving concrete piles at the Lynch Creek crossing.

A small number of Juvenile steelhead in the Petaluma River may experience sound levels due to pile driving that affect their behavior; however, NMFS expects these levels will be attenuated enough to not significantly disrupt normal behavior patterns, which include feeding and sheltering for juvenile steelhead, and are therefore discountable.

[7] This result is based on the habitat conditions in Novato Creek near the pile driving location, and recent surveys indicating steelhead have not been found within this distance of the bridge.

F. Habitat Impacts

1. Instream Habitat Loss

The installment of piers in the Petaluma River, Novato Creek, San Antonio Creek, Lynch Creek will result in instream habitat losses of 0.22 acres (9,583 square feet (ft^2)), 0.0012 acres (52 $feet^2$), 0.0023 acres (100 $feet^2$), 0.0222 acres (967 $feet^2$) respectively. This overall loss of instream habitat is small relative to the overall action area in these reaches. Lynch Creek will experience a greater loss of habitat than the other creek crossings relative to its size; however, steelhead do not use this portion of the action area; having only been found in Lynch Creek below the Highway 101 crossing, where habitat is limited and tidally influenced. The habitat area that will be lost in San Antonio Creek is also not utilized by steelhead. The portion of the action area that is impacted by this habitat loss in Novato Creek and the Petaluma River is used predominantly for adult and juvenile steelhead migration with some marginal rearing. The new piers are not expected to slow or prevent steelhead migrations through any of these waterways and can provide velocity refuge for steelhead during particularly high winter flows.

2. Shading

The combined amount of permanent impacts due to shading between the bridge spans will be 0.7403 acres (32,247 $feet^2$). The riparian cover located within the bridge gaps will likely wither and eventually die from the lack of sunlight as a consequence of shading. This amount of riparian cover in the gaps is minimal at all crossings with the exception of Lynch Creek and the new San Antonio Creek bridge crossings; however, steelhead use only the lower portion of Lynch Creek and have not been observed in San Antonio Creek at any of the bridge crossings. There is currently a lack of shade at the bridge crossings that likely results in higher water temperatures and any additional shading could potentially benefit salmonids by lowering water temperatures at or below these areas.

The reaches at the bridge crossings are used by steelhead migration and are deficient in the PCEs associated with other stages in the salmonid life-cycle. Salmonid species are attracted to shaded areas that provide an ambient light source. This additional shade from the new bridges would result in conditions that are expected to leave enough ambient light for successful salmonid navigation through the area.

3. Riparian

The dominant plant species found in the riparian corridors within the action area include California bay laurel (*Umbellularia californica*), California buckeye (*Aesculus californica*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), valley oak (*Quercus lobata*), Himalayan blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), and stinging nettle (*Urtica dioica*).

Riparian vegetation removal for this project will result in both temporary and permanent loss. Permanent impacts include loss of habitat due to shading and placement of bridge abutments and

approach roads. Temporary impact numbers include bioswale areas, designated staging areas, and areas in between the cut and fill line and the project footprint.

Riparian habitat loss will result from the clearing of banks to allow access to the construction sites and the placement of new crossings and connecting road. The riparian corridor along the banks of San Antonio Creek is better established than the corridors at the other locations, due to the two smaller crossings at San Antonio Road and Highway 101, and the overall limited land use in the area. Trees along the banks that provide overhanging canopy will be removed along with low lying brush and herbaceous vegetation along the creek banks. At the San Antonio Creek locations, Caltrans expects the 2.39 acres (104,138 ft^2) of permanent riparian removal and 0.64 acres (42,989ft^2) of temporary removal. The amount of riparian removal along San Antonio Creek is greater than in the other locations; however, the amount is relative to the riparian vegetation remaining in the area, which is ample enough to continue providing shade and cover within the area. Both temporary and permanent effects will also be mitigated should steelhead population re-establish within the San Antonio Creek.

Riparian removal at the Petaluma River and the Novato Creek locations consists of ground vegetation only and will result in a permanent loss of 0.34 acres (14,868ft^2) and 0.40 acres (17,372ft^2), and a temporary loss of 0.99 acres (42,989ft^2) and 0.47 acres (20,546ft^2) respectively. The impacts associated with this loss can result in an increase of sediment from eroding banks. Much of the Petaluma River vegetation is low ground cover, consisting mainly of pickle weed that while providing some bank support, does not support good quality habitat for fish. Ground cover will be re-vegetated with native plants after completing construction in these areas. BMPs for erosion control will be in place during all phases of construction to control erosion.

The Lynch Creek crossing has sparse riparian vegetation in the gap and along the banks. The amount of permanent riparian loss in this area is expected to be 0.28 acres (12,227ft^2) and a temporary riparian loss of 0.22 acres (9,391ft^2). The current amount of riparian cover at the bridge crossing does not contribute to lower water temperatures or provide cover for steelhead. Steelhead would use this reach for a migration corridor to habitat farther upstream, but have only been known to use the lower reaches of Lynch Creek, that are tidally influenced by the Petaluma River. Steelhead migrations through the area are more associated with flow than riparian cover in Lynch Creek and would still able to navigate through the reach at the crossing to more suitable habitat farther upstream unimpeded during wetter years.

Riparian habitat providing instream cover and food resources for salmonids will be temporarily impacted by the removal of bank cover and over-hanging canopy along creek banks. Although it may take 10 to 50 years to restore the full function of this component of salmonid habitat where vegetation clearing will occur on banks, the proposed restoration of planting riparian vegetation prescription in accordance with CDFG guidelines, over time will restore the function of the riparian habitat lost due to the construction activities. Habitat will be degraded during this riparian growth recovery period. Rearing juvenile and smolt steelhead will have less cover and potential prey resources for food. Migrating fish moving through the area will be more susceptible to predation. The riparian areas other than San Antonio Creek are sparse and do not provide much cover as would a riparian area with dense, mature vegetation.

4. Instream Habitat Loss

Temporary instream habitat loss will result from dewatering operations in the Petaluma River and Novato Creek. Temporary loss of habitat in the San Antonio and Lynch creeks will not be significant because steelhead are not anticipated to be present in these areas during or after construction. Instream work at a minimal level of intensity would require diverting channel flow from the pathways of equipment and the construction of falsework on timber pads. If in-channel construction is conducted in these creeks during a wet year or in early June, water will need to be diverted from the construction areas using cofferdams and associated equipment. The areas that will need dewatering would occur under existing and newly constructed bridges during the construction of the center decks and new bridges. The predicted cofferdam locations are between the north and southbound lanes at the Highway 101 crossing and these areas are narrow and the work space needed in the dewatered areas is on a small scale, therefore, the amount of temporary habitat loss is predicted to be small.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Impacts from urbanization, such as increased runoff from new areas of impervious surfaces, and sediment and turbidity associated with road repair and construction, are likely to continue to occur in the action area. Some degradation of water quality in the Petaluma River is likely contributed by boat traffic and marina activities near the bridge crossing. The pace of such development fluctuates based on economic conditions, and has currently slowed. In recent years, additional aquatic habitat protections have been applied by State and Federal agencies to development projects. Based on these factors, NMFS concludes that the level of habitat degradation in the action area resulting from cumulative effects is expected to remain fairly constant or somewhat reduced during the next several years when the project is implemented.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

Steelhead in the CCC DPS are suffering severe and long-term declines, both range-wide and within the action area. Across the region, significant destruction and degradation of spawning and rearing habitat has occurred. Threats to naturally reproducing steelhead are numerous, varied, and ongoing. NMFS listed as threatened the southern DPS of North American green sturgeon on April 7, 2006, (70 FR 17757) because of substantial loss of spawning habitat, the concentration of a single spawning population in one section of the Sacramento River, and multiple other risks to the species.

The MSN Project activities will directly affect steelhead and steelhead critical habitat. NMFS anticipates that take in the Petaluma River of listed juvenile steelhead as a result of this project

will be in the nature of injury, mortality and temporary capture and harassment. Some juvenile steelhead that were not captured and relocated from the cofferdams will perish from desiccation resulting from dewatering the cofferdam. A small number of juvenile steelhead may be injured or killed during relocation. This level of injury and mortality is expected to be small based on the results of other similar relocation efforts, the thoroughness of relocation efforts and the low steelhead numbers anticipated in the action area

Other take is expected in the form of harassment of steelhead from sound levels resulting from year-round pile driving in the Petaluma River. This take is expected to harass fish as they pass through the area and could result in migration delays both up and down river. Sound attenuation devices will be used and sound levels will be monitored to keep impacts below the sound thresholds for tissue injury and mortality. A small number of smolts are likely to experience increased predation due to delay.

The temporary capture and harassment will be of limited duration and mortality numbers due to relocation, dewatering, and delay in the Petaluma River will be low. BMPs incorporated into the project will avoid and minimize the impacts associated with these activities. Therefore, the summed amount of the steelhead take is not expected to have any long-term effects on the survival of the affected steelhead population that should be able to replace their lost numbers once fish return to their normal behavior patterns. Due to the small number of juveniles and smolts lost, adult returns are likely to be only minimally affected, if at all. There will be enough returning adults to populate the Petaluma River watershed with steelhead juveniles in numbers equivalent to those currently found in the watershed, including the action area.

NMFS has determined that it is unlikely that North American green sturgeon will occur in the action area due to the lack of observations of this species in the Petaluma River. Green sturgeon do have access to this reach of the Petaluma River, but there is minimal to no risk that they will be in this area during construction. There they are unlikely to be adversely affected.

The amount of permanent habitat loss is minimal when compared to the overall migratory corridor above and below the modified and new bridges and is not expected to create a migration barrier (at most or all flows). PCE's within the action area also include some marginal rearing habitat for steelhead. Short-term impacts from construction activities will be minimal and localized at the project site, and are unlikely to affect critical habitat up or downstream. Long-term impacts to the rearing PCE from construction will be limited to the actual footprint of the new bridge crossing. Much larger areas in the creeks and river will remain undisturbed, as will the higher quality rearing and spawning habitats up and downstream of the action area. Therefore, the project is not expected to affect the value critical habitat for species conservation.

VIII. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of the species and critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NMFS' biological opinion that the MSN Project

is not likely to jeopardize the continued existence of threatened CCC steelhead or the southern DPS of North American green sturgeon.

After reviewing the best available scientific and commercial information, the current status of critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NMFS' biological opinion that the MSN Project is not likely to destroy or adversely modify designated critical habitat or proposed critical habitat for CCC steelhead or the southern DPS of North American green sturgeon, respectively.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by Caltrans, as appropriate, for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans: (1) fails to assume and implement the terms and conditions or (2) fails to require their designee(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR §402.14(i)(3)).

A. Amount or Extent of Take

The MSN Project is expected to result in minimal incidental take of threatened CCC steelhead. As described above in the biological opinion, juvenile steelhead are expected to be subject to capture for relocation efforts. A small number of fish are likely to be killed as a result of relocation efforts in the Petaluma River during dewatering. A few fish may avoid relocation efforts and be killed when the work area is dewatered. The number of threatened CCC steelhead that may be incidentally taken during fish collection and relocation cannot be precisely quantified in the Petaluma River, but is expected to be a small amount.

Therefore, take is quantified as: all fish present in the cofferdams installed in the Petaluma River may be captured by dewatering and relocation activities. NMFS anticipates a small number of these juvenile steelhead will either avoid relocation efforts and be killed during dewatering, or be injured or killed during capture and relocation. No more than 4.5 percent of juvenile steelhead within the proposed cofferdams in the Petaluma River will be injured or killed.

Take from pile driving is quantified as: all steelhead (adult, smolts, and juveniles) present in the Petaluma River portion of the action area during pile driving. These fish are likely to experience disruption in normal behavior patterns when pile driving is done using an impact hammer. For example, adults and smolts may experience migration delays due to the sound pressure waves generated by pile driving in the Petaluma River; however, spawning habitat used by steelhead is not far upstream from the action area and spawning success is not expected to be compromised by short-term migration delays. Outmigrating smolts in the spring are expected to be able to pass the short distance trough the action area via the 60-foot navigation channel that Caltrans has proposed to maintain in the Petaluma River. Smolts migrating during the day may experience short-term disruption during migrations as they may hold above the action area during pile driving activities. During the holding times, smolts would likely seek cover until the pile driving activities have stopped then continued migration through the area under the cover of night. Nevertheless, a small number of these smolts may experience increased predation.

Because the precise number of steelhead delayed or exposed to increased predation cannot be determined, NMFS will use the underwater sound thresholds described above in the biological opinion as surrogates for incidental take. If underwater sound produced during five or more strikes on a single day exceeds the anticipated levels of 206 dB peak SPL and 187 accumulated dB SEL at 10 m from the pile being installed, incidental take is likely to be exceeded.

B. Effect of the Take

In the accompanying biological opinion, NMFS determined that this level of anticipated take is not likely to result in jeopardy to CCC steelhead.

C. Reasonable and Prudent Measures

Pursuant to section 7(b)(4) of the ESA, the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of threatened CCC steelhead:

1. Measures shall be taken to minimize injury and mortality to listed steelhead from fish relocation activities, dewatering activities, and bridge construction.

2. Measures shall be taken to minimize injury and mortality to listed steelhead from pile driving activities.

3. FHWA and Caltrans shall provide reports to NMFS on the effectiveness of the project's incidental take minimization measures.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, Caltrans and their designee(s) must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary. Monitoring requirements are included below, as per 50 CFR 402.12(i)(3): "In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service [NMFS] as specified in the incidental take statement."

The following terms and conditions implement Reasonable and Prudent Measure 1.

1. Caltrans shall provide NMFS with a "Fish Relocation Plan" and a "Dewatering Plan" for review 30 days prior to the start of dewatering and fish relocation activities. The Fish Relocation Plan shall outline all fish collection and relocation methods and materials. The plan shall be submitted to NMFS' Santa Rosa Area Office (see address below). The Dewatering Plan shall outline all dewatering methods, including dewatering timeframes before and after pile driving within the cofferdams. Plans for storing and cleaning water pumped from the river and creeks prior to discharge must be described. The plan shall be submitted to NMFS' Santa Rosa Area Office (see address below).

2. Caltrans shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the "NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act", June 2000. A Statement of Qualifications for all biologists who will be employed on the project shall be provided to NMFS for review 30 days prior to any onsite project construction (or demolition) related activities.

3. The biologist shall monitor the construction site during fish relocation and dewatering activities to minimize or avoid take of salmonids. The biologist shall be on site during all these events to ensure that all listed salmonids are captured, handled, and relocated safely. The biologist shall notify NMFS biologist Dave Walsh (707) 575-6016 or dave.walsh@noaa.gov one week prior to relocation activities in order to provide an opportunity for NMFS staff to observe the activities.

4. Listed salmonids shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year salmonids from older salmonids and other potential aquatic predators. Captured salmonids shall be relocated, as soon as possible, to a location out of the project's impact area, which has suitable habitat conditions, and which allows for maximum survival of the transported salmonids.

5. Caltrans shall provide NMFS with an annual summary report within 90 days of the completion of fish relocation and monitoring activities. The report shall include the methods used during the fish relocation and monitoring efforts, location, number and species captured, number of mortalities by species, and other pertinent information related to the monitoring and fish relocation activities. Reports shall be submitted to NMFS Santa Rosa Area Office (see address below).

6. All pumps used in the work area shall be equipped with screens that meet the following NMFS fish screening criteria:

a. Perforated plate: screen openings shall not exceed 3/32 inches (2.38 mm), measured in diameter.
b. Woven Wire: screen openings shall not exceed 3/32 inches (2.38 mm measured diagonally).
c. Screen material shall provide a minimum of 27 percent open area.
d. Approach velocity shall not exceed 0.33 feet per second.

7. Caltrans shall provide written notification to NMFS at least 14 days prior to commencement of in-channel bridge construction, or over-channel bridge demolition. Written notification shall be sent to NMFS' Santa Rosa Area Office (see address below).

8. All cofferdams must be inspected and maintained on a daily basis to ensure its integrity for the duration of the work schedule below OHW.

<u>The following terms and conditions implement Reasonable and Prudent Measure 2.</u>

9. Pile driving of the CISS piles in wetted channels (or within cofferdams in wetted channels) shall occur only during daylight hours with the sun above the horizon. This is to ensure that pile driving does not occur at dawn or dusk, which can be peak movement times for juveniles.

10. FHWA and Caltrans shall monitor underwater sound during all impact hammer pile driving activities on land or in water for CISS piles used in the construction of the Petaluma River Bridge footings. If underwater sound produced during five or more strikes on a single day exceeds the anticipated levels of 206 dB peak SPL and 187 accumulated dB SEL at 10 m from the pile being installed, then pile driving must cease and NMFS must be contacted within 24 hours: Dave Walsh (707) 575-6016 or dave.walsh@noaa.gov, or the NMFS Santa Rosa Office (707) 575-6050. The purpose of the contact is for Caltrans to describe the measures that will be taken to reduce underwater sound levels. Once NMFS agrees to the measures to reduce underwater sound, pile driving may proceed unless monitoring detects underwater sound levels greater than those specified above. If sound levels exceed those specified above, Term and Condition 10 repeats until sound levels are below the levels specified above.

11. An environmental noise technician shall monitor the construction site during pile driving activities to monitor sound impact avoidance measures and record the outcomes of each pile driving event. The technician shall be on site during all these events to ensure that all sound attenuation devices are being used and that sound impact avoidance protocols are adhered to.

12. Each pile driving incident shall be monitored and recorded in a log that includes the sound levels at the stopping time and the sound levels at the starting time. If sound levels are above SPL and SEL, actions will be taken to lower the sound level to a level that will not produce injurious sound pressure levels to salmonids.

13. Sound attenuation devices will be used for all pile driving activities.

14. If Caltrans is unable to meet these sound attenuation criteria then impact driving of CISS pile shall only occur from May 15 through November 30 in any given construction season to allow adult and smolt steelhead migration to their natal streams and the ocean.

15. At the Petaluma River location, if pile driving of CISS piles commences within the June 15 to October 31 timeframe in the first work season, Caltrans shall monitor these activities, using the hydroacoustic equipment, for a period of no less than two weeks. If the sound levels fall below the sound thresholds of 206 dB peak SPL and 187 accumulated dB SEL at 10 m from the pile being installed, then Caltrans may continue to drive CISS piles with an impact hammer until November 1. Otherwise, Caltrans may continue to pile drive as long as additional sound attenuation can reduce underwater sound below the thresholds above.

<u>The following terms and conditions implement Reasonable and Prudent Measure 3.</u>

16. FHWA and Caltrans shall provide reports to NMFS on the effectiveness of the project's incidental take minimization measures no later than 90 days following the end of each construction season, including an annual minimization measure effectiveness report for the Petaluma River activities.

17. FHWA and Caltrans shall provide annual reports to NMFS with the results of the hydroacoustic monitoring program. The first report shall be submitted to NMFS no later than January 31, following the first year of construction, and shall provide year-round results of the previous construction season. The second annual hydroacoustic report, covering the second year monitoring period, shall be provided to NMFS by January 31 in the year following the second year of construction (see address below).

18. FHWA and Caltrans shall provide NMFS with an annual summary report within 90 days of the completion of fish relocation and monitoring activities each year. The report of relocation shall include the methods used during the fish relocation and monitoring efforts, location, number and species captured, number of mortalities by species, and other pertinent information related to the monitoring and fish relocation activities. Reports shall be submitted to NMFS Santa Rosa Area Office (see address below).

19. FHWA, Caltrans, or contractor shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to access the MSN Project work areas during the construction period for the purpose of observing monitoring activities, evaluating fish and stream conditions, performance of Caltrans' BMPs, or perform other monitoring/studies. NMFS will notify Caltrans

Resident Engineer 48 hours prior to plan site visits and will contact Caltrans personnel prior to entering the construction site.

20. All reports or plans required for the above terms and conditions shall be sent to:

NMFS Santa Rosa Area Office
Supervisor, Protected Resources Division
Southwest Region
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

X. REINITIATION NOTICE

This concludes formal consultation on the proposed Marin Sonoma Narrows High Occupancy Vehicle Widening Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or develop additional information.

1. NMFS recommends that piles not be installed during steelhead migration - December through mid-May in the Petaluma River.

2. NMFS recommends that FHWA and Caltrans consult with NMFS to develop a long range planning approach that seeks to minimize and avoid the impacts of road-related projects on listed salmonids.

3. Caltrans should identify and prioritize any maintenance and construction projects which, if implemented, can improve ESA-listed salmonid migration or in-stream environmental conditions.

4. Caltrans in coordination with NMFS should use this project to initiate studies to acquire empirical data for establishing criteria for the cumulative effects to fish from exposure to underwater sound produced during multiple pile driving strikes.

XII. LITERATURE CITED

Abbott, R., J. Reyff, and G. Marty. 2005. Monitoring the effects of conventional pile driving on three species of fish. Final report submitted to Manson Construction Co. April 8, 2005.

Adams, P.B., C.B. Grimes, S.T. Lindley, and M.L. Moser. 2002. Status Review for North American Green Sturgeon, *Acipenser medirostris*.

Anderson, C.R., and J.A. Reyff. 2006. Underwater sound measurement data for the driving of steel sheet piles and square concrete piles. Port of Oakland, Berth 23. Vortex Marine Construction. Oakland, CA.

Baxter, R., K. Hieb, S. DeLeon, K. Flemmingm, and J. Orsi. 1999. Report on the 1980-1995 fish, shrimp, and crab sampling in the San Francisco Estuary, California. Edited by J. Orsi. California Dept. of Fish and Game, Tech. Rpt. 63, November 1999. 503 pp.

Beamish, R.J., and D.R. Bouillion. 1993. Pacific salmon production trends in relation to climate. Canadian Journal of Fisheries and Aquatic Sciences 50:1002-1016.

Beamish, R.J., C.M. Neville, and A.J. Cass. 1997. Production of Fraser River sockeye salmon (*Oncorhynchus nerka*) in relation to decadal-scale changes in the climate and the ocean. Canadian Journal of Fisheries and Aquatic Sciences 54:543-554.

Berg, L., and T. G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Berggren, T.J. and M.J. Filardo. 1993. An analysis of variables influencing the migration of juvenile salmonids in the Columbia River Basin. North American Journal of Fisheries Management 13:48-63.

Bilby, R.E., and B.R. Fransen *et al.* 1996. Incorporation of nitrogen and carbon from spawning coho salmon into the trophic system of small streams: evidence of stable isotopes. Canadian Journal of Fisheries and Aquatic Sciences. 53:164-173.

Bilby, R.E., and P.A. Bisson. 1998. Function and Distribution of Large Woody Debris. Pages 324-346. *In*: Naiman, R.J. and R.E. Bilby, editors. River Ecology and Management: Lessons from the Pacific Coastal Ecoregion. Springer-Verlag. New York. 705 pages.

Bjorkstedt E.P., B.C. Spence, J.C. Garza, D.G. Hankin, D. Fuller, W.E. Jones, J.J. Smith, and R. Macedo. 2005. An Analysis of Historical Population Structure for Evolutionarily

BRT (Biological Review Team). 2005. Green Sturgeon (*Acipenser medirostris*) Status Review Update. National Marine Fisheries Southwest Fisheries Science Center, Santa Cruz, California.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. United States Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NOAA Fisheries-NWFSC-27. 261 pages.

California Department of Transportation (Caltrans). July 2008. Biological Assessment for the Marin Sonoma Narrows Project.

Campbell, R.N.B., and D. Scott. 1984. The determination of minimum discharge for 0+ brown trout (*Salmo trutta L.*) using a velocity response. New Zealand Journal of Marine and Freshwater Research. 18:1-11.

Chapman, D.W., and T.C. Bjornn. 1969. Distribution of salmonids in streams, with special reference to food and feeding. *In* T.G. Northcote, ed., Symposium on salmon and trout in streams, pgs. 153-176. H.R. MacMillan Lectures in Fisheries, University of British Columbia, Institute of Fisheries, Vancouver.

Clothier, W.D. 1953. Fish loss and movement in irrigation diversions from the west Gallatin River, Montana. Journal of Wildlife Management. 17:144-158.

Clothier, W.D. 1954. Effect of water reductions on fish movement in irrigation diversions. Journal of Wildlife Management. 18: 150-160.

Cushman, R.M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. North American Journal of Fisheries Management. 5:330 339.

Eisler, Ronald. 2000. Handbook of Chemical Risk Assessment: Health Hazards to Humans, Plants, and Animals. Volume 1, Metals. Lewis Press, Boca Raton, Florida EPA (Environmental Protection Agency). 1993. Office of Water. Guidance Specifying Management Measures of Sources of Nonpoint Pollution in Coastal Waters. EPA-840-B-93-001c. January 1993.

EPA (Environmental Protection Agency). 1993. Office of Water. Guidance Specifying Management Measures of Sources of Nonpoint Pollution in Coastal Waters. EPA-840-B-93-001c. January 1993.

Fawcett Environmental Consulting. 2000. Brief summary of aquatic species captured and relocated from the Novato Creek Flood Control Project site, August 2000. Report

Fawcett Environmental Consulting. 2006. Brief summary of aquatic species captured and relocated from the Novato Flood Control Project, Phase VIII, June 2006. Report

Fukushima L., and E.W. Lesh. 1998. Adult and juvenile anadromous salmonid migration timing in California streams. California Department of Fish and Game 84(3):133- 145.

Furrer, T. Website: United Anglers of Casa Grande. Accessed September 15, 2007. http://www.uacg.org/.

Gregory, R. S., and T. G. Northcote. 1993. Surface, planktonic, and benthic foraging by juvenile Chinook salmon (*Oncorhynchus tshawytcha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50:233-240.

Gresh, T., J. Lichatowich, and P. Schoonmaker. 2000. An estimation of historic and current levels of salmon production in the northeast pacific ecosystem. Fisheries 15(1):15-21.

Hamaker T., Hiss A., and Kettley, L. 2003. *Special-Status Fish Habitat Surveys for the State Route 101 Novato Narrows Project*. Technical Memorandum. CH2M HILL. 8 pp.

Hanson, L.C. 1993. The foraging ecology of Harbor Seals, *Phoca vitulina*, and California Sea Lions, *Zalophus californianus*, at the mouth of the Russian River, California. Master of Science thesis, Sonoma State University, Rohnert Park, California.

Harvey, B.C. 1986. Effects of suction gold dredging on fish and invertebrates in two California streams. North American Journal of Fisheries Management 6:401-409.

Hastings, M.C., and A. N. Popper. 2005. Effects of Sound on Fish. Prepared for the California Department of Transportation. January 28, 2005. http://www.dot.ca.gov/hq/env/bio/files/Effects_of_Sound_on_Fish23Aug05.pdf.

Hayes, D.B., C.P. Ferreri, and W.W. Taylor. 1996. Active fish capture methods. Pages 193-220 *in* B.R. Murphy and D.W. Willis, editors. Fisheries Techniques, 2nd edition. American Fisheries Society. Bethesda, Maryland. 732 pages.

Hubert, W.A. 1996. Passive capture techniques. Pages 157-192 *in* B.R. Murphy and D.W. Willis, editors. Fisheries Techniques. Second Edition. American Fisheries Society. Bethesda, Maryland. 732 pages.

Jensen, P.T., and P.G. Swartzell. 1967. California salmon landings 1952 through 1965. California Department of Fish and Game, Fish Bulletin 135:1-57.

Johnson, S.L. 1988. The effects of the 1983 El Niño on Oregon's coho (*Oncorhynchus kisutch*) and Chinook (*O. tshawytscha*) salmon. Fisheries Research 6:105-123.

Kraft, M.E. 1972. Effects of controlled flow reduction on a trout stream. Journal of Fisheries Research. Board of Canada 29:1405-1411.

Leidy, R.A. 1984. Distribution and Ecology of Stream Fishes in the San Francisco Bay Drainage (and associated unpublished data, 1981-1984). Hilgardia 52(8).

Leidy, R.A. 2002. Unpublished stream survey data 1992-2002. U.S. Environmental Protection Agency.

Leidy, R.A., G.S. Becker, and B.N. Harvey. 2005. Historical Distribution and Current Status of Steelhead/Rainbow Trout (*Oncorhynchus mykiss*) in Streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, California.

Lindley, S.T., M.L. Moser, D.L. Erickson, M. Belchik, D.W. Welch, E. Rechisky, J.T. Kelly, J. Heublein, A.P. Klimley. 2008. Marine migration of North American green sturgeon. Trans. Am. Fish. Soc. Accepted for publication.

MacFarlane, R.B., and E.C. Norton. 2001. Physiological ecology of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) at the southern end of their distribution, the San Francisco Estuary and Gulf of the Farallones, California. Fish. Bull. 100:244-257.

McElhany, P., M.H. Ruckelshaus, M.J. Ford, T.C. Wainwright, and E.P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, NOAA Technical Memorandum NMFS-NWFSC-42. 156 pages.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press. Berkeley, California.

NMFS (National Marine Fisheries Service). 1997. Status review update for West Coast steelhead from Washington, Idaho, Oregon, and California. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 68 pages. Conditions. Prepared for Environmental Science Assoc., June 19, 1997.

NMFS (National Marine Fisheries Service). 1999. Status review update for four deferred ESUs of Chinook salmon from Washington, Oregon, California, and Idaho. National Marine Fisheries Service, Northwest Fisheries Science Center. 100 pages, plus appendixes.

NMFS (National Marine Fisheries Service). 2005a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. United States Department of Commerce, National

Oceanic and Atmospheric Administration, National Marine Fisheries Service. June 2005. 512 pages.

NMFS (National Marine Fisheries Service). 2005b. Final assessment of the National Marine Fisheries Service's Critical Habitat Review Teams (CHARTs) for seven salmon and steelhead evolutionarily significant units (ESUs) in California. July 2005. 23 pages, plus appendices.

Pile Driving Compendium. 2007. The Compendium of Pile Driving Sound Data. Prepared by Illinworth and Rodkin for the California Department of Transportation. http://www.dot.ca.gov/hq/env/bio/files/pile_driving_snd_comp9_27_07.pdf.

Reiser, D.W., and T.C. Bjornn. 1979. Habitat requirements of anadromous salmonids. United States Department of Agriculture Forest Service General Technical Report PNW-96. 54 pages.

Rich, A.A. 1997. Novato Creek Flood Control Project, Marin County, Fishery Resources

Sigler, J.W., T.C. Bjornn, and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelhead and coho salmon. Transactions of the American Fisheries Society 113:142-150.

Skinner, J.E. 1962. Fish and Wildlife Resources of the San Francisco Bay Area.

Thomas, V. G. 1985. Experimentally determined impacts of a small, suction gold dredge on a Montana stream. North American Journal of Fisheries Management 5:480- 488.

Thomson, B., and J. Michaels. 1968a. Stream Survey Petaluma Creek. CDFG report submitted to Marin County Public Works Department. 2 pages.

Thomson, B., and J. Michaels. 1968b. Stream Survey Adobe Creek. CDFG report submitted to Marin County Public Works Department. 2 pages.

Thut, R. N., and D.C. Schmiege. 1991. Processing Mills. Pages 369-387 *in* Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. W.R. Meehan, editor. American Fisheries Society Special Publication 19. American Fisheries Society. Bethesda, Maryland.

Velagic, E. 1995. Turbidity study: a literature review. Prepared for Delta planning branch, California Department of Water Resources by Centers for Water and Wildland Resources, University of California, Davis.

Waples, R.S. 1991. Definition of "Species" Under the Endangered Species Act: Application to Pacific Salmon. United States Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS F/NWC-194. 15 pages.

Waples, R.S. 1999. Dispelling some myths about hatcheries. Fisheries 24(2):12-21.

Waters, T. F. 1995. Sediment in Streams: Sources, Biological Effects, and Control. American Fisheries Society Monograph 7.

XIII. FEDERAL REGISTER NOTICES CITED

61 FR 56138: Endangered and Threatened Species; Threatened Status for Central California Coast Coho Salmon Evolutionarily Significant Unit (ESU). National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Department of Commerce. Final Rule. Federal Register, Volume 61, No. 212, October 31, 1996. pages 56138-56149.

62 FR 43937: National Marine Fisheries Service. Final Rule: Listing of Several Evolutionary Significant Units of West Coast Steelhead. Federal Register, Volume 62 pages 43937-43954. August 18, 1997.

69 FR 71880: Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionary Significant Units of Pacific Salmon and Steelhead in California; Final Rule. Federal Register 70, No 170: 52488-52586. September 2, 2005.

70 FR 17386. April 6, 2005. Proposed Rule: Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Federal Register, Volume 70 pages 17386-17401.

70 FR 52488: National Marine Fisheries Service. Final Rule: Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionary Significant Units of Pacific Salmon and Steelhead in California. Federal Register, Volume 70 pages 52488-52586. September 2, 2005.

71 FR 17757. April 7, 2006. Final Rule: Endangered and Threatened Wildlife and Plants: Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Federal Register, Volume 71 pages 17757-17766.

71 FR 834: National Marine Fisheries Service. Final Listing Determinations for Ten Distinct Population Segments of West Coast Steelhead; Final Rule. Federal Register, Volume 71 pages 834-862. January 5, 2006.

73 FR 52084: National Marine Fisheries Service. Proposed Rulemaking To Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American

Green Sturgeon; Proposed Rule. Federal Register, Volume 73 pages 52084-52110. September 8, 2008.

XIV. PERSONAL COMMUNICATIONS

Michael Fawcett, Fawcett Consulting, personal communication with Dave Walsh, October 15, 2007, and October 3, 2008.

Michael Fawcett, Fawcett Consulting, email communication with Dave Walsh, January 20, 2009.

David Woodbury, NMFS, personal communication with Dave Walsh, October 2008.

Bill Cox, California Department of Fish and Game, personal communication with Caltrans on June 29, 2002.

Bill Cox, California Department of Fish and Game, personal communication with Dave Walsh via email, October 2, 2008.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
81420-2008-F-1619-4

APR 0 1 2009

Mr. Walter C. Waidelich Jr.
Federal Highway Administration
U. S. Department of Transportation
650 Capitol Mall, Suite 4-100
Sacramento, California 95814

Subject: Biological Opinion for the State Route 101 Marin-Sonoma Narrows High Occupancy Vehicle Widening Project, Marin and Sonoma Counties, California (Caltrans EA 264000) on the Threatened California Red-legged Frog and the Endangered Salt Marsh Harvest Mouse

Dear Mr. Waidelich:

This is in response to your June 18, 2008, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed State Route 101 Marin-Sonoma Narrows High Occupancy Vehicle Widening Project, Marin and Sonoma Counties, California. Your request was received in this office via an electronic mail message on June 24, 2008, and included the request for formal consultation on the threatened California red-legged frog (*Rana aurora draytonii*) and the endangered salt marsh harvest mouse (*Reithrodontomys raviventris*). This document represents the Service's biological opinion on the effects of the proposed action on this listed species. This document is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*)(Act).

Protocol level surveys have not been completed in the action area due to scheduling issues and access problems for the soft bird's beak (*Cordylanthus mollis* ssp. *mollis*), endangered Baker's larkspur (*Delphinium bakeri*), endangered Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), endangered showy Indian clover (*Trifolium amoenum*), and endangered Contra Costa goldfields (*Lasthenia conjugens*). Suitable habitat is located within the action area for all of these listed plants. At this time, based on the preliminary and incomplete information provided to the Service, we concur that the proposed project may affect, but is not likely to adversely affect these five listed plant species. At a meeting with the Service on June 5, 2008, and in a letter to the Service dated June 18, 2008, the Federal Highway Administration (FHWA) stated that they will complete protocol level surveys within the action area for all of these listed

species prior to groundbreaking and reinitiate consultation pursuant to section 7 if any or all of these taxa are found, with the understanding that the presence of any or all of these plants could lead to additional conservation measures that will be determined in conjunction with the Service, project delays, project redesign, or other significant effects on the State Route 101 Marin Sonoma Narrows project.

Based on our current knowledge regarding their distribution we have determined the proposed action is not likely to adversely affect the endangered Sebastopol meadowfoam (*Limnanthes vinculans*, endangered Sonoma County Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*), or the endangered California clapper rail (*Rallus longirostris obsoletus*) due to lack of appropriate habitat in the action area.

This biological opinion is based on: (1) May 2008 Biological Assessment; (2) June 19, 2008, field review; (3) additional project information provided by the California Department of Transportation (Caltrans) on August 27, 2008; (4) miscellaneous correspondence and electronic mail concerning the proposed action between the Service and Caltrans, the Transportation Authority of Marin, and the Sonoma County Transportation Authority; and (5) other information available to the Service.

Consultation History

April 21, 2008	The Service received a letter dated April 17, 2008, regarding a tentative meeting agenda and information on a proposed Least Environmentally Damaging Preferred Alternative for the Marin-Sonoma Narrows Project.
June 2, 2008	The Service received a letter dated May 30, 2008, providing a summary of the May 7, 2008, meeting to discuss the proposed Least Environmentally Damaging Preferred Alternative for the Marin-Sonoma Narrows Project.
June 5, 2008	The Service received an advance copy of the Biological Assessment for the proposed State Route 101 Marin-Sonoma Narrows High Occupancy Vehicle (HOV) Widening Project, Marin and Sonoma Counties, California, at a meeting with the FHWA and Caltrans. In the Biological Assessment, Caltrans determined that the proposed project *is likely to adversely affect* Burke's goldfields, Sonoma alopecurus, Contra Costa goldfields, Sebastopol meadowfoam, California red-legged frog, and the salt marsh harvest mouse; but *will not affect* the soft bird's beak, showy Indian clover, California tiger salamander, or the California clapper rail. The Service recommended that FHWA and Caltrans revise their current determinations to a *no effect* for the Sebastopol meadowfoam and a *may affect, not likely to adversely affect* for the five remaining listed plant species given their commitment to reinitiate consultation following completion of protocol surveys for these species within suitable habitat

within the action area prior to construction. The Service also recommended that FHWA/Caltrans consider the presence of upland and aquatic habitat for California red-legged frog on the east side of State Route 101. This was based on the existing east-west connectivity provided by culverts and bridge crossings under State Route 101, particularly in Segment B. During the meeting Caltrans requested that the biological opinion first be issued as a draft for their review.

June 19, 2008 — The Service attended a field review of the project with Caltrans, the Transportation Authority of Marin (TAM), the Sonoma County Transportation Authority (SCTA), and their consultants. Following the field review, the Service met with Caltrans, TAM, and SCTA to summarize the information requests that arose during the visit. The information requests were primarily associated with the need for more complete project description for activities at creek and river crossings.

June 24, 2008 — The Service received a letter dated June 18, 2008, from the Federal Highway Administration (FHWA) requesting formal consultation for the proposed State Route 101 Marin-Sonoma Narrows High Occupancy Vehicle (HOV) Widening Project, Marin and Sonoma Counties, California. The letter was received via an electronic mail message. In the letter, FHWA requested formal consultation on the threatened California red-legged frog, the endangered salt marsh harvest mouse, and seven listed plants. It was noted in the letter that FHWA was requesting formal consultation on seven listed plants due to their incomplete plant surveys of the action area. FHWA also outlined their plan to reinitiate consultation on the individual listed plants following the completion of additional protocol plant surveys within the action area prior to ground disturbing activities.

June 25, 2008 — The Service sent FHWA a request for additional information to adequately review the determination of the effects of the project on listed species (Service File: 81420-2008-I-1619-1). The information requested primarily focused on the need for additional project description information, particularly for those activities associated with drainage crossings. Other issues of particular focus included: the effects to salt marsh harvest mouse potential habitat under the Petaluma River Bridge; the acknowledgement of California red-legged frog habitat on the east side of State Route 101 in Segment B; the potential for California red-legged frog to occur in the more urban drainages of Segments A and C; appropriate compensation ratios to offset effects; and the previously mentioned recommended listed plant species determinations.

August 7, 2008	The Service received additional information dated August 5, 2008, from Caltrans in response to the June 25, 2008, information request and questions asked during the June 19, 2008, field visit. Of note, the Caltrans letter revised the California red-legged frog effects acreage to 206.94 acres (203.78 acres of permanent effects and 3.16 acres of temporary effects) and FHWA and Caltrans revised their effects determination for the Sebastopol meadowfoam to "no effect." Caltrans also revised their determination for soft bird's beak, Baker's larkspur, Sonoma alopecurus, and Contra Costa goldfields to a "may affect, not likely to adversely affect." Caltrans committed to completing protocol level surveys for these four listed plants within the action area prior to construction. FHWA will reinitiate consultation with the Service if a listed species is found in the action area or could otherwise be affected by the project.
August 13, 2008	The Service received a revised project description from Caltrans developed for the formal consultation process with the National Marine Fisheries Service via an electronic mail message.
August 27, 2008	The Service received a revised a complete project description from Caltrans via an electronic mail message.
August 29, 2008	The Service issued a draft biological opinion (file # 81420-2008-F-1619-2).
September 16, 2008	The Service met with FHWA, Caltrans, TAM, and SCTA to discuss the draft biological opinion.
September 19, 2008	The Service received additional project information, comments on the draft biological opinion, and September 16, 2008, meeting notes from Caltrans via an electronic mail message.
September 24, 2008	The Service received elevation contours for action area near the Petaluma Bridge from Caltrans via an electronic mail message.
September 26, 2008	The Service received comments on the draft biological opinion from FHWA.
October 9, 2008	The Service met representatives from Caltrans and CDFG to discuss the proposed geotechnical borings for the Petaluma Bridge portion of the proposed action.
December 2, 2008	The Service received project description information from Caltrans for the proposed geotechnical borings for the Petaluma Bridge portion of the

proposed action via an electronic mail message. A hardcopy of the information was received on December 3, 2008.

December 10, 2008 The Service received an electronic message from Caltrans outlining the proposed compensation language for the biological assessment. The statement proposed the fulfillment of appropriate California red-legged frog compensation through either purchase of credits at a conservation bank, establishment of a conservation easement, or fee title habitat acquisition. As stated in the message, a conservation easement would include a management plan and endowment. Caltrans referenced the Lawson's Landing property as a potential site for compensation through purchase on a conservation easement.

December 11, 2008 The Service received additional project description information from FHWA for the proposed geotechnical borings for the Petaluma Bridge portion of the proposed action and other outstanding Service information requests via an electronic mail message.

December 15, 2008 The Service received a map depicting the mean high water limits in the Petaluma River Bridge portion of the action area attached to an electronic mail message. This map was sent in response to the Service's request for information regarding available upland refuge for the salt marsh harvest mouse during high water events.

December 22, 2008 The Service issued a second draft of the biological opinion (file # 81420-2008-F-1619-3).

December 22, 2008 The Service issued a second draft of the biological opinion (file # 81420-2008-F-1619-3).

December 10, 2009 The Service received comments from Caltrans regarding the second draft of the biological opinion. The comments were attached to an electronic mail message as an undated letter that represented the consolidated comments of the SCTA, TAM, FHWA, and Caltrans.

March 5, 2009 The Service met with Caltrans and FHWA to discuss the second draft of the biological opinion (file # 81420-2008-F-1619-3).

March 27, 2009 The Service received additional information from Caltrans regarding proposed project scheduling and compensation phasing via an electronic message. The correspondence also included language related to contractor actions and compliance with the Act.

March 31, 2009 The Service received project description revisions and requested terms and conditions revisions from Caltrans via an electronic mail message.

BIOLOGICAL OPINION

Description of the Proposed Action

FHWA and Caltrans propose to construct HOV lanes on State Route 101 from just south of State Route 37 in the City of Novato to just north of Corona Road in the City of Petaluma. These transportation improvements also will include construction and modification of interchanges as well as the establishment of a new frontage road. According to Caltrans, the project is intended to reduce congestion and improve mobility while providing an incentive for commuters to use buses, carpools, or vanpools for peak period travel, and to improve freeway operations including providing safe access to and from State Route 101. The project will be referred to in the remainder of this biological opinion as the Marin-Sonoma Narrows Project.

Caltrans is in the process of developing bridge designs for the Marin-Sonoma Narrows Project and not all of the project description has been fully developed. According to the May 2008, Biological Assessment, additional design engineering will be completed for Segments B and C when funding becomes available for those segments. FHWA will reinitiate consultation with the Service if the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in this project description.

Construction Schedule and Funding

The proposed project is divided into three project segments (A, B, and C) that are further divided into sub-segments (such as A1 and B2). The overall project will be completed in two primary construction phases. Construction Phase 1 will include segments A1, B2, and B3. Construction Phase 2 will include all remaining project segments.

Construction in Phase 1 is scheduled to begin in Fiscal Year 2010/2011 (between July 1, 2010, and June 30, 2011). Construction in Phase 2 is scheduled to begin in Fiscal Year 2014/2015 (between July 1, 2014, and June 30, 2015).

The activities associated with the sub-segments are described as follows:

1. A1 consists of constructing approximately 1.5 miles of the southbound HOV lane between State Route 37 and Rowland Boulevard in Novato (Segment A), and approximately 4 miles of the northbound HOV lane between State Route 37 and Atherton Avenue in Segments A and B.

2. B1 consists of converting the existing Redwood Landfill overcrossing to a full interchange, including the construction of associated frontage roads in Segment B.

3. B2 consists of constructing a new Petaluma Boulevard South interchange including associated frontage roads in Segment B.

4. B3 is fully funded as well and consists of constructing a new mainline bridge at San Antonio Creek in Segment B. This segment would shift US-101 traffic to the west and allow the existing highway to be converted to a frontage road.

5. B4, not yet fully funded, would replace the Petaluma River bridges in Segment B and northbound State Route 116 bridge in Segment C. The southbound State Route 116 bridge, also in Segment C, would be widened as part of this phase.

Additional sub-phases are contemplated and will be defined and advanced as funding is identified.

Two upland and two aquatic geotechnical investigation bores under the Petaluma River Bridge will likely occur prior to construction of the three project segments. The bores are expected to be completed in approximately one week. Scheduling will be weather dependent to avoid boring activities and access of equipment in and out of the action area during rain and when the ground is wet. Additional borings will be accessed from the State Route 101 median and performed in areas that are not identified as listed species habitat or having the potential to adversely affect listed species.

Project Components

Caltrans has divided the approximately 16.1 mile long Marin-Sonoma Narrows Project into three segments, based on the activities occurring in each distinct segment and the construction schedule. The segments are labeled from south to north as A, B, and C. Segments A and C consist of the existing freeway in the cities of Novato and Petaluma, respectively. Segment B is the existing expressway between the two cities. The project activities are discussed by segment as follows. Caltrans has characterized the planned activities in each segment as those that will and will not affect aquatic habitat for listed species.

Segment A

<u>HOV Lane Construction</u>. The existing Segment A includes the existing State Route 101 roadway from State Route 101/State Route 37 Interchange and north of the Atherton Avenue Interchange through the City of Novato. The existing Segment A roadway consists of six 12-foot wide lanes (three in each direction) with 10 foot outside shoulders and 5 foot inside shoulders. The existing non-paved median between the opposite lanes of travel vary in width from 28 to 45 feet and include a double thrie-beam barrier.

According to Caltrans, the majority of the existing drainage features in the existing roadway right-of-way will remain with only minor modifications due to a lack of drainage issues.

Caltrans proposes to widen the Segment A roadway by adding a new HOV lane to each direction of travel. These new 12 foot lanes will be added to the median and will separated by a concrete barrier and varying-width inside shoulders. The new median width from the start of the project to the Atherton Avenue interchange will vary between 22 to 28 feet and will be paved. The median between the Atherton Avenue interchange and Olompali State Historic Park will vary between 28 to 44 feet with 10 foot minimum paved shoulders with the remainder unpaved.

To construct the HOV lanes, heavy equipment would be used to excavate the existing material to sub-grade for the proposed structural section. Excavated material would be tested for the presence of aerially deposited lead (ADL) and if high levels are found, Caltrans would require that the material be handled in compliance with state and federal requirements. According to an August 5, 2008 letter from Caltrans, recycled roadbed material will only be placed on areas that are classified as permanently disturbed by project activities, including material that will be used as fill or base material under the roadway. Material that exceeds the threshold for re-use would be hauled off-site to a Service-approved and/or Type 1 facility. Existing soil under the existing roadway will be used as fill. Temporary impact areas will not have stockpiles.

According to their August 5, 2008 letter, Caltrans would not place any stockpiles of material containing ADL near any sources of run-off. The contractor will place and cover stockpiles of ADL material on 0.33 millimeter thickness plastic sheeting. These stockpiles would not be placed in environmentally sensitive areas and in addition to be covered with plastic, they piles would be surrounded by either hay bales or wattles to protect them from runoff.

Dump or haul trucks would transport borrow and aggregate materials for placement and compaction. Water trucks would spray water on excavated material to maintain control of dust. Sub-base and base material would be compacted and leveled using vibratory rollers and other standard compacting equipment. Aggregate material would be placed in multiple lifts set at a maximum depth of 0.5 feet. The concrete median barrier would be placed via a concrete slip form machine. Asphalt concrete material would be hauled onto the site, and the asphalt would then be spread with a paving machine and rolled with a roller for compaction.

Sub-Grade Correction at the Rowland Interchange. According to Caltrans the existing sub-grade at the Rowland Interchange is failing due to poor soil conditions created by soft clay (Bay Mud) that is not able to support the existing roadbed.

Caltrans plans to remove 11 feet of existing fill and replace it with a lightweight fill material to stabilize the roadbed.

Caltrans will correct the sub-grade with a two-stage construction operation. Temporary lanes would be constructed to the outside of the mainline and traffic would be shifted. These new temporary lanes would require a temporary realignment of the northbound onramp at the Rowland Interchange. Once traffic is shifted, one half of the mainline would be dug out with excavation equipment and temporary retaining walls would be put in place to shore the excavation. Lightweight fill material would be placed 0.5 foot lifts and compacted with rollers. After the sub-grade has been reached and compacted, base and sub-base aggregates would be trucked and placed in 0.5 foot lifts and compacted with rollers. Asphalt concrete (AC) material would be hauled onto the site and the asphalt will then be spread with an AC paving machine and rolled with a roller for compaction. After the first stage is complete, traffic would be moved over to the median and the same process would be repeated for the outside lanes and shoulders. After the existing fill has been replaced, centerline and roadway edges would be re-striped.

Roadway Resurfacing and Striping. Caltrans plans to repair deteriorated localized sections of the existing pavement and put down an overlay on all of the existing six lanes of pavement to prevent reflective cracking and extend the service life of the roadway by 20 years. The centerline and roadway edges would be re-striped following rehabilitation.

Damaged roadway would be removed with a grinder or excavation equipment. The excavated material would be recycled and reused as embankment material for the fill section, or removed off-site. The dig-out areas would be patched with material and overlayed and striped during the rehabilitation process.

Culvert Improvements. According to Caltrans, the existing roadway drainage is conveyed by a depressed median to drainage inlets at low points in the median. There are thirty-five cross culverts that convey storm water to swales along the outside which then drain to adjacent water courses.

Caltrans proposes to replace the depressed median with new HOV lanes, shoulders, and a median barrier. The new roadway would sheet flow drainage towards the outside shoulders, away from the median. Through mainline horizontal curves when sheet flow drainage is directed towards the median due to super elevation, 27 existing drainage inlets would be reconfigured at the median. Cross culverts that are not needed would be abandoned in place and plugged. Caltrans determined that some of the cross culverts would need to be replaced due to deterioration or the need for a larger culvert.

After new cross-culvert construction has been completed, repaving methodology will be similar to those described for roadway rehabilitation. Existing cross culverts that are to

be abandoned would be capped with concrete at each end or filled with either a concrete slurry or sand.

California Highway Patrol (CHP) Pullouts, HOV Bypass Lanes, Ramp Metering. The addition of HOV Lanes would require the addition of HOV bypass lanes, CHP pullouts and ramp metering.

Caltrans proposes to widen existing on-ramps for HOV bypass lanes, CHP pullouts, and install ramp-metering infrastructure at all four of the existing interchanges in Segment A (State Route 37, Rowland, DeLong, and Atherton). An additional 12 foot lane would be added to the interchange ramps. The CHP pull outs would be 15 feet wide and 100 feet long. The length of the bypass lane will vary by ramp and all on-ramps within the action area would have HOV bypass lanes, CHP pullouts, and ramp-metering infrastructure.

The ramp widening would consist of importing fill material and placing in multiple lifts set at a maximum depth of 0.5 feet. The fill material would then be compacted between lifts until the sub-grade depth is met. Dump or haul trucks would transport aggregate materials for placement and compaction. Asphalt concrete material would be hauled to the site and then spread with an AC paving machine and rolled with a roller for compaction. Before AC is placed, electrical conduit would be trenched and placed for the ramp metering system infrastructure.

Sound Walls. Caltrans plans to erect sound walls at four locations within Segment A. The combined length of the four walls will be 4,770 feet.

The sound wall locations would be cleared and bulldozed to meet finished grade for the sound wall footing. The foundation type would depend on soil type. After the foundation is complete, a pile cap would be formed up with wood forming, steel would be placed within the cap, and concrete would be poured to complete the pile cap. If the sound wall is within 30 feet of the edge of travel way, the sound wall is required to be placed on a concrete protective barrier. Once the pile cap or the concrete barrier is in place, the concrete masonry blocks would be set and mortared to the top of the barrier or pile cap until the wall is complete.

Retaining Walls. Caltrans plans to construct retaining walls to reduce the widening needed to construct additional lanes at three existing ramps (the State Route 101/State Route 37 Southbound Connector, the DeLong Southbound On-Ramp, and the South of Rowland Southbound On-Ramp).

The retaining wall locations would be cleared and excavated with excavation equipment to reach grade for the retaining wall footing. Once grade is met, the footing would be formed, steel would be placed and the concrete would then be poured for the footing.

After the footing is poured, the same process would be used to build the stem wall. After the wall is complete, the excavated material would be backfilled and compacted.

In instances where a retaining wall is included in the design as a means of reducing the project footprint in the vicinity of sensitive resources, the following construction techniques and equipment will be used:

1. Retaining walls with spread footings: This work involves excavating through the existing shoulder backing to the substrate below using excavators and/or backhoes. The retaining walls would be constructed before the shoulder widening takes place and may involve the use of a crane from the roadway.

2. Retaining walls with pile foundations: This work involves constructing a retaining wall foundation which could include driven concrete or steel piles, cast-in-drilled-hole (CIDH) piles, or cast-in-steel shell (CISS) piles. If CIDH or CISS piles are used, a drill auger would be used to remove soil at the piles location.

3. Mechanically Stabilized Earth (MSE) retaining walls: This work involves constructing a retaining wall without a foundation. Precast concrete panels would be placed at the bottom of the wall to create the wall face. Reinforcing steel would connect to the wall panels and extend behind the wall. Fill would be placed in layers on top of the reinforcing steel and compacted in place. This procedure would be repeated until the wall is built up to the elevation of the highway.

If subsurface water is encountered during the drilling or excavation, the excavation will be de-watered under the direction of their Best Managmeent Practices (BMPs) of the Storm Water Pollution Prevention Plan (SWPPP). Residues may include aerially deposited lead material. If the residue exceeds the level of lead standards, the material would be deposited off-site at an approved location.

Structures. According to Caltrans, roadway widening would require modification to existing structures such as railing, sound walls, deck treatment, and bridges. Caltrans describes the proposed bridge work as follows.

> *Novato Creek Bridge*. There are two existing Novato Creek Bridges that are only wide enough to accommodate the three lanes of north or southbound traffic plus 5 foot inside shoulders and 8 to 10 foot outside shoulders. Both of the existing 192 foot long structures were built in 1974 and consist of a five-span continuous reinforced concrete T-beam superstructures on 18 inch +/- octagonal pre-stressed concrete pile bents (total 44 octagonal bent piles) and diaphragm type abutments on reinforced concrete piles.

Caltrans proposes to widen and connect the Novato Creek Bridges in the median to allow for the two HOV lanes and 10 foot shoulders. It is also proposed to replace the existing bridge barriers with current standard barriers. The widening of the existing bridges would include the construction of a new cast-in-place reinforced concrete T-beam superstructure, including new concrete bent caps and abutments. The substructure would consist of Class 140 driven pre-cast concrete piles at the abutments and driven CISS piles at the bents. The location and bearing for the new abutments and bents would match with the alignments of the existing abutments and bents. It is anticipated that four-2 foot diameter new CISS piles would be required per bent for a total of 16 piles for the 4 bents.

Caltrans would widen the Novato Creek Bridges by constructing and connecting the right and left parallel bridge structures to the median side of each of the existing bridge structures and closing the median gap. The existing bridge barrier would be replaced with current standard barriers. A portion of the existing overhang in the median would be removed. Access to the existing channel would be required for construction. (In Phase A1, the existing northbound structure would be widened to provide for the northbound HOV lane and shoulders. The complete widening and the ultimate connection of the northbound and southbound structures will not be completed until a future project phase.)

The construction of the CISS piles would likely include driving down the steel pipe pile into ground, removing the soil inside the steel pile, inserting bar reinforcing steel (rebar cages) into the steel pipe and filling the remaining void inside the steel pipe with concrete using a concrete pump truck. The piles would extend into the superstructure.

Existing pilings that need to be removed during construction or demolition (e.g. those in conflict with new bridge or falsework) would be removed by commonly practiced methods. These include pulling by crane or through use of vibratory methods. It may also be possible that some existing pilings can be left in place and cut off below ground.

According to Caltrans, temporary supports also known as falsework would be required to construct the superstructure. The falsework is used to support construction loads such as bar reinforcing steel, wet concrete and live loads (construction crew, equipment, etc). According to Caltrans, the falsework system usually consists of a series of falsework bents placed in the creek at certain intervals with steel beams (falsework stringers) spanning across the falsework bents. Plywood deckings are then placed between the steel beams to allow for the placement of bar reinforcing steel and forming/constructing the superstructure. The falsework bents may be constructed using braced steel or timber posts supported on timber pads placed on top of existing ground or supported on timber

or steel piles driven into the ground depending on the bearing capacity of the soil. Falsework piles may be completely removed or cut below the ground elevation and left in place.

Types of hammers used in piling installation would conform to Caltrans Standard Specifications (49-1.05). Impact hammers would be steam, hydraulic, air or diesel hammers sufficient to drive piles at a penetrations rate of not less than 1/8 inches per blow at the specified nominal resistance. Vibratory hammers would not be used for installation of permanent piles unless shown on the plans or specified in the special provisions. Caltrans might use vibratory hammers to install shoring, coffer dam or falsework piles unless otherwise restricted in the Contract Special Provisions or as listed in permits.

Once the falsework is complete the reinforced concrete T-beam superstructure would be constructed. After completion of the structure, all temporary falsework material would be removed, the creek banks would be stabilized and erosion control BMP's would be placed.

The Novato Creek Bridge work will be located approximately 28 meters east of potential salt marsh harvest mouse habitat. In their August 5, 2008 letter, Caltrans maintained that the bridge work will be accessed from the opposite side of the existing bridge and this pickleweed habitat would be effectively avoided.

Storm Water Quality Systems and Construction Site BMPs. The proposed project would incorporate bio-filtration strips, swales, and Austin sand filters to receive storm water discharges from the highway or other impervious surfaces. The project will also likely include off-site storm water treatment.

Bio-filtration strips would be located at the base of fill slopes and graded to flow perpendicular to the mainline. Bio-filtration swales would also be located at the base of fill slope and convey water parallel with the main line. Swales would be a graded trapezoidal channel with side slopes of 4:1 or flatter.

Bio-filtration strips and swales have the same means of construction. A backhoe and excavator would be used to excavate and set grade for the channel. After the channel is graded, it would be planted with a vegetative species that has filtration properties.

An Austin sand filter is a two-chamber device with the first chamber used to settle out larger sediment and meter flow into the second chamber. The second chamber is a sand media filter that removes the finer particulates from the influent. The treated effluent is then discharged back into the drainage system.

Construction Site BMPs. To maintain water quality during construction, Caltrans would implement BMPs to reduce unnecessary water quality impacts. The following methods and practices would be implemented:

1. Earth dikes/drainage swales and lined ditches
2. Outlet protection/velocity dissipation devices
3. Check dams
4. Silt fencing with maintenance openings
5. Fiber rolls
6. Concrete washouts
7. Drainage inlet protection
8. Construction entrance/exit protection

Staging Locations. Staging locations would be used for temporary storage of heavy construction equipment and construction materials, equipment maintenance shops, stockpile areas, and field offices. The primary staging area in Segment A would be located within the interchange at the South Novato overcrossing. According the Caltrans project description, areas that are located within the State Right-of-Way and quantified as within the project area of effect may also be used, subject to approval of the contractor submitted SWPPP. Contractors may independently seek off-site staging locations. Off-site staging locations will be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.

Segment B

Nonstandard Shoulders, Vertical and Horizontal Curves. The existing State Route 101 roadway in Segment B is a four-lane expressway with two 12 foot wide lanes in each direction. Most of the existing roadway in this segment does not meet current horizontal alignment, vertical profile and sight distance requirements for the 70 mile per hour corridor design speed. The shoulders are variable width, with the outside shoulders varying from 5 to 8 feet and the inside shoulders varying from 2 to 4 feet. The non-paved median varies in width from 11 to 51 feet and contains a double thrie-beam barrier.

Caltrans plans to improve the Segment B roadway design by upgrading the existing nonstandard shoulders, constructing a HOV lane in each direction, and bringing vertical and horizontal curves to current standards. The proposed project design would include 10 foot shoulders with a concrete median barrier. Nonstandard vertical and horizontal curves would be brought to current standards to meet stopping sight distance requirements. Within the concrete medians, Type S barriers for wildlife crossing would be installed every 20 feet and Type M wildlife crossings would be installed every 0.25 miles. Type S barriers are a type 60 concrete barrier with a 6 inch diameter opening at the base of the barrier for small animal passage. Type M wildlife crossings are a type 60

concrete barrier with a 2-foot break in the barrier, with the break protected by a thrie-beam guard rail to deflect vehicle traffic.

Caltrans proposes to realign the roadway mainline to correct vertical and horizontal curves throughout Segment B.

The proposed horizontal alignment would shift from the existing alignment throughout Segment B to correct nonstandard curves. Approximately 75% of the existing alignment would be reconstructed with a new structural section. The additional 25% of Segment B would utilize the existing roadway alignment and would be widened in the median for HOV lanes and shoulders.

According to Caltrans, the proposed vertical alignment would correct nonstandard curves. The locations of the profile corrections are from approximately 229 feet south of the Redwood Landfill OC to approximately 3280 feet north of the OC; from approximately 656 feet south of San Antonio Creek to Gambini Road, and from South Kastania Road to the Petaluma River Bridge. Through these areas the proposed profile would shift the new roadway up to 28 feet above or up to 24 feet below the existing roadway.

Due to the rolling terrain in Segment B, Caltrans will use two methods for the construction of the proposed roadway realignment. When the alignment is shifted through a hillside, material would be cut from the hillside until finished grade is met. Typical equipment to be used for this method would include excavators, bulldozers, earth movers, and compaction equipment. Excess fill cut from other locations within the project would be used in areas where the roadway needs to be built up. This material would either be hauled in by trucks for long hauls, or from earth moving equipment for short hauls. Once the fill material is hauled in, it will be placed in multiple lifts set at a maximum depth of 0.5 feet. Fill material would then be compacted between lifts until the sub-grade depth is met. Dump or haul trucks would then transport aggregate materials for placement and compaction. Asphalt concrete material will be hauled to the site and then spread with an AC paving machine and rolled with a roller for compaction.

Upgrade Expressway to Freeway with the Addition of Frontage Roads. Residents, ranches, and other land uses are only directly accessible off of State Route 101 in Segment B. There are currently 31 driveways and seven at-grade intersections that connect directly to State Route 101. Also in Segment B there is no other north-south bicycle passage other than on the shoulder of State Route 101. These conditions make the State Route 101 through Segment B an expressway rather than a freeway. Caltrans proposes to upgrade Segment B to a freeway by constructing off-ramps to new frontage roads. Local access and bicycle traffic will be moved to frontage roads or a dedicated bicycle and pedestrian facility.

Therefore the proposed project will convert the existing expressway in Segment B to an access-controlled freeway. Converting the existing expressway would require reconfiguring the existing Landfill Overcrossing into an interchange, reconfiguring the Petaluma Boulevard South interchange, and building a frontage road system to maintain access to intersecting roadways and adjacent parcels, as well as replacing bicycle and pedestrian access. Bicycle access will be moved to frontage roads or a dedicated bicycle and pedestrian facility.

As previously described, due to the rolling terrain in Segment B, Caltrans will use two methods for the construction of the proposed roadway realignment. When the alignment is shifted through a hillside, material would be cut from the hillside until finished grade is met. Typical equipment to be used for this method would include excavators, bulldozers, earth movers, and compaction equipment. Excess fill cut from other locations within the project would be used in areas where the roadway needs to be built up. This material would either be hauled in by dump trucks for long hauls, or from earth moving equipment for short hauls. Once the fill material is hauled in, it will be placed in multiple lifts set at a maximum depth of 0.5 feet. Fill material would then be compacted between lifts until the sub-grade depth is met. Dump or haul trucks would then transport aggregate materials for placement and compaction. Asphalt concrete material will be hauled to the site and then spread with an AC paving machine and rolled with a roller for compaction.

Culvert Improvements. As described for Segment A, existing drainage in Segment B is conveyed by a depressed median to drainage inlets at low points in the median. Cross culverts convey the storm water to swales along the outside which drain to adjacent water courses.

The roadway realignment would replace the depressed median with new HOV lanes, shoulders, and a median barrier. These improvements would cause the sheet flow to drainage towards the outside shoulders, away from the median. Through mainline horizontal curves, where sheet flow drainage is directed towards the median due to super elevation, existing drainage inlets would be reconfigured at the median. Cross culverts that are no longer needed would be abandoned in place.

Caltrans determined that the majority of culverts are still in a state of good repair and function adequately. Some systems will require replacement due to deteriorated conditions or resizing to handle additional flow.

As described for culvert work in Segment A, Caltrans determined that some of the cross culverts would need to be replaced due to deterioration or the need for a larger culvert.

Caltrans plans to abandon unneeded culverts in place. The extension of existing box culverts may require accessing creeks.

According to an August 5, 2008 Caltrans letter, Caltrans is considering adding cross culverts, where feasible, in Segment B specifically to provide wildlife passage under State Route 101.

After new cross-culvert construction has been completed, repaving methodology will be similar to those described for roadway rehabilitation. Existing cross culverts that are to be abandoned would be capped with concrete at each end and filled with either a concrete slurry or sand.

Recurring Flooding and Culvert Improvements. Caltrans plans to replace or upgrade the majority of the drainage facilities through Segment B due to their age, capacity or condition. There are two locations, San Antonio Creek and Gunn Lane, where roadway flooding has been a problem.

Caltrans plans to realign and raise the road profile through San Antonio Creek and near Gunn Lane to alleviate recurring flooding and replace the majority of the existing culvert systems due to the proposed realignment or deteriorated condition. Cross culverts would be sized to pass design-year flows with a minimum diameter of 24 inches for maintenance and approximately 79 new cross culverts will be added.
Caltrans plans to address the flooding issue by building a fill section with a higher profile through the area. This would be constructed using the previously described methods for constructing nonstandard shoulders, vertical and horizontal curves. During construction of the new fill sections, cross-culverts would be placed as the fill section is being built. Existing drainage systems that only require extensions or reconfigurations would be installed as previously described for Segment A.

Retaining Walls. Caltrans plans to construct retaining walls to avoid a historic residence near Kastania Road, trees on the new frontage road at the Landfill Interchange, and salt marsh harvest mouse habitat near the northbound off-ramp at the Petaluma Boulevard, South Interchange.

The retaining walls near Kastania Road and the Landfill Interchange locations would be one of the three types described for Segment A.

The retaining wall near the Landfill Interchange would be a soil nail or tieback retaining structure. Soil would be excavated from the top of the wall down approximately 5 to 10 feet to the first tieback or soil nail location. Horizontal drill equipment would drill holes along the length of the wall and a post tensioned tieback tendons or soil nails would be installed and grouted in place. If post tensioned tiebacks are used, a reinforced concrete whaler would be constructed at the tieback location horizontally across the wall. Tendons would be post tensioned and locked against the concrete whaler. In either case, reinforcing steel would be placed in front of the excavation and shotcrete would be placed against the excavated hillside. If soil nails are used, they would be locked against steel

plates. The hillside would then be excavated to the next tieback or soil nail location and the process would be repeated to reach the bottom of the wall. A reinforced concrete or shotcrete facing would then be constructed to complete the wall.

Utility Relocations. The project design in Segment B would require a significant number of intricate utility relocations. According to Caltrans, the exact location and condition of the existing facilities would not be determined until positive location (potholing) work has been completed. As the designs of these relocations proceed, the remaining service life of the existing individual facilities would be calculated and a cost/benefit analysis would be performed to determine the feasibility of their retention. If retention appears to be the preferred alternative, encroachment exceptions would be requested on a case-by-case basis. Otherwise, the utility will be relocated at a location within the project footprint. Depending on the nature of the utility relocations, FHWA may reinitiate Section 7 consultation to address any additional effects to listed species not described in this biological opinion.

Structures. The proposed project includes modifications to several bridges. Of these, the San Antonio Creek Bridge (mainline), San Antonio Creek Bridge (frontage road), and the Petaluma River Bridge all cross over bodies of water, and are discussed below. Although bridge designs have not been determined, Caltrans stated in their August 5, 2008, letter that the described action area is based on the alternative with the largest footprint.

San Antonio Creek Bridge (mainline). The existing San Antonio Creek Bridges are located within an area of recurring flooding. The new San Antonio Creek Bridge would be built on a realigned portion of State Route 101, west of the existing highway, with a raised profile. The bridge is proposed as a cast-in-place concrete pre-stressed box girder with reinforced concrete bent caps and abutments. The existing northbound structure would be used for a new frontage road creek crossing and the southbound structure would be removed.

Two structure alternatives are proposed for the new bridge. Alternative 1 is a five-span structure, 634.8 feet long by 115.2 feet wide, with 4 columns per bent for a total of 16 columns for the 4 bents. Alternative 2 is a three-span structure, 428.1 feet long by 115.2 feet wide, with 4 columns per bent for a total of 8 columns for the two bents. The bridge layout for Alternative 1 and Alternative 2 are similar except that Alternative 2 includes a Mechanically Stabilized Earth (MSE) wall at abutment 1 which would result in a shorter bridge. The substructure would consist of reinforced concrete columns and abutments supported on a concrete pile cap with driven pre-cast concrete piles. The column size is expected to be approximately 5.5 feet in diameter. Each column footing size is approximately 22 by 22 by 6 feet deep. There would be approximately 25 piles per column footing. The dimensions of the pre-cast concrete pile are approximately 1.24 x 1.24 feet.

It is anticipated that the construction footprint would extend 50feet beyond each side of the edge of bridge deck. Access to the existing channel would be required for construction.

To construct the new bridge, soil at the abutment locations would be re-graded to raise the profile. If Bridge Alternative 2 is selected, the MSE wall would be constructed as the profile is raised at Abutment 1. After the profile is raised at the abutment locations, the precast concrete piles would be driven into the ground. A reinforced concrete footing would be constructed on top of the piles. Then, a reinforced concrete abutment would be constructed on the pile cap.

The contractor would excavate soil at the column footing locations. If water is anticipated at the footing elevations, cofferdams consisting of driven sheet pilings would be construction around the perimeter of the footings. If needed, cofferdams would be approximately 32 by 32 feet per column footing. After cofferdams are placed, soil would be excavated to the footing elevation. The column footing piles would then be driven with an impact hammer. If water is encountered, it would be pumped from the cofferdam to trucks or a sediment basin permitted by the Water Quality Control Board. A lean concrete seal course might be placed to minimize water intrusion. Reinforced concrete pile caps and columns would be constructed at each column footing.

To construct the new superstructure, temporary supports also known as falsework would be required. The falsework is used to support construction loads such as bar reinforcing steel, wet concrete and live loads (construction crew, equipment, etc.). The falsework system usually consists of a series of falsework bents placed at certain intervals with steel beams spanning across the falsework bents. Plywood decking is then placed between the steel beams to allow for the placement of bar reinforcing steel and forming/constructing the superstructure. The falsework bents might be constructed using steel or braced timber posts supported on timber pads which have been placed on top of existing ground or steel piles that have been driven into the ground depending on the bearing capacity of the soil. Once the falsework is complete the reinforced concrete box girder superstructure would be constructed. After completion of the structure, all temporary cofferdam and falsework material would be removed, the creek banks would be stabilized and erosion control BMP's would be placed. Falsework piles may be completely removed or cut below the ground elevation and left in place.

Bridge removal work would consist of breaking and removing the existing concrete structure. Over land, the bridge would be dropped in sections onto filter fabric or similar material and removed. Over the creek, the contractor would use approved BMP's to protect the creek from falling debris.

San Antonio Creek Bridge (frontage road). The existing historic San Antonio Creek Bridge on San Antonio Road is approximately 101 feet long and 23 feet wide. According to Caltrans the existing structure is not wide enough to provide two new12 foot-wide lanes and 5 foot wide shoulders and the historic nature of the structure does not allow it to be widened. Therefore Caltrans plans to build a new bridge to cross San Antonio Creek. The existing structure will be re-striped for a one-way bridge and a bike lane.

Two structure alternatives are proposed for the new San Antonio Creek bridge. Alternative 1 is proposed as a cast-in-place concrete slab with reinforced concrete bent caps and abutments. This seven-span bridge is approximately 227.5 feet long and 42 feet wide. The substructure would consist of Class 140 driven precast concrete piles at the abutments and driven cast-in-steel shell piles at the bents. Caltrans anticipates that five 2-foot diameter new CISS piles will be required per pier for a total of thirty for the 6-piers. Alternative 2 is proposed as a cast-in-place concrete pre-stressed box girder with reinforced concrete bent caps and abutments. This new two-span bridge would be approximately 235 feet long and 42 feet wide. The substructure would consist of reinforced concrete columns (total two) approximately 4 feet in diameter and abutments that are supported on a concrete pile cap with driven pre-cast concrete piles. The size of the column footings is approximately 28 by 28 by 6 feet. Each column footing would have approximately 25 driven piles. The size of each pile is approximately 15 x 15 inches.

Caltrans anticipates that the area required for construction activities would extend 50 feet beyond each side of the edge of bridge deck. Access to the existing channel would be required for construction.

To construct the new bridge, soil at the abutment locations would be re-graded to raise the profile. After the profile is raised at the abutment locations, the precast concrete piles would be driven into the ground. A reinforced concrete footing would be constructed on top of the piles. Then, a reinforced concrete abutment would be placed on the pile cap.

If Alternative 1 is selected, the contractor would drive CISS piles into the ground at column locations. The soil inside the steel shells would be drilled out, a reinforcing steel cage would be placed inside the shell, and concrete would be placed by a pump. The foundation piles would be extended as columns into the deck slab.

If Alternative 2 is selected, the contractor would excavate soil at the column footing locations. If water is anticipated at the footing elevations, cofferdams consisting of driven sheet pilings would be construction around the perimeter of

the footings. If needed, cofferdams would be approximately 38 by 38 feet per column footing. After cofferdams are placed, soil would be excavated to the footing elevation. The column footing CISS piles would then be driven with an impact hammer. If water is encountered, it would be pumped from the cofferdam to trucks or a sediment basin permitted by the Water Quality Control Board. A lean concrete seal course might be used to minimize water intrusion. The soil inside the steel shells will be dug out, a reinforcing steel cage would be placed inside the shell, and concrete would be placed by a pump. Reinforced concrete pile caps and columns would be constructed at each column footing.

To construct the superstructure, temporary supports also known as falsework would be required. The falsework would be used to support construction loads such as bar reinforcing steel, wet concrete and live loads (construction crew, equipment, etc). According to Caltrans, the falsework system usually consists of a series of falsework bents placed at certain intervals with steel beams spanning across the falsework bents. Plywood decking is then placed between the steel beams to allow for the placement of bar reinforcing steel and forming/constructing of the superstructure. The falsework bents might be constructed using steel or timber posts supported on timber pads which have been placed on top of existing ground or on timber or steel piles that have been driven into ground depending on the bearing capacity of the soil. Access to the existing channel would be required for pile driving, pile cap construction and falsework construction. Once the falsework is complete the reinforced concrete slab or box girder superstructure would be installed. After completion of the structure, all temporary cofferdam and falsework material would be removed, the creek banks would be stabilized and erosion control BMP's would be installed. Falsework piles may be completely removed or cut below the ground elevation and left in place.

Petaluma River Bridge. The existing Petaluma River Bridge on State Route 101 consists of two separate structures, each 885 feet long and 31 feet wide. The bridges were built in 1955.

Due to the age of the existing structures and the costs associated with bringing them up to current standards, it is proposed to replace the two existing bridges with a single bridge. There is an existing fender system protecting the bridge bents at each side of the waterway. This fender system would be removed during construction in order to facilitate bridge construction work. The new bridge would increase the span over the waterway to 210 feet long and the new Pier 3 would be located above the waterway limit. A new bridge fender system would likely be required for Pier 4 even though it would be located closer to the north bank.

Caltrans has proposed two structure alternatives for the new bridge. Both alternatives would include construction of an 855 foot long and 115 foot wide, five-span bridge. Alternative 1 would consist of a reinforced concrete box girder superstructure. Alternative 2 would consist of a Precast/Pre-stressed Concrete Bulb "T" girder superstructure. The substructure for both alternatives consists of reinforced concrete column piers supported on spread footings or on pile caps with either cast-in-drilled hole (CIDH) or cast-in-steel shell (CISS) pilings. Both alternatives would include between 3 to 5 columns per pier for a total of between 12 to 20 columns for the 4 piers. The size of the individual column footings would be approximately 35 by 28 by 7 feet deep. Caltrans anticipates that each column footing would consist of between twenty-five to forty 18-inch to 30-inch diameter CIDH or CISS pilings for each of the twelve to twenty columns.

Geotechnical investigation will be needed prior to construction of the new Petaluma River Bridge. The purpose of the investigation is to characterize the subsurface conditions and to evaluate engineering properties of the soils and/or rock for the design development of the replacement of the Petaluma River Bridge. As part of the geotechnical investigation for the proposed improvements of Segment B4 of the Marin Sonoma Narrows project, four borings, ranging from 50 to 100 feet in depth, are planned to investigate the bents of the proposed Petaluma River Bridge Replacement located north of the Petaluma River. Two of the bore sites will be located in the designated temporary staging areas and the other two will be located in the Petaluma River. Additional borings will be accessed from the State Route 101 median and performed in areas that are not identified as listed species habitat or having the potential to adversely affect listed species.
The drilling will be completed using a track-mounted drill rig, a truck-mounted drill rig, or a potable drill rig may be used to access the slopes along the east side of the freeway between the Petaluma River Bridge and the 101/116 Separation and Overhead, and the banks of the Petaluma River. A skid-mounted drill rig attached to a sectional barge will be used to explore the bent on the river bank and in the river. Drilling will be completed using rotary wash methods; the size of the borehole will be about 5 inches in diameter.

Prior to the start of the field investigation Underground Service Alert (USA) will be contacted at least 48 hours before the start of work to clear underground utilities. All boring locations will also be cleared utilizing the services of a private underground utility locator. Some locations may require that the boring first be advanced using a hand auger to a depth of at least 3 feet to check for underground utilities, and then be advanced with the drill rig.

Boring permits are required by County of Sonoma, Department of Health Services, Environmental Health Division, for completion of the borings. The permit applications will be processed by consultant, URS. The borings will be

completed during daylight hours. Traffic control will be provided during drilling pursuant to Caltrans standards and as specified in the encroachment permit. A traffic control specialty contractor will be retained to provide traffic control for other borings, where required.

Sampling in the borings will be completed at 5-foot intervals or closer intervals at changes in material type as the drilling progresses. Caltrans anticipates that the majority of the sampling will be completed using a Standard Penetration Test (SPT) or Modified California (MC) sampler. If soft cohesive soils are encountered thin-walled Shelby tube samples will also be obtained.

All soil cuttings generated during the drilling of the borings will be placed in drums and stored at an offsite location designated by Caltrans. The soil cuttings in the drums will be sampled for waste characterization (approximately 1 sample for 3 drums) and disposed of at the nearest non-hazardous waste landfill following reception of the analytical testing results and acceptance of the materials for disposal. If analytical results indicate that the soil cuttings cannot be disposed of at the nearest non-hazardous landfill further testing and analysis may be required to dispose of the drums of soil at an appropriate facility.

Waste associated with the drilling operation such as drilling fluid, material containers, and personal trash will be placed in drums or containers and moved offsite for proper disposal.

All drilling equipment and vehicles will access the drill locations using an existing designated road/path. Access will be confined to this designated route to minimize effects to adjacent pickleweed habitat for the salt marsh harvest mouse.

The two upland borings (R-08-005 and R-08-006) will be explored by using a track mounted rig. The exploration for the two borings in the Petaluma River (R-08-005A and R-08-005B) is planned using a skid-mounted CME 45 rotary drill rig attached to a sectional barge that would be floated to the proposed locations at appropriate high tide levels. The remaining proposed borings will be explored with a truck-mounted rotary drill rig.

For rotary drilling, a one-ton service truck equipped with a water tank will support the drill rig. In general, the drill rig will access the site at the beginning the job and be parked over night until drilling is complete. On the other hand, the service truck will access the site in the morning at the beginning of each shift of drilling and leave the site at the end of the day to refill for the next day. It will leave the site during the day only if the drill hole requires more water for the drilling fluid mixture. The service truck will also be used to transport drill waste containers and soil cutting drums.

The new Petaluma River Bridge would be constructed in three stages. During Stage 1, the middle portion of the new bridge would be built in between the two existing structures and the existing median barriers would be removed. During Stage 2, the existing southbound structure would be removed for the new bridge construction. During stage 3, the northbound structure would be removed to allow for the construction of the final portion of the new bridge. Pile driving for the column footings will occur year-round. Other construction activities that will occur year-round on land include: bridge demolition, vegetation clearing and planting, and road construction for site access, removal of existing piles, falsework removal and cleanup, and concrete pouring (which may involve some work over water using appropriately sealed forms).

Access to the existing channel would be required for construction. The contractor would access the north bank of the river from State Route 116 along the east side of State Route 101. The contractor would access the south bank of the river from Petaluma Boulevard South. Piers 2 and 5 are located above the banks of the Petaluma River. Pier 3 is located on land at the edge of the south bank the river. Pier 4 is located in the river, adjacent to the north bank. Caltrans anticipates that the contractor would need to construct a trestle bridge to gain access to Pier 4 and to gain access to the north side of Pier 3. The trestle would also need to be extended around the existing piers for demolition of the existing bridge and towards the center of the channel for falsework, temporary erection tower, and temporary fender pile installation. A navigational opening would be maintained for mariners on the Petaluma River. The size of the opening would be negotiated and subject to approval of the U.S. Coast Guard. At the north and south sides of the opening a temporary fender system consisting of driven piles and steel and timber barriers would be placed to protect the falsework and/or erection towers from being hit from a vessel. The contractor would drive piles in the river and place a timber deck on the pilings to create a work platform or trestle above the river. The maximum trestle size is estimated at 1000 by 36 feet. Trestle and temporary fender piles would be either steel H-piles or steel pipe piles. Pipe would be approximately 20 to 24 inches in diameter. Piles would initially be driven with a vibratory hammer. Bearing would be confirmed with an impact hammer. Caltrans anticipates that a maximum of 300 temporary trestle and fender piles would be needed. Trestle and fender piles would be between 20 to 45 feet deep and would be installed between June 15 and October 31 of any year. Caltrans estimates that the contractor would install approximately 2 to 10 trestle and/or fender piles per day. Trestle and fender piles would be installed on approximately 20 to 75 days over a three year period. When an impact hammer is used to confirm bearing, each pile would receive approximately 5 to 20 strikes. If required for noise reduction, trestle piles would be driven inside a double walled isolation casing when an impact hammer is used.

Cofferdams consisting of sheet pilings will then be installed around the perimeter of Piers 3 and 4 footings. It is anticipated that one large cofferdam approximately 135 by 38 feet would be installed per pier location. Cofferdams might also be used at Piers 2 and 4, if ground water is anticipated. Four additional cofferdams approximately 39 by 22 feet would be used during demolition of the existing column footings in the river. Cofferdams would be constructed of interlocking sheet pilings, which would be driven by a vibratory hammer. If difficult driving is encountered, an impact hammer might be used for the final few feet of installation. Cofferdams would be installed between June 15 and October 31 of any year.

According to the August 5, 2008, Caltrans letter an existing ditch that contains pickleweed and acts as a connector between two pickleweed areas on the east and west sides of the existing Petaluma River Bridges. Caltrans would construct a new bridge pier and footing at the site of the existing ditch. A new ditch would be constructed slightly south of the existing ditch to maintain flow regimes during construction. The new ditch would be culverted for three years so construction equipment can access the area to construct the new pier and footing. Once construction is complete, Caltrans would restore the ditch, which will include removing the culvert and grading it to mimic the current ditch, including the same elevation, topography, and vegetation. This will be done in order to encourage the pickleweed to self-propagate as it has in the existing ditch.

The pickleweed removal would be the first order of work at the Petaluma River Bridge, prior to any heavy equipment being brought onto the site. The pickleweed will be removed by hand and the area is expected to be re-vegetated based on previous pickleweed propagation information. Caltrans makes this assumption based on other projects such as the Guadalcanal Tidal Marsh Restoration Project on State Route 37 in Solano County where a levee was breached and pickleweed self-propagated within several years.

Additionally, the construction access road would require an approximate 25-foot long temporary culvert in the vicinity of the SMART railroad bridge. Currently drainage traverses into the Petaluma River via an open ditch that contains some pickleweed. This culvert will also be in place for approximately 3-years, during construction. At the conclusion of construction, the culvert will be removed and the ditch will be restored to pre-construction conditions

Caltrans has developed minimization and avoidance measures to address potential adverse effects to listed salmonids and will implement those measures according to the separate biological opinion issued by National Marine Fisheries.

After cofferdams are completed and cleared of salmonid issues by the fisheries biologist, the contractor would install permanent foundation piles and the soil would be excavated to the footing elevation. If final design indicates CIDH piles, the contractor would likely use temporary steel casings at pile locations to help prevent caving and control water. CIDH piles would be constructed by drilling holes to the pile tips. Slurry would also likely be placed in the holes to control water and prevent caving. Once drilling is complete, a reinforcing steel cage would be placed in the hole and concrete would be pumped to the bottom of the hole, displacing the slurry, which would be pumped into holding tanks. If final design indicates CISS piles, Caltrans anticipates that the contractor would initially drive the piles with a vibratory hammer and complete driving into bedrock with an impact hammer. Piles at Piers 3 and 4 are estimated to be between 30 to 50 feet long and each pile will receive between 200 to 600 strikes. Piles will extend to bedrock and the contractor would likely install between 2 to 20 CISS piles per day. The contractor would likely be driving piles at Piers 3 and 4 with an impact hammer for up to 60 days over an 18 month period. CISS would be installed year round from completed trestle and cofferdams. If required for noise reduction, bubble curtains would be used around CISS piles, inside of cofferdams at Piers 3 and 4, when driving with an impact hammer. After piles are driven, soil would be excavated from inside the pile shells by drilling. Slurry would likely be pumped inside the shells to displace water. A reinforcing steel cage would be placed inside the shell, and structural concrete would be pumped to the bottom of the shell, displacing the slurry. Slurry would be pumped to holding tanks.

After piles are constructed, a seal course of lean concrete would likely be placed at the bottom of the footing to prevent water intrusion. Water would be pumped from the cofferdam into a baker tanks or a sediment basin permitted by the Water Quality Control Board. Then, a reinforced concrete footing cap and columns would be constructed on top of the pilings.

To construct the superstructure, temporary supports also known as falsework would be required for Alternative 1 and temporary erection towers would be needed for Alternative 2. The falsework would be used to support construction loads such as bar reinforcing steel, wet concrete and live loads (construction crew, equipment, etc). According to Caltrans, the falsework system usually consists of a series of falsework bents placed at certain intervals with steel beams spanning across the falsework bents. Plywood decking is then placed between the steel beams to allow for the placement of bar reinforcing steel and forming/constructing the superstructure. The falsework bents might be constructed using steel or timber posts supported on timber pads which have been placed on top of existing ground or on timber or steel piles that have been driven into ground depending on the bearing capacity of the soil. Temporary erection towers are needed to provide temporary support and a work platform for splicing precast concrete bulb T-

Girders. Erection towers would be supported by piles driven in the water. Steel and/or timber posts, beams, and lateral supports would complete the tower to the bottom of the superstructure elevation. Falsework or temporary erection piles would be either steel H-piles or steel pipe piles. The pipe would be approximately 20 to 24 inches in diameter. Piles would initially be driven with a vibratory hammer. Bearing would be confirmed with an impact hammer. It is estimated that a maximum of 160 falsework or temporary erection piles would need to be driven in Petaluma River. Falsework or temporary erection piles would be between 20 to 45 feet deep and would be installed between June 15 and October 31 of any year. Caltrans estimates that the contractor would install approximately 2 to 20 falsework or temporary erection piles per day. Trestle piles would be installed on approximately 20 to 80 days over a three year period. When an impact hammer is used to confirm bearing, each pile would receive approximately 5 to 20 strikes. If required for noise reduction, falsework or temporary erection piles would be driven inside a double walled isolation casing when an impact hammer is used.

After the completion of the Stage 1 bridge construction, the existing northbound bridge would be removed. After the completion of the Stage 2 bridge construction, the existing southbound bridge would be removed. For the portion of the structure over the waterway, the structure would likely be removed by saw cutting between precast concrete girders and then using crane(s) to lift the girders out of place. Subject to the engineer's approval, the crane(s) would likely be located at the adjacent spans of the bridge or barge cranes would be utilized to remove the girders. Bridge removal protective cover, if necessary, would be attached to the existing bridge soffit/bents. Cofferdams of approximately 39 feet long by 22 feet wide each (total 4) would be required for the removal of the existing columns and/or spread footings at Pier 5 and Pier 6. Access would be gained by using the temporary trestle.

For bridge demolition work on non-waterway areas, the columns would likely be tipped over and demolished on ground or on protective ground cover such as crane mats etc. Existing footings in water and on banks would be removed to a required minimum elevation or distance below original ground.

After completion of the new bridge, all temporary cofferdam, temporary fender system, temporary erection tower, and falsework material would be removed. Piles would be removed by vibrating and/or pulling the piles with a crane. Alternatively, the piles may be cut at an elevation specified by the U.S. Coast Guard and left in place below existing grade. A new permanent pier protective system consisting of either a closed fill system or a fender system of driven piles and barriers would be placed to protect the new bridge Pier 4. The permanent fenders would consist of approximately 60 driven piles. Piles would be made of

steel pipe, steel H, or timber. Pipe would be approximately 20 to 24 inches in diameter. Piles would initially be driven with a vibratory hammer. Bearing would be confirmed with an impact hammer. Permanent fender piles would be between 20 to 45 feet deep and would be installed between June 15 and October 31 of any year. It is estimated that the contractor would install approximately 2 to 20 permanent fender piles per day. Permanent piles would be installed during approximately 3 to 15 days over a three year period. When an impact hammer is used to confirm bearing, each pile would receive approximately 5 to 20 strikes. If required for noise reduction, permanent fender piles would be driven inside a double walled isolation casing when an impact hammer is used.

The creek banks would then be stabilized and erosion control BMP's would be implemented.

Storm Water Quality Systems and Construction Site BMPs. The proposed project would incorporate bio-filtration strips and swales to receive storm water discharges from the highway or other impervious surfaces. The project would also likely include off-site storm water treatment.

The Segment B on-site storm water treatment would include bio-filtration strips, bio-filtration swales, and Austin sand filters. The installation of these features were discussed in the Segment A project description.

Construction Site BMPs. To maintain water quality during construction, Caltrans would implement BMPs to reduce unnecessary water quality impacts. The following methods and practices would be implemented:

1. Earth Dikes/Drainage Swales and Lined Ditches
2. Outlet Protection/Velocity Dissipation Devices
3. Check Dams
4. Silt Fencing with Maintenance Openings
5. Fiber Rolls
6. Concrete Washouts
7. Drainage Inlet Protection
8. Construction Entrance/Exit Protection

Staging Locations. Caltrans would use staging locations for temporary storage of heavy construction equipment and construction materials, equipment maintenance shops, stockpile areas, and field offices. The primary staging areas in Segment B would be located within the new interchange at the Sanitary Landfill Road (Station 1405-1409), at the new interchange off of Kastania Road (Station 2039-2045), and below and along the sides of the Petaluma River Bridge (Station 2053-2055). Caltrans proposes areas that are located within the State Right-of-Way and quantified as within the project area of effect,

subject to approval of the contractor submitted SWPPP. Contractors may independently seek off-site staging locations. Off- site staging locations will be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.

Segment C

HOV Lane Construction. The existing State Route 101 Segment C roadway travels through the City of Petaluma. This segment is classified as a freeway, and includes two 12 foot lanes in each direction, 10 foot outside shoulders and 5 foot inside shoulders. The majority of existing curves in Segment C meet current horizontal alignment, vertical profile and sight distance requirements for the 70 mile per hour corridor design speed with the exception of the Petaluma Overhead. The existing Petaluma Overhead vertical profile is nonstandard and would be brought to current standards with this project. The non-paved median varies in width from 28 to 35 feet and contains a double thrie-beam barrier. The majority of the drainage facilities through Segment C can be utilized with only minor modifications and no historical drainage issues or recurring flooding has been documented.

In Segment C, Caltrans proposes to add a 12 foot wide HOV lane in each direction between south of the Lakeville Highway/State Route 116 Interchange and north of the Corona Road Overcrossing. The new roadway would be separated by a concrete barrier and would include 10 foot-wide inside shoulders. The majority of the widening would be in the median, with some outside widening. The roadway would be reconstructed at the approaches to the North Petaluma Overhead to correct the existing nonstandard vertical alignment. The proposed profile would be a new roadway located up to 17 feet above the existing roadway.

The HOV roadway construction would be completed as described for Segment A.

Vertical Curve Correction at the Petaluma Overhead. Caltrans plans to reconstruct the vertical profile through the Petaluma Overhead to achieve standard specification and replace the structure. The work would be completed in three stages. The first stage would consist of constructing the median portion of the overhead and fill the section leading up to both sides of the structure. Temporary retaining walls would be set in place for the fill section and imported material would be trucked in and placed in 0.5 foot lifts. Each lift would be spread and compacted with grading compacting equipment. The structural section would then be placed and compacted using the same methodology as described for HOV construction. Once the median is constructed, northbound traffic would be shifted to the median, and the same process would be used to construct the northbound portion of the vertical curve correction. Finally, northbound traffic would be moved to the new northbound lanes and southbound traffic would be shifted to the median for construction of the southbound lanes.

Roadway Resurfacing and Striping. Roadway resurfacing and striping for Segment C would use the same methodology as that described for Segment A.

Culvert Improvements. As described for the previous segments existing roadway drainage in Segment C is conveyed by a depressed median to drainage inlets at low points in the median. Segment C includes fifteen cross culverts that convey storm water to swales along the outside of the roadway which drain to adjacent water courses.

Caltrans would replace the depressed median with new HOV lanes, shoulders, and a median barrier. These improvements would result in sheet flow drainage towards the outside shoulders, away from the median. Sixteen existing drainage wells will be reconfigured at the median in Segment C. Cross culverts that are no longer needed would be abandoned in place and plugged. Caltrans has determined that most of the existing culverts are adequate but some would require replacement due to deterioration and improper sizing.

The construction methods for removing, installing, and extending culverts are as described for Segment A.

CHP Pullouts, HOV Bypass Lanes, and Ramp Metering. The addition of CHP pullouts, HOV bypass lanes, and ramp metering in Segment C will be similar to the methodology described for Segment A. These features will be added Landfill, Petaluma Boulevard South, State Route 116/Lakeville, and East Washington interchanges.

Sound Walls. Caltrans will construct new sound walls at four locations within Segment C. These locations include Ponderosa Drive to East Washington, North of Lynch Creek, Napa Drive to Corona Road, and East Washington to north of Lynch Creek. The combined length of the new walls would be approximately 12,230 feet.

Retaining Walls. Caltrans plans to construct three retaining walls for structural reasons in Segment C. The walls will be located north on both sides of the Petaluma Bridge and from McGregor Avenue Drive to East Washington. The combined length of the retaining walls in Segment C would be 3,635 feet long and will vary between 4 and 7 feet high. The walls will be constructed as described in Segment A.

Structures. Six bridges would be modified for the widening and include the structures at Route 101/116, Caulfield Lane, East Washington Street, Washington Creek, Lynch Creek, and North Petaluma. Only the two creek crossings are further described as follows.

> *Washington Creek Bridge*. The existing 67 foot-long Washington Creek Bridges accommodate two 12 foot-wide lanes of traffic and one 2 foot-wide inside shoulder and a 4 foot-wide outside shoulder in each direction.

Caltrans plans to widen both bridges in order to add the 12 foot wide HOV lane along with 10 foot-wide shoulders and HOV bypass. The existing twin bridges will be widened by connecting the right and left bridges and matching the existing structures to make a total width of 139.8 feet. It is also proposed that the existing bridge barriers with current standard barriers be replaced.

Access to the existing channel would be required for construction. Widening would involve the construction of a new cast-in-place reinforced concrete slab superstructure including new concrete bent caps and abutments. The substructure would consist of class 140 driven steel shell piles approximately 1.2 feet in diameter at the abutments and piers. Caltrans anticipates that there would be 11 new driven steel shell piles (pier columns) per pier for a total of 22 for the two piers. The piles would extend into the superstructure.

The Washington Creek Bridge would be constructed using the same methods described for Segment B.

Lynch Creek Bridge. The two Lynch Creek Bridges are only wide enough to accommodate two 12 foot wide lanes along with 2 foot wide inside shoulders and 4 foot wide outside shoulders. Both of the existing bridges were built in 1955 and consist of a three-span continuous reinforced concrete slab superstructure on reinforced concrete pile bents and reinforced concrete "U" open abutments.

As with the Washington Creek Bridge, Caltrans plans to widen the Lynch Creek Bridges to accommodate an additional 12 foot-wide HOV lane, 10 foot wide shoulders, and a ramp taper. Caltrans also plans to replace the existing bridge barriers with current standard barriers.

Access to the existing channel would be required for construction. Caltrans would widen the Lynch Creek Bridge by constructing and connecting parallel bridge structures to the median side of each of the existing bridge structures and closing the median gap as well as constructing and connecting a parallel bridge structure to the northbound side of the existing bridge. Caltrans would construct the widened portions of the bridge similar to the existing structure so that the widened portions match the existing structure in strength, durability, and flexibility.

Caltrans also plans to construct a sound wall on a bridge barrier on the southbound side of the structure. According to Caltrans, the widening of the existing bridge would require the construction of new a cast-in-place reinforced concrete slab superstructure including new concrete bent caps and abutments. The substructure consists of Class 140 (12 by 12 inch) driven precast concrete piles

Caltrans anticipates that there would be 10 new driven precast concrete piles (pier columns) per pier for a total of 20 piles for the 2 piers. The piles would extend into the superstructure.

The location and bearing for the new abutments and bents would match with the alignments of the existing abutments and bents. The use of falsework and erosion control BMPs would be similar to that used for the other bridges in this project.

Storm Water Quality Systems and Construction Site BMPs. Segment C would use the same BMPs as described for Segment B.

Construction Site BMPs. Segment C would use the same BMPs as described for Segment B.

Staging Locations. Caltrans would use staging locations for temporary storage of heavy construction equipment and construction materials, equipment maintenance shops, stockpile areas, and field offices. The primary staging areas in Segment C would be located within the State Route 116 Interchange. Caltrans proposes to use areas that are located within the State Right-of-Way and quantified as within the project area of effect, subject to approval of the contractor submitted SWPPP. Contractors may independently seek off-site staging locations. Off- site staging locations will be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.

Construction Site Restoration

Caltrans plans to restore areas of temporary ground disturbances, including storage and staging areas, and temporary roads. These areas will be re-contoured, if appropriate, and revegetated with seeds and/or cuttings of appropriate plant species to promote restoration of the area to pre-project conditions. Caltrans defines areas of "temporary" disturbance to be any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Caltrans will be developing a restoration plan that will be submitted to the Service for comment prior to initial ground breaking. According to Caltrans, to the maximum extent practicable (i.e., presence of natural lands), topsoil will be removed, cached, and returned to the site according to successful restoration protocols. Loss of soil from run-off or erosion will be prevented with straw bales, straw wattles, or similar means provided they do not entangle, block escape or dispersal routes of listed animal species.

Proposed Avoidance and Minimization Measures

According to the May 2008 Biological Assessment and the revised project description provided by Caltrans on August 27, 2008, FHWA/Caltrans propose to avoid, minimize, and compensate for effects to listed species by implementing the following measures:

Federally Listed Plants

If listed plants may be affected by the project, Caltrans will implement the following:

1. Minor design modifications will be made to avoid effects to listed plant species.

2. Any area where federally listed plants and/or populations have been observed within the temporary work area will be designated an Environmentally Sensitive Area and marked in the field with orange construction fencing.

3. The location of all Environmentally Sensitive Area's will be shown on project construction drawings and noted for monitoring during construction.

4. Preconstruction botanical surveys will be conducted prior to construction during the appropriate time of year (during spring and early summer), by qualified botanists familiar with the regional flora, and will follow Service, California Department of Fish and Game, and CNPS approved protocols.

California Red-Legged Frog

1. To compensate for the potential effects to 203.78 acres of California red-legged frog habitat Caltrans and FHWA will provide compensation at a 1:1 ratio totaling approximately (203.78 acres). This compensation, which is being provided pursuant to CEQA/NEPA and FHWA policies on mitigating effects to natural lands, and which is incorporated as part of the project description, will be achieved using a combination of the following:

    a. Purchasing credits at a resource agency approved mitigation bank servicing the action area;

    b. Purchasing conservation easements at or as close to the project site as practical within Marin and/or Sonoma Counties;

    c. Purchasing fee title and preserving the land for California red-legged frog at or as close to the project site as practical within Marin and/or Sonoma Counties.

Compensation may be provided by Caltrans itself or to the extent feasible with the assistance of a state or local partner such as a park or open space district or a resource conservation district. Compensation for California red-legged frog will be provided before or concurrent with the project effects to California red-legged frog for each project Construction Phase.

2. A Service-approved biologist(s) will be designated for the construction phase activities in Segment B and Segment C that will affect California red-legged frog habitat. The qualified biologist(s) will be on-site during specific construction activities for each construction phase work in potential California red-legged frog habitat. The qualifications of the biologist(s) will be presented to the Service for review and written approval prior to ground-breaking at the project site. The biologist(s) will coordinate through the Resident Engineer, to stop any work that may result in take of the California red-legged frog. If work is stopped, the biologist(s) will notify the Service by telephone and electronic mail within one (1) working day. The Service contact will be Chris Nagano, Division Chief, Endangered Species Program at the Sacramento Field Office at telephone (916) 414-6600.

3. The Resident Engineer will halt work and immediately contact the Service-approved project biologist(s) and the Service in the event that a California red-legged frog gains access to a construction zone. The Resident Engineer will suspend construction activities in the immediate construction zone within Segment B and Segment C for each specific project phase that may affect California red-legged frog habitat until the animal leaves the site voluntarily or is removed by the biologist(s) to a release site using Service-approved handling techniques.

4. All construction supervisory personnel for each specific project phase within Segment B and Segment C that are working in areas of potential endangered species habitat will attend an environmental education program delivered by the Service approved biologist prior to working on the project site. The program will include an explanation as how to best avoid the accidental take of California red-legged frogs. The Service approved biologist(s) will conduct a training session that would be scheduled as a mandatory informational field meeting by the Caltrans Resident Engineer for all construction contractor supervisory personnel. The field meeting will include topics on species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis will be placed on the importance of the habitat and life stage requirements within the context of project maps showing areas where minimization and avoidance measures are being implemented. The program will include an explanation of appropriate federal and state laws protecting endangered species as well as the importance of compliance with Caltrans and various resource agency conditions.

5. To minimize temporary disturbances in areas of potential California red-legged frog habitat, project related vehicle traffic within Segment B and Segment C for construction phases with potential California red-legged frog habitat will be restricted to established roads, construction areas, and other designated areas. These areas also should be included in pre-construction surveys and, to the maximum extent practicable, should be established in locations disturbed by previous activities to prevent further adverse effects. Project related vehicles will observe a 20-mile per hour speed limit within Segment B and Segment C for construction phases with potential California red-legged frog habitat, except on County roads, and State and Federal highways. Off-road traffic outside of designated action areas of Segment B and Segment C for construction phases with potential California red-legged frog habitat will be prohibited.

6. Dust control measures will be implemented within Segment B and Segment C for construction phases with potential California red-legged frog habitat, consisting of regular truck watering of constriction access areas and disturbed soil areas with the use of organic soil stabilizers to minimize airborne dust and soil particles generated from graded areas. Regular truck watering will be a requirement of the construction contract. In addition, for disturbed soil areas, an organic tackifier to control dust emissions blowing off of the right-of-way or out of the construction area during construction will be included in the contract special provisions. Watering guildelines for dewatering will be established to avoid any excessive run-off that may flow into contiguous areas. Any material stockpiles will be watered, sprayed with tackifier or covered, to minimize dust production and wind erosion.

7. Project employees will be provided with written guidance governing vehicle use, speed limits on unpaved roads, fire prevention, and other hazards.

8. To eliminate an attraction to predators of the California red-legged frog, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed at least once a day from the action area.

9. To avoid injury or death of a California red-legged frog, no firearms will be allowed in the action area except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials.

10. To prevent harassment, injury or mortality of a California red-legged frog or destruction of their refuge, project personnel will not be permitted to have dogs or cats in the action area.

11. Use of rodenticides and herbicides in the action area will be used in such a manner to prevent primary or secondary poisoning of a California red-legged frog and the depletion of vegetation on which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other appropriate State and Federal regulations, as well as additional project-related restrictions deemed necessary by the Service or the California Department of Fish and Game.

12. Dedicated fueling and refueling practices will be designated as part of the approved SWPPP. Dedicated fueling areas will be protected from storm water run-on and run-off and will be located at least 50 feet from downslope drainage facilities and water courses. Fueling must be performed on level-grade areas. On site fueling will only be used where it is impractical to send vechicles and equipment off-site for fueling. When fueling must occur on-site, the contractor will designate an area to be used subject to the approval of the Resident Engineer, representing Caltrans. Drip pans or absorbent pads will be used during on-site vehicle and equipment fueling.

13. All grindings and asphaltic-concrete waste will be stored within previously disturbed areas absent of California red-legged frog habitat and at a minimum of 150 feet from any downstream riparian habitat, aquatic habitat, culvert, or drainage feature.

14. For each specific project phase within Segment B and Segment C, and to the extent practicable, areas outside of the construction zones containing suitable habitat for the California red-legged frog will be delineated with high visibility temporary fencing at least 4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment onto sensitive areas during construction activities. The fencing will be removed only when all construction equipment is removed from the site. No project activities will occur outside the delineated project construction area.

15. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans will allow access by Service personnel to the action area to inspect project effects to California red-legged frogs and their habitats. Due to safety concerns, Caltrans requests that Service staff check in with the Resident Engineer prior to accessing the construction site.

16. For work on each construction phase within Segment B and Segment C that may affect California red-legged frog habitat, a Service-approved biologist(s) will be on-site to monitor the initial ground disturbance activities for the road construction. The biologist(s) will perform a clearance survey immediately prior

to the initial ground disturbance. Safety permitting, the Service-approved biologist(s) will investigate areas of disturbed soil for signs of listed species within thirty (30) minutes following the initial disturbance of that given area.

17. To prevent inadvertent entrapment of California red-legged frogs during work within construction Phase B4, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. Alternatively, an additional 4-foot high vertical barrier, independent of exclusionary fences, may be used to further prevent the inadvertent entrapment of California red-legged frogs. If it is not feasible to cover an excavation or provide an additional 4-foot high vertical barrier, independent of exclusionary fences, one or more escape ramps constructed of earth fill or wooden planks will be installed. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped listed animal is discovered, the on-site biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape, or the Service will be contacted by telephone for guidance. The Service will be notified of the incident by telephone and electronic mail within one working day.

18. Plastic mono-filament netting (erosion control matting) or similar material will not be used at the project site because California red-legged frogs may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

19. Injured California red-legged frogs will be cared for by a licensed veterinarian or other qualified person such as the on-site biologist; dead individuals must be placed in a sealed plastic bag with the date, time, location of discovery, and the name of the person who found the animal; the carcass should be kept in a freezer; and held in a secure location. The Service and the California Department of Fish and Game will be notified within one (1) working day of the discovery of death or injury to a California red-legged frog that occurs due to project related activities or is observed at the project site. Notification will include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Division Chief, Endangered Species Program at the Sacramento Fish and Wildlife Office (916/414-6600), and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6660. The California Department of Fish and Game contact is Mr. Scott Wilson at telephone (707) 944-5563. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game

20. Caltrans will submit post-construction compliance reports for each Segment B and Segment C construction phase with potential California red-legged frog habitat, prepared by the on-site biologist, to the Service within sixty (60) calendar days following completion of each phase with potential California red-legged frog habitat or within sixty calendar days of any break in construction activity lasting more than sixty calendar days. This report will detail (1) dates that construction occurred; (2) pertinent information concerning the success of the project in implementing avoidance and minimization measures for listed species; (3) an explanation of failure to meet such measures, if any; (4) known project effects on California red-legged frogs, if any; (5) occurrences of incidental take of any of these species; (6) documentation of employee environmental education; and (7) other pertinent information. The reports will be addressed to the Deputy Assistant Field Supervisor of the Endangered Species Program, Sacramento Field Office of the Service.

Salt Marsh Harvest Mouse

Caltrans stated in their August 5, 2008 letter that the following measures would be implemented during activities associated with the Petaluma Bridge. Caltrans will avoid potential salt marsh harvest mouse habitat adjacent to the action area at other locations.

1. Caltrans will begin restoration of all salt marsh harvest mouse pickleweed and upland habitat associated with the action area to baseline or better conditions following the completion of construction at the Petaluma River Bridge. Successful establishment of baseline or better salt marsh harvest mouse pickleweed habitat should be achieved within three years.

2. A Service and the California Department of Fish and Game approved biologist will be designated for construction activities for Construction Phase B4. The qualified biologist(s) will be on-site during specific construction activities for each project activity that may have adverse effects to the salt marsh harvest mouse. The qualifications of the biologist(s) will be presented to the Service and the California Department of Fish and Game for review and written approval prior to ground-breaking at the project site. The biologist(s) will coordinate through the Resident Engineer, to stop any work that may result in take of these listed animal species. If work is stopped, the biologist(s) will notify the Service and the California Department of Fish and Game by telephone and electronic mail within one working day. The Service contact will be Chris Nagano, Division Chief, Endangered Species Program at the Sacramento Field Office at telephone (916) 414-6600. The California Department of Fish and Game contact is Mr. Scott Wilson at (707) 944-5563.

3. The Resident Engineer will halt work and immediately contact the Service and California Department of Fish and Game approved biologist and the Service and the California Department of Fish and Game in the event that a salt marsh harvest mouse gains access to a construction zone. The Resident Engineer will suspend construction activities in the immediate construction zone for work in Construction Phase B4 that could have adverse effects to the salt marsh harvest mouse until the animal leaves the site voluntarily.

4. All supervisory construction personnel for Construction Phase B4 that are working in areas of potential endangered species habitat will attend an environmental education program delivered by the Service and California Department of Fish and Game approved biologist prior to working on the project site. The program will include an explanation as how to best avoid the accidental take of salt marsh harvest mouse. The Service and California Department of Fish and Game approved biologist(s) will conduct a training session that would be scheduled as a mandatory informational field meeting by the Caltrans Resident Engineer for all construction contractor supervisory personnel. The field meeting will include topics on species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis will be placed on the importance of the habitat and life stage requirements within the context of project maps showing areas where minimization and avoidance measures are being implemented. The program will include an explanation of appropriate federal and state laws protecting endangered species as well as the importance of compliance with Caltrans and various resource agency conditions.

5. To minimize temporary disturbances for work in areas of potential salt marsh harvest mouse habitat, project related vehicle traffic within Construction Phase B4 will be restricted to established roads, construction areas, and other designated areas. These areas also should be included in preconstruction surveys and, to the maximum extent practicable, should be established in locations disturbed by previous activities to prevent further adverse effects. Project related vehicles will observe a 20-mile per hour speed limit within Construction Phase B4, except on County roads, and State and Federal highways. Off-road traffic outside of designated action areas within Construction Phases B2 and B4 will be prohibited.

6. Dust control measures will be implemented within Construction Phase B4, consisting of regular truck watering of constriction access areas and disturbed soil areas with the use of organic soil stabilizers to minimize airborne dust and soil particles generated from graded areas. Regular truck watering will be a requirement of the construction contract. In addition, for disturbed soil areas, an organic tackifier to control dust emissions blowing off of the right-of-way or out of the construction area during construction will be included in the contract special provisions. Watering guildelines for dewatering will be established to

avoid any excessive run-off that may flow into contiguous areas. Any material stockpiles will be watered, sprayed with tackifier or covered, to minimize dust production and wind erosion.

7. Project employees will be provided with written guidance governing vehicle use, speed limits on unpaved roads, fire prevention, and other hazards.

8. To eliminate an attraction to predators of the salt marsh harvest mouse, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed at least once a day from the action area.

9. To avoid injury or death of the salt marsh harvest mouse, no firearms will be allowed in the action area except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials.

10. To prevent harassment, injury or mortality of a salt marsh harvest mouse or destruction of their refuge/nesting areas by dogs or cats, project personnel will not be permitted to have dogs or cats in the action area.

11. Rodenticides and herbicides in the action area will be used in such a manner to prevent primary or secondary poisoning of salt marsh harvest mouse and the depletion of vegetation on which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other appropriate State and Federal regulations, as well as additional project-related restrictions deemed necessary by the Service or the California Department of Fish and Game.

12. Dedicated fueling and refueling practices will be designated as part of the approved SWPPP. Dedicated fueling areas will be protected from storm water run-on and run-off and will be located at least 50 feet from downstream drainage facilities and water courses. Fueling must be performed on level-grade areas. On site fueling will only be used where it is impractical to send vechicles and equipment off-site for fueling. When fueling must occur on-site, the contractor will designate an area to be used subject to the approval of the Resident Engineer, representing Caltrans. Drip pans or absorbent pads will be used during on-site vehicle and equipment fueling.

13. All grindings and asphaltic-concrete waste will be stored within previously disturbed areas absent of salt marsh harvest mouse habitat and at a minimum of 150 feet from any downslope riparian habitat, aquatic habitat, culvert, or drainage feature.

14. To minimize or avoid the loss of individual salt marsh harvest mice from construction activities in the Petaluma River area, pickleweed vegetation will be hand-removed. Following removal, a special 2-foot high fence consisting of plastic sheeting will be placed 20 feet from the boundaries of construction areas in and adjacent to the pickleweed areas after the vegetation is removed. The fence will be held in place with 2-inch wide and 3-foot long stakes and will be buried in a 6 to 8 inch deep trench to prevent mice from pushing under the fence. These methods will occur with the approval of and in coordination with the California Department of Fish and Game.

15. Prior to commencing construction work for Contract Phase B4 that can have adverse effects to salt marsh harvest mouse, and to the extent practicable, areas outside of the construction zones containing suitable habitat for salt marsh harvest mouse will be delineated with high visibility temporary fencing at least 4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment onto sensitive areas during construction. The fencing will be removed only when all construction equipment is removed from the site. Actions within the action area will be limited to vehicle and equipment operation on existing roads. No construction activities will occur outside the delineated project construction area.

16. Caltrans will minimize effects on potential habitat at Location 4 by restricting construction to within 100 feet of the existing Caltrans ROW. The closest potential habitat for salt marsh harvest mouse was found approximately 150 feet from the existing Caltrans ROW.

17. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans will allow access by the Service and/or California Department of Fish and Game personnel to the project site to inspect project effects to the salt marsh harvest mouse and their habitats. Due to safety concerns, Caltrans requests that Service staff check in with the Resident Engineer prior to accessing the construction site.

18. For work within Construction Phase B4 that could have adverse effects to salt marsh harvest mouse, a Service and California Department of Fish and Game approved biologist will be on-site to monitor the initial ground disturbance activities for the road construction. The biologist will perform a clearance survey immediately prior to the initial ground disturbance. Safety permitting, the Service and California Department of Fish and Game approved biologist(s) will investigate areas of disturbed soil for signs of listed species within thirty (30) minutes following the initial disturbance of that given area.

19. To prevent inadvertent entrapment of salt marsh harvest mouse during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. Alternatively, an additional 2-foot high vertical barrier, independent of exclusionary fences, may be used to further prevent the inadvertent entrapment of salt marsh harvest mice. If it is not feasible to cover an excavation or provide an additional 2-foot high vertical barrier, independent of exclusionary fences, one or more escape ramps constructed of earth fill or wooden planks will be installed. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped listed animal is discovered, the on-site biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape, or the Service and/or California Department of Fish and Game will be contacted by telephone for guidance. The Service will be notified of the incident by telephone and electronic mail within one working day.

20. Injured salt marsh harvest mice will be cared for by a licensed veterinarian or other qualified person such as the on-site biologist; dead individuals must be placed in a sealed plastic bag in which a piece of paper is placed that contains the date, time, location of discovery, and the name of the person who found the animal; the carcass should be kept in a freezer; and held in a secure location. The Service and the California Department of Fish and Game will be notified within one (1) working day of the discovery of death or injury to a salt marsh harvest mouse that occurs due to project related activities or is observed at the project site. Notification will include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Division Chief, Endangered Species Program at the Sacramento Fish and Wildlife Office (916/414-6600), and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6660. The California Department of Fish and Game contact is Mr. Scott Wilson at telephone (707) 944-5563. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game.

21. Caltrans will submit a post-construction compliance report for Construction Phase B4 prepared by the on-site biologist to the Service within sixty (60) calendar days following completion of Construction Phase B4 or within sixty (60) calendar days of any break in construction activity lasting more than sixty calendar days. This report will detail (1) dates that construction occurred; (2) pertinent information concerning the success of the project in implementing avoidance and minimization measures for listed species; (3) an explanation of failure to meet such measures, if any; (4) known project effects on the salt marsh harvest mouse, if any; (5) occurrences of incidental take of this listed species; (6) documentation

of employee environmental education; and (7) other pertinent information. The report will be addressed to the Deputy Assistant Field Supervisor of the Endangered Species Program.

According to the revised project description received by the Service on December 2, 2008, Caltrans plans to implement the following measures during the geotechnical investigation activities associated with construction of the Petaluma Bridge.

1. When accessing the designated temporary staging area, located between the north bank of Petaluma River and the toe of the north approach embankment, a qualified biologist will monitor the site access path taken by the drilling equipment. Along the access path near any salt marsh harvest mouse habitat designated by the biologists, plywood boards (4 feet by 8 feet) will be placed to temporarily form a pathway for the drilling equipment. A steel plate will be used to provide temporary crossing platform of a drainage ditch.

2. Maintain all vehicles and drill rigs will be inspected frequently and maintained to repair leaks.

3. Drip pans or drop cloths will be used to catch drips and spills. Drain and replace motor oil, radiator coolant, or other fluid will be conducted off site. All spent fluids will be collected, stored in labeled separate containers, and recycled whenever possible. All fuels, oils and lubricants will be kept within secondary containment.

4. Perform major maintenance, repair jobs and vehicle and equipment washing will be performed off-site when feasible, or in designated and controlled areas on-site.

5. Vehicles will be washed at an appropriate off-site facility. If equipment must be washed on-site, water will be prevented from entering the storm drain or open channel. Use of soaps, solvents, degreasers, or steam cleaning equipment will be prohibited. Wash water will be directed to an area that will not flow to any storm drain inlets or open channels.

6. Vehicles and heavy equipment will be refueled in one designated location on the site and spills will be cleaned up immediately.

7. A biological monitor will hold daily tail gate meeting prior to start of drilling activities.

8. Plastic sheeting or visqueen will be placed over the drill site to catch spills and drips of drilling fluids.

9. Straw waddle will be placed on top of visqueen to form a temporary dike surrounding the drill hole and circulation tub to contain spills.

10. Absorbents will be made available to clean up any leaks or spills.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the action area includes all lands associated with the approximately 786.402 acre project footprint and roads (except for County roads, and State and Federal highways) and other areas accessed by project vehicles.

Status of the Species and Environmental Baseline

California Red-Legged Frog

The California red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996). Please refer to the final rule and the *Recovery Plan for the California Red-Legged Frog (Rana aurora draytonii)* (Service 2002) for additional information on this species.

This threatened species is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have lighter centers (Stebbins 2003) and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Female frogs deposit egg masses on emergent vegetation, allowing the egg mass floats on the surface of the water (Hayes and Miyamoto 1984). Red-legged frogs breed from November through March with earlier breeding records occurring in southern localities (Storer 1925). Individuals occurring in coastal drainages are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold season.

The historic range of the red-legged frog extended coastally from the vicinity of Elk Creek in Mendocino County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species historically was documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties. This represents a loss of 70 percent of its former range (Service 2002). Red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the central coast. Within the

remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. This listed amphibian is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (California Department of Fish and Game 2004).

Adult California red-legged frogs prefer dense, shrubby or emergent riparian vegetation closely associated with deep (>2.3 feet), still, or slow-moving water (Hayes and Jennings 1988). However, frogs also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. The largest densities of red-legged frogs currently are associated with deep pools with dense stands of overhanging willows (*Salix* species) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). Red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat.

California red-legged frogs also can be found in disturbed areas such as channelized creeks and drainage ditches in urban and agricultural areas. An adult California red-legged frog recently was observed in a shallow isolated pool on North Slough Creek in the American Canyon area of Napa County (Christine Gaber/PG&E personal communication with Chris Nagano/Service on October 22, 2008). This frog location was surrounded by vineyard development. Another adult California red-legged frog was observed under debris in an unpaved parking lot in a heavily industrial area of Burlingame (Patrick Kobernus communication with Michelle Havens on October 16, 2008). This Burlingame frog was likely utilizing a nearby drainage ditch. Caltrans has also discovered California red-legged frog adults, tadpoles, and egg masses within a storm drainage system within a major cloverleaf intersection of Millbrae Avenue and State Route 101 in a heavily developed area of San Mateo County (Caltrans 2007). California red-legged frog has the potential to persist in disturbed areas as long as they provide at least one or more of their life history requirements.

According to Feller and Kleeman (2007), non-breeding dry season habitat includes several characteristics: 1) sufficient moisture to allow the frogs to survive throughout the non-breeding season that may be up to 11 months long ; 2) sufficient cover to moderate temperatures during the warmest and coldest times of the year; and 3) protection (e.g., deep pools in a stream, or complex cover such as root masses or thick vegetation) from predators such as hawks and owls, herons, and small carnivores.

During other parts of the year, habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote bush (*Baccharis pilularis*), California blackberry thickets (*Rubus ursinus*), and root masses associated with willow (*Salix* species) and California bay trees (*Umbellularia californica*). Sometimes the non-breeding habitat used by red-legged frogs is extremely limited in size. For example, non-breeding red-legged frogs have been found in a 6-foot wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat for red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that

provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

Red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites all year while others disperse. Dispersal distances are typically less than 0.5 mile (0.8 kilometers), with records of a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005). Dispersing frogs in northern Santa Cruz County traveled distances from 0.25 miles to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003). Fellers and Kleeman (2007) and Bulger et al. (2003) found that California red-legged frog migration corridors can be less "pristine" (e.g., closely grazed fields, plowed agricultural lands) than breeding or non-breeding habitats. Bulger *et al.* (2003) observed that this listed ranid did not avoid or prefer any landscape feature or vegetation type. They tracked individuals that crossed agricultural land, including recently tilled fields and areas with mature crops. The threats facing migrating California red-legged frogs during their movements include being run over by vehicles on roads (Gibbs 1998; Vos and Chardon 1998), degradation of habitat (Vos and Stumpel 1995; Findlay and Houlahan 1997; Gibbs 1998), predation (Gibbs 1998), and dessication (Rothermel and Semlistch 2002; Mazerolle and Desrochers 2003).

Egg masses contain about 2,000 to 5,000 moderate sized (0.08 to 0.11 inches in diameter), dark reddish brown eggs and are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* species) or cattails (Jennings *et al.* 1992). Red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs hatch in 6 to 14 days (Jennings 1988). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand results in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1990). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925; Jennings and Hayes 1985). Red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations of red-legged frogs fluctuate from year to year. When conditions are favorable red-legged frogs can experience extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of

occupied sites. In contrast, red-legged frogs may temporarily disappear from an area when conditions are stressful (e.g., drought).

The diet of red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. According to their data, vertebrates, such as Pacific tree frogs and California mice (*Peromyscus californicus*) represent over half the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. The diet of red-legged frogs is not well studied, but their diet is likely similar to other ranid frogs that feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b).

Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculus*), and several species of warm water fish including sunfish (*Lepomis* species), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993). Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the red-legged frog throughout its range.

Several researchers in central California have noted the decline and eventual disappearance of red-legged frog populations once bullfrogs became established at the same site (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs (*Rana aurora aurora*), and suggested that bullfrogs could prey on subadult northern red-legged frogs as well. Bullfrogs may also have a competitive advantage over red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Further more, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; M. Jennings, in litt.1993; R. Stebbins in litt. 1993). Thus bullfrogs are able to prey upon and out-compete red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to red-legged frog habitat has also adversely affected red-legged frogs. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, and the introduction of predatory fishes and bullfrogs. The conversion and isolation of perennial pool habitats resulting from urbanization is an ongoing impact to red-legged frogs.

The California red-legged frog may be susceptible to many of the same pathogens, fungi, water mold, bacteria, and viruses have been known to adversely affect tiger salamander species or other amphibians. As with the California tiger salamander, Chytridiomycosis and ranaviruses may be a particular developing concern for California red-legged frog populations. Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric three-spined sticklebacks (*Gasterosteus aculeatus*) in northwestern California. Ingles (1932a, 1932b, and 1933 cited in Fellers 2005) reported four species of trematodes from red-legged frogs, but he later synonymized two of them (found them to be the same as the other two). Nonnative species, such as bullfrogs and nonnative tiger salamanders, are both located within the range of the California red-legged frog and have been identified as potential carriers of these diseases. Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in red-legged frogs being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small, fragmented remaining California red-legged frog breeding sites, the many stresses on these sites due to habitat losses and alterations, translocation of infected animals, and the many other potential disease-enhancing anthropogenic changes which have occurred both inside and outside the species' range.

The recovery plan for red-legged frogs identifies eight Recovery Units (Service 2002). The establishment of these Recovery Units is based on the Recovery Team's determination that various regional areas of the species' range are essential to its survival and recovery. The status of the red-legged frog will be considered within the smaller scale of Recovery Units as opposed to the overall range. These Recovery Units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the draft recovery plan is to protect the long-term viability of all extant populations within each Recovery Unit. Within each Recovery Unit, core areas have been delineated and represent contiguous areas of moderate to high red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of red-legged frogs. The Marin-Sonoma Narrows Project is within Recovery Unit 3 (North Coast and North San Francisco Bay) (Service 2002).

Project Segments A and C cross through urbanized area with little potential upland red-legged frog habitat but with urban creek crossing that include degraded riparian habitat and non-native predators of this animal. Although urban, Washington and Lynch creeks in Segment C have well developed riparian cover within their confines and provide habitat for California red-legged frogs.

The habitat in and surrounding the action area of Segment B is rural and characterized by rolling oak grasslands and creeks with well-developed riparian systems. The development in Segment B is primarily limited to several large ranches and the dominate land use is cattle grazing. Based on the habitat conditions it appears likely that there is suitable upland and aquatic red-legged frog habitat throughout Segment B. According to Caltrans assessment, potential California red-legged frog habitat on both sides of the roadway that would be affected in Segment B amounts to 206.94 acres. Therefore, the Service has determined it is reasonable to conclude the California red-legged frog inhabits and has the potential to be encountered within 206.94 acres of the action area, based on the biology and ecology of the species, and the presence of suitable habitat.

Salt Marsh Harvest Mouse

The salt marsh harvest mouse was federally listed as endangered in 1970 (Service 1970). Critical habitat has not been proposed or designated. A detailed account of the taxonomy, ecology, and biology of the salt marsh harvest mouse is presented in the *Salt Marsh Harvest Mouse & California Clapper Rail Recovery Plan* (Service 1984) (Recovery Plan) and the references cited therein. The salt marsh harvest mouse is a Fully Protected Species under California law (See California Fish and Game Code Section 4700).

The salt marsh harvest mouse is a rodent endemic to the salt and brackish marshes of the San Francisco Bay Estuary and adjacent tidally influenced areas. The salt marsh harvest mouse closely resembles the western harvest mouse (*R. megalotis*). The salt marsh harvest mouse typically weighs about 0.35 ounce, has a head and body length ranging from 2.7-2.9 inches, a tail length ranging from 2.6-3.2 inches, and a hind foot length of 0.7 inch (Fisler 1965). As stated in the recovery plan, the salt marsh harvest mouse, when compared to the western harvest mouse, have darker ears, belly and back, and a slightly thicker, less pointed and unicolored tail. The salt marsh harvest mouse is further distinguished taxonomically into the northern and southern subspecies, *R. raviventris halicoetes* and *R. raviventris raviventris*, respectively. Of the two subspecies, *R. r. halicoetes* more closely resembles *R. megalotis*, and can be difficult to differentiate in the field; body color and color of ventral hairs as well as the thickness and shape of the tail have been used to distinguish the two.

The salt marsh harvest mouse has evolved to a life in tidal marshes. Specifically, they have evolved to depend mainly on dense pickleweed as their primary cover and food source. However, salt marsh harvest mice may utilize a broader source of food and cover which includes saltgrass (*Distichlis spicata*) and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, salt marsh harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia is an essential habitat component during high tide events. Salt marsh harvest mice are highly dependent on cover, and open areas as small as 33 feet wide may act as barriers to movement (Shellhammer 1978, as cited in Service 1984). The salt marsh harvest mouse does not burrow. It has been noted that the northern subspecies may build nests of loose grasses.

As described by Fisler (1965), male salt marsh harvest mice are reproductively active from April through September, but may appear active throughout the year. Females are reproductively active from March to November, and have a mean litter size of approximately four offspring.

The historic range of the species included tidal marshes within the San Francisco and San Pablo bays, east to the Collinsville-Antioch areas. Agriculture and urbanization has claimed much of the former historic tidal marshes, resulting in a 79 percent reduction in the amount of tidal marshes in these areas (Goals Project 1999). At present, the distribution of the northern subspecies occurs along Suisun and San Pablo Bays north of Point Pinole in Contra Costa County and Point Pedro in Marin County. The southern subspecies is found in marshes in Corte Madera, Richmond, and South San Francisco Bay mostly south of the San Mateo Bridge (Highway 92).

The preservation and growth of existing populations of the salt marsh harvest mouse is considered important to assuring the survival of this species. The Recovery Plan identifies essential habitat areas to be preserved or restored throughout the Estuary to meet the recovery objectives for this species. No essential habitat for the salt marsh harvest mouse is identified within the action area in the Recovery Plan.

Although no surveys for salt marsh harvest mice have been conducted within the action area, pickleweed-vegetated tidal wetlands and other potential habitat areas of suitable for the salt marsh harvest mouse occur within the action area at the Petaluma Bridge crossing. Salt marsh harvest mice have been detected in tidal marshes approximately 0.5 mile downstream of the Petaluma Bridge portion of the action area. Given that the salt marsh harvest mouse recovery plan identified four essential habitat areas on the Petaluma River and the species is known throughout the Petaluma Marsh Wildlife Area downstream of the Petaluma Bridge it is likely that salt marsh harvest mice would be found in pickleweed habitat throughout the tidally influenced portions of the Petaluma River system. As noted in the May 2008 Biological Assessment, California Department of Fish and Game biologist Fred Botti stated that the listed mouse may use the pickleweed habitat at the Petaluma Bridge crossing for migration or dispersal. Therefore, given the biology and ecology of this animal, the presence of occupied habitat in other nearby tidal marshes, and recent records, the salt marsh harvest mouse is likely to inhabit the action area.

Effects of the Proposed Action

<u>California Red-Legged Frog</u>

The proposed project could have adverse effects on the threatened California red-legged frog through mortality, injury, harassment, and harm of individual juveniles and adults. According to the August 5, 2008, Caltrans letter, the proposed actions will adversely affect 206.94 acres of California red-legged frog habitat. According to Caltrans, the affects amount to 203.78 acres of permanent effects and 3.16 acres of temporary effects associated with the creation of bioswales.

The proposed project likely will result in adverse effects to the feeding, resting, aestivation, movement, and other essential behaviors of the California red-legged frog. It will result in the loss and degradation of habitat. The primary east-west habitat connectivity in Segment B is at the existing bridge spanned creek crossings. The bridge widening at these locations is unlikely to present any barriers to those movement corridors. Construction and maintenance of properly sized and located culverts likely will minimize this adverse effect of the threatened California red-legged frog (see Rodriguez *et al.* 1996; Yanes *et al.* 1905).

Construction activities associated with the proposed project would remove vegetation and other materials necessary for cover and aestivation, fill or crush burrows or crevices, and potentially reduce the prey base for the California red-legged frog. Because this listed amphibian uses small mammal burrows and soil crevices for shelter, individuals may be crushed, buried, or otherwise injured during construction activities. California red-legged frogs also may be run over by construction equipment or other vehicles accessing the construction areas. Disturbance caused by construction activities may cause frogs to disperse into areas of unsuitable habitat, increase the risk of predation or other sources of mortality. Siltation, fill, or spill of petroleum products or other chemicals could cause loss of prey items in or adjacent to the project area. Construction activities are likely to result in the direct disturbance, displacement, injury, and/or morality of California red-legged frogs. Individuals likely are to be killed or injured by construction equipment or other vehicles accessing the construction site. There is a likelihood of direct injury or mortality to the animal from injury or death due to pet cats or dogs owned by construction related personnel, poisoning by pesticides, injury or death due to predators attracted to food or trash at the site, and harassment from night-lighting, noise, and vibration. Implementation of certain types of erosion control materials, such as plastic netting, could result in the entanglement and death of California red-legged frogs within these materials due to exposure or predators (Bartin and Kinkead 2005; Stuart *et al.* 2001). Disturbance from construction activities may also cause individuals to move into or across areas of unsuitable habitat where they may be prone to higher rates of mortality from vehicles and predation.

Range-wide habitat loss, fragmentation, and degradation from multiple factors are the primary threats to the California red-legged frog (Service 1996, 2004). Loss of natural lands continues to occur further reducing the habitat available for this listed animal. However, the amount of historical and current habitat loss directly attributable to road loss has not been calculated, but the effect of habitat fragmentation on the California red-legged frog is significant. Fragmentation can reduce access to habitat as well as habitat suitability, increase mortality of animals that are moving between habitat patches due to increased risk of predation, and disrupt movements, dispersal, and gene flow. As barriers to movement for the California red-legged frog, roads create smaller patches of habitat and increase patch isolation. Smaller populations of animals are at greater risk of extinction by chance from demographic, genetic, and environmental stochastic events (Wilcox and Murphy 1985; Schoener and Spiller 1992). Isolated populations also have a higher chance of extinction without the demographic and genetic input of immigrants and a lower chance of colonization after extinction (Lande 1988; Sjogren-Gulve 1994).

The short term temporal effect will occur when suitable habitat is lost when riparian and other vegetation vegetation is removed for construction of the highway, and also due to the improved ability of predators to hunt the listed amphibian. Hilty and Merender (2004) found that, in contrast to native species, non-native mammalian predators were more active in narrow and denuded riparian corridors and in large expanses of agricultural land (vineyards) far from core habitat. The increased width of the highway along with higher numbers of vehicles and speed of the cars and trucks likely will discourage or prevent movement by the California red-legged frog.

The necessity of moving between multiple habitats and breeding ponds means that many amphibian species, such as the California red-legged frog are especially vulnerable to roads in the landscape. Van Gelder (1973) and Cooke (1995) have examined the effect of roads on amphibians; and found that because of their activity patterns, population structure, and preferred habitats, aquatic breeding amphibians are more vulnerable to traffic mortality than some other species.

Fahrig *et al.* (1995) found that high traffic two-lane paved roads had a much larger effect on frog abundance than low traffic two-lane roads. Mortality rates for anurans on high traffic roads are higher than on low traffic roads (Hels and Buchwald 2001). Vos and Chardon (1998) found a significant negative effect of road density on the occupation probability of ponds by the moor frog (*Rana arvalis*) in the Netherlands. In addition, incidences of very large numbers of road-killed frogs are well documented (e.g., Asley and Robinson 1996), and studies have shown strong population level effects of traffic density (Carr and Fahrig 2001) and high traffic roads on these amphibians (Van Gelder 1973; Vos and Chardon 1998). Most studies regularly count road kills from slow moving vehicles (Hansen 1982; Rosen and Lowe 1994; Drews 1995; Mallick *et al.* 1998) or by foot (Munguira and Thomas 1992). These studies assume that every victim is observed, which may be true for large conspicuous mammals, but it certainly is not true for small animals, such as the California red-legged frog. Amphibians appear especially vulnerable to traffic mortality because they readily attempt to cross roads, are slow-moving and small, and thus can not easily be avoided by drivers (Carr and Fahrig 2001).

The direction and type of habitat used by dispersing animals is especially important in fragmented environments (Forys and Humphrey 1996). Models of habitat patch geometry predict that individual animals will exit patches at more "permeable" areas (Buechner 1987; Stamps *et al.* 1987). A landscape corridor may increase the patch-edge permeability by extending patch habitat (La Polla and Barrett 1993), and allow individuals to move from one patch to another. The geometric and habitat features that constitute a "corridor" must be determined from the perspective of the animal (Forys and Humphrey 1996).

State Route 101 from Navato to Petaluma is a formidable barrier to California red-legged frog and general wildlife movement. There are existing bridge and culvert crossings that have the potential to provide wildlife passage under State Route 101. As part of the project, Caltrans plans to upsize the diameter of approximately 36 culvert pipes and one reinforced concrete box (RCB). These replacements will include the installation of two 18-inch pipes, twenty 24-inch

pipes, six 30-inch pipes, one 36-inch pipe, two 42-inch pipes, one 43-inch pipe and a 6 foot by 3 foot RCB. In addition, Caltrans will install approximately 41 new culvert pipes, including one new 7 foot by 7 foot cattle pass. These new structures include five 18-inch pipes, fifteen 24-inch pipes, four 30-inch pipes, three 36-inch pipes, one 42-inch pipe, and two 48-inch double pipes. There are also existing crossing structures in Segment B that are not subject to project alteration. Those include two 7- to 10-foot high cattle crossings and eight 2- to 7-foot high RCBs.

The project will provide more opportunity for wildlife passage under State Route 101, however, it is doubtful if frogs will use long corregated culverts across a 80-foot or wider roadway that are not day-lighted, do not have a natural bottom, and do not have regular maintenance to prevent filling with sediment and debris. The dimension of the tunnels is considered one of the most important variables in the design of passage ways for vertebrates (Yanes *et al.* 1995; Rodriguez *et al.* 1996); although no studies have determined a minimum width for the California red-legged frog, passages made for other small vertebrates, such as salamanders, must be wide and tall enough to enable animals to clearly see to the opposite end of the culvert, or there is lighting along the culvert provided by overhead grates. Ng *et al.* (2004) note that culverts typically are installed to accommodate water flow, the installation of such passage ways solely for listed species and wildlife, especially across major roadways, is justified if no other passages or crossings exist and there is suitable habitat. It is also important that the crossing attract target listed species and wildlife; fencing or other measures be incorporated into a wildlife crossing to guide animals to the preferred crossing; the crossing be placed strategically to enhance habitat connectivity; and that the adjacent land use be conducive to long-term habitat protection (Portland State University 2003). The culverts, RCBs, and cattle crossings proposed by Caltrans may not adequately minimize the reduction or elimination of the movement of the California red-legged frog. The long term viability of any designated wildlife crossing is questionable unless crossing locations and the habitat on both sides of the crossing are permanently set aside as open space or have a conservation easement or some other designation that limits development. In addition, hog wire apparently will not be placed on the bottom one foot of the highway perimeter fence to deter frogs from entering the roadway and guide them towards safe crossings. The culverts may not be high enough to allow the animals to see through them to the other side of the roadway, improper placement in areas where the animals will not use them, and the uncertainty of maintenance and silt removal at drainage-associated crossings could eliminate their potential use by the frogs. The lack of hog wire will result in individuals crossing the roadway where they are more likely to be killed by vehicles.

Larger culverts, e.g. at least 72 inches tall, grates placed midway on the culvert to allow lighting to encourage the animals to use them, placement in areas where the animals are moving through, and appropriate, maintenance and silt removal, and the use of properly sized hog wire along the bottom of the highway perimeter fence to guide the California red-legged frog to the culverts, RCBs, and cattle crossings should increase the potential for these animals to move across the State Route 101 right-of-way in areas other than the bridged creek crossings.

Road studies suggest that properly designed passage can significantly reduce wildlife, including frog mortality (Dodd *et al.* 2004). The Town of Amherst in the State of Massachusetts installed two culverts with guiding fences to facilitate spotted salamander (*Ambystoma maculatum*) migration from their wintering burrows during the spring. Before the placement of these culverts under Henry Street, a two-lane street, salamander mortality was high. After installation, approximately 75.9% of animals that reached the tunnel entrances successfully passed through them (Jackson 1996).

The installation of a concrete median will present a definitive barrier to California red-legged frog movement over the road. Within the concrete medians, Caltrans plans to install Type S barriers for wildlife crossing every 20 feet and Type M wildlife crossings would be installed every 0.25 miles. Type S barriers are a type 60 concrete barrier with a 6 inch diameter opening at the base of the barrier for small animal passage. Type M wildlife crossings are a type 60 concrete barrier with a 2-foot break in the barrier, with the break protected by a thrie-beam guard rail to deflect vehicle traffic. Given the amount of traffic on State Route 101 it is unlikely that frogs will be able to successfully cross the road even if they do manage to find these openings.

Though the intent of wildlife culverts and crossings are to ensure safe passage of listed species and wildlife, they are also a benefit to human safety (Aleshire 2007; Ruediger and DiGiorgio undated; Sherwood 2007). Deer-automobile collisions, estimated by the Insurance Information Institute to occur at a rate of 500,000 per year, result in over $1 billion worth of vehicular damages, 29,000 human injuries, and 200 human fatalities each year (Cornell University). Insurance company, State Farm estimates that there were more than 1.2 million claims for damage in crashes with animals during the last half of 2007 and the first half of 2008 (Highway Loss Data Institute 2008). Although most animal strikes do not result in human injury, human deaths resulting from animal collision is increasing (Highway Loss Data Institute 2008). Culverts large enough to accommodate species such as deer (*Odocoileus* species) and mountain lion (*Felis concolor*), while maintaining substrates for the California red-legged frog and smaller wildlife, could reduce roadway collisions for a variety of species. For example, wildlife crossings of the Trans-Canada Highway in Canada's Banff National Park have reduced wildlife road mortality by 80%, and as much as 96% for ungulates (Robbins 2003).

Because their habitats have been fragmented, many endangered and threatened species exist as metapopulations (Verboom and Apeldom 1990; Verboom *et al.* 1991). A metapopulation is a collection of spatially discrete subpopulations that are connected by the dispersal movements of the individuals (Levins 1970; Hanski 1991). For metapopulations of listed species, a prerequisite to recovery is determining if unoccupied habitat patches are vacant due to the attributes of the habitat patch (food, cover, and patch area) or due to patch context (distance of the patch to other patches and distance of the patch to other features). Subpopulations on patches with higher quality food and cover are more likely to persist because they can support more individuals. Large populations have less of a chance of extinction due to stochastic events (Gilpin and Soule 1986). Similarly, small patches will support fewer individuals, increasing the rate of extinction. Patches that are near occupied patches are more likely to be recolonized when local extinction

occurs and may benefit from emigration of individuals via the "rescue" effect (Hanski 1982; Gotelli 1991; Holt 1993; Fahrig and Merriam 1985). For the metapopulation to persist, the rate of patches being colonized must exceed the rate of patches going extinct (Levins 1970). If some subpopulations go extinct regardless of patch context, recovery actions should be placed on patch attributes. Patches could be managed to increase the availability of food and/or cover. Movements and dispersal corridors likely are critical to California red-legged frog population dynamics, particularly because the animals likely currently persist as metapopulations with disjunct population centers. Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Hilty and Merenlender 2004; Petit *et al.* 1995; Buza *et al.* 2000).

Most metapopulation or meta-population-like models of patchy populations do not directly include the effects of dispersal mortality on population dynamics (Hanski 1994; With and Crist 1995; Lindenmayer and Possingham 1996). Based on these models, it has become a widely held notion that more vagile species have a higher tolerance to habitat loss and fragmentation than less vagile species. But models that include dispersal mortality predict exactly the opposite: more vagile species should be more vulnerable to habitat loss and fragmentation becase they are more susceptible to dispersal mortality (Fahrig 1998; Casagrandi and Gatto 1999). This prediction is supported by Gibbs (1998), who examined the presence-absence of five amphibian species across a gradient of habitat loss. He found that species with low dispersal rates are better able than more vagile species top persist in landscapes with low habitat cover. Gibbs (1998) postulated that the land between habitat serves as a demographic "drain" for many amphibians. Furthermore, Bonnet *et al.* (1999) found that snake species that use frequent long-distance movements have higher mortality rates than do sedentary species.

The construction activities at the proposed project could result in the introduction of chemical contaminants to the site. Substances used in road building materials or could leach out or wash out of the soil into adjacent habitat. Vehicles may leak hazardous substances such as motor oil and antifreeze. A variety of substances could be introduced during accidental spills of materials. Such spills can result from leaks in vehicles, small containers falling off vehicles, or from accidents resulting in whole loads being spilled. Large spills may be partially or completely mitigated by clean-up efforts, depending on the substance. California red-legged frogs using these areas could be exposed to any contaminants that are present at the site. Exposure pathways could include inhalation, dermal contact, direct ingestion, or ingestion of contaminated soil or plants. Exposure to contaminants could cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality. Carcinogenic substances could cause genetic damage resulting in sterility, reduced productivity, or reduced fitness among progeny. Little information

is available on the effects of contaminants on the California red-legged frog. The effects may be difficult to detect. Morbidity or mortality likely would occur after the animals had left the contaminated site, and more subtle effects such as genetic damage could only be detected through intensive study and monitoring.

Preconstruction surveys and the relocation of individual red-legged frogs may reduce injury or mortality. However, the capturing and handling of red-legged frogs to remove them from a work area may result in the harassment, mortality or injury of individuals. Stress, injury, and mortality may occur as a result of improper handling, containment, and transport of individuals. Death and injury of individual red-legged frogs could occur at the time of relocation or later in time subsequent to their release. Although survivorship for translocated red-legged frogs has not been estimated, survivorship of translocated wildlife, in general, is lower because of intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, risk of contracting disease in foreign environment, and increased risk of predation. Improper handling, containment, or transport of individuals would be reduced or prevented by use of a Service-approved biologist, by limiting the duration of handling, limited the distance of translocation, and requiring the proper transport.

Biologists, construction workers, and construction equipment working in different areas and with different species may transmit diseases by introducing contaminated equipment. The chance of a disease being introduced into a new area is greater today than in the past due to the increasing occurrences of disease throughout amphibian populations in California and the United States. It is possible that chytrid fungus may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes (e.g., water pH) that reduce normal immune response capabilities (Bosch *et al.* 2001). Implementation of the "Declining Amphibian Populations Task Force Fieldwork Code of Practice" during any aquatic survey activity will likely prevent transfer of diseases through contaminated equipment or clothing.

Construction of roads can facilitate the invasion and establishment by species not native to the area (Gelbard and Belnap 2003) or are native and are better competitors than the California red-legged frog, such as the bullfrog, that could feed on or compete with, the listed amphibian or its food sources. Disturbance and alteration of habitat adjacent to roads may create favorable conditions for non-native plants and animals. These exotic species can spread along roadsides and then into adjacent habitat. Non-native animals may use modified habitats adjacent to road to disperse into California red-legged frog habitat. These animals could compete with the listed ranid for resources such as food or cover, or directly injure or kill the amphibians. Non-native plants and animals may reduce habitat quality for the threatened frog, and reduce the productivity or the local carrying capacity for the animals. Introductions of non-native species could cause California red-legged frogs to alter behavioral patterns by avoiding or abandoning areas near road.

Disturbed areas adjacent to roads provide favorable habitat conditions for a number of non-native plant species. Some of these taxa are aggressively invasive and they can alter natural communities and potentially affect habitat quality. A problematic species within the range of the California red-legged frog is yellow star thistle (*Centaurea melitensis*). Dense stands of this plant can form along roadsides and then spread into adjacent habitat. This plant displaces native vegetation, competes with native plants for resources, and it may be difficult for the animals to move through due the plant's numerous sharp spines. Other species that may disperse along roads and invade adjacent riparian habitats include mustards (*Brassica* species) and Russian thistle (*Salsola tragus*) (Tellman 1997). Disturbed soils and reduced competition from native plants are some of the conditions that facilitate invasion along roads by non-native plant species.

Negative effects to wildlife populations from roads may extend some distance from the actual road, as the proposed project. The phenomenon can result from any of the effects already described in this biological opinion, such as vehicle-related mortality, habitat degradation, and invasive exotic species. Forman and Deblinger (1998) described the area affected as the "road effect" zone. Along a 4-lane road in Massachusetts, they determined that this zone extend for an average of approximately 980 feet to either side of the road for an average total zone width of approximately 1970 feet. However, in places they detected an effect > 0.6 mile from the road. Rudolph *et al* (1999) detected reduced snake abundance up to 2790 feet from roads in Texas. They estimated snake abundance out to 2790 feet, so the effect may have been greater. Extrapolating to a landscape scale, they concluded the effect of roads on snake populations in Texas likely was significant, given that approximately 79% of the land area of the Lone Star State is within 1640 feet of a road. The "road-zone" effects can be subtle. Van der Zandt *et al.* (1980) reported that lapwings (*Vanellus vanellus*) and black-tailed godwits (*Limosa limosa*) feeding at 1575 feet-6560 feet from roads were disturbed by passing vehicles. The heart rate, metabolic rate and energy expenditure of female bighorn sheep (*Ovis canadensis*) increases near roads (MacArthur *et al.* 1979). Trombulak and Frossell (2000) described another type of "road-zone' effect. Heavy metal concentrations from vehicle exhaust were greatest within 66 feet of roads, by elevated levels of metals in both soil and plants were detected at 660 feet of roads. The "road-zone" apparently varies with habitat type and traffic volume. Based on responses by birds, Forman (2000) estimated the effect zone along primary roads of 1000 feet in woodlands, 1197 feet in grasslands, and 2657 feet) in natural lands near urban areas. Along secondary roads with lower traffic volumes, the effect zone was 656 feet. The "road zone" and the California red-legged frog have not been adequately investigated.

The proposed compensation for the effects to 203.78 acres of California red-legged frog habitat will likely be beneficial to this listed species in Marin and/or Sonoma Counties. Caltrans proposes expenditure of the funds to purchase California red-legged frog credits at a Service-approved approved conservation bank, establishment of a Service-approved conservation easement, or obtaining fee title to habitat acquisition.

Caltrans is entertaining the possibility of obtaining a conservation easement at the Lawson's Landing property at Dillon Beach in Marin County. Lawson's Landing property is approximately 940 acres, and is one of the few areas remaining in coastal California with an active dune system that is not under permanent conservation status. The site supports a high proportion of dune slack wetlands with breeding habitat for the California red-legged frog. It has the largest expanse of native coastal scrub vegetation on paleodunes north of Monterey. The beach supports one of the largest wintering populations for the threatened western snowy plover (*Charadrius alexandrinus nivosus*) between San Francisco and the northern end of their range in Washington State. The endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) has been documented in the past as well as the endangered Tidestrom's lupine (*Lupinus tidestromii*) and the potential exists to repatriate these species for their recovery. The dunes and wetlands host numerous other special status plants and invertebrates that are adapted to shifting sands and coastal wetlands. The site not only offers important biological resources, but geological interest, as well as stunning scenic resources. The area contains important habitat for the California red-legged frog, as well as other listed species. Not all of the Lawson's Landing property provides habitat for the California red-legged frog but the establishment of a conservation easement on the California red-legged frog habitat within the Lawson's Landing property likely will provide benefits to several listed species, as well as native wildlife.
There are also several ranchers in Marin and Sonoma Counties that would be willing to sell conservation easements on their land that would allow them to maintain ecologically sustainable grazing while providing in-perpetuity management for the California red-legged frog. Conservation easements would be especially valuable for this listed frog in areas of designated or proposed California red-legged frog critical habitat.

Salt Marsh Harvest Mouse

Construction and other work activities at the Petaluma River Bridge crossing would permanently eliminate about 0.05 acres of pickleweed-vegetated habitat currently available for salt marsh harvest mice. Construction and other work activities in and around the pickleweed habitat near the Petaluma River Bridge crossing could affect individual salt marsh harvest mice through increased disturbance and habitat destruction. Increased levels of disturbance to salt marsh harvest mice would result from noise and vibrations from equipment and other work activities. Operation of equipment and associated loss of habitat would result in displacement of salt marsh harvest mice from protective cover and their territories/home ranges (through noise and vibrations) and/or direct injury or mortality (through crushing). These disturbances likely would disrupt normal behavior patterns of breeding, foraging, sheltering, and dispersal, and likely result in the displacement of salt marsh harvest mice from their territory/home range in the areas where their habitat is destroyed. Displaced salt marsh harvest mice may have to compete for resources in occupied habitat, and may be more vulnerable to predators. Female salt marsh harvest mice are reproductively active from March through November (Fisler 1965), so disturbance during this period could result in abandonment or failure of their litter. Thus, displaced salt marsh harvest mice may suffer from increased predation, competition, mortality, and reduced reproductive success.

Salt marsh harvest mice could be harmed if the habitat area affected by the proposed action is colonized by non-native, invasive plant species. The proposed action could result in the invasion of non-native plant species in the habitat area off the Petaluma River and subsequently into adjacent habitat areas for the salt marsh harvest mouse and California clapper rail. If established in these habitat areas, these non-native plant species could limit the habitat value of these areas for salt marsh harvest mice and California clapper rails by out competing and preventing or limiting the establishment of native wetland plant species. Successful removal of non-native, invasive plant species could prevent, or at least severely reduce the establishment of these undesirable species and ensure that current habitat values are reestablished or increased.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Numerous non-Federal activities continue to negatively affect the California red-legged frog in Marin and Sonoma Counties. Habitats are lost or degraded as a result of road and utility construction and maintenance, overgrazing, agricultural expansion, and water irrigation and storage projects that may not be funded, permitted, or constructed by a Federal agency. Other threats include contamination, poisoning, increased predation, and competition from non-native species associated with human development. Small private actions that may impact listed species, such as conversion of land, small mammal population control, mosquito control, and residential development, may occur without consultation with or authorization by the Service or the California Department of Fish and Game pursuant to their respectively Endangered Species Act.

As urban development continues, it will likely adversely affect upland areas that serve as dispersal and aestivation habitat for red-legged frogs. Continued development and maintenance of roadways to serve expanding urban areas may further fragment and isolate populations of red-legged frogs from other nearby populations. Increased predation associated with domesticated pets or feral animals generally accompanies urban expansion. As urban development encroaches on rural areas, the need increases for mosquito abatement programs that may introduce exotic fish into ponds used for breeding by red-legged frogs, thus impacting the reproductive success of this species.

Increased levels of vehicles and increased vehicle speeds could lead to an increased mortality level for the California red-legged frog. The cumulative local development will result in temporary and permanent habitat fragmentation. The results of fragmentation are inhibition of genetic exchange between populations and impediments to recolonization of habitats from which populations have been extirpated. Small, isolated populations are substantially more vulnerable

to stochastic events (e.g., aberrant weather patterns, fluctuations in availability of food) and may exhibit reduced adaptability to environmental (natural or anthropogenic) changes.

There is a continued demand for new housing and commercial development in Marin and Sonoma Counties and other road and development projects have been recently completed or are planned along the State Route 1, State Route 12, State Route 101, and State Route 116. These developments and further infill will eliminate the habitat connectivity between listed species habitat remaining habitat in the action area vicinity and the local region. Development of adjacent wildlife habitat will continue to result in the loss of not only breeding, resting, and foraging habitat, but the loss of dispersal corridors between breeding populations, thereby further isolating and fragmenting wildlife populations. Additionally, development of small reservoirs or water bodies, such as golf course hazards, and water diversions may occur which may pose further threats such as disruption of dispersal corridors for terrestrial species, and competition or predation from with non-native species such as bullfrogs for aquatic species.

Cumulative effects to the California red-legged frog include continuing and future conversion of suitable breeding, foraging, sheltering, and dispersal habitat resulting from urban development. Additional urbanization can result in road widening and increased traffic on roads that bisect habitat, thereby increasing road-kill while reducing in size and further fragmenting remaining habitats.

Cattle-grazing is a common land use practice in rural Marin and Sonoma Counties. Overgrazing results in degradation and loss of riparian vegetation, increased water temperatures, streambank and upland erosion, and decreased water quality in streams. Livestock operations may also degrade water quality with pesticides and nutrient contamination. However, light to moderate livestock grazing is generally thought to be compatible with continued successful use of rangelands by the red-legged frog and other listed species, provided the grazed areas do not also have intensive burrowing rodent control efforts (T. Jones, in litt. 1993; Shaffer et al. 1993). The shorter vegetation associated with grazed areas may make the habitat more suitable for ground squirrels whose burrows are utilized by red-legged frogs. Rodent control in rural areas in Marin and Sonoma Counties could contribute to the decline of red-legged frogs in the region, as well as other sensitive species that utilize burrows created by burrowing rodents.

Agricultural development, impoundments, and irrigation can reduce stream flows, resulting in the loss of aquatic habitat during the summer for red-legged frogs. Discing is a common practice on agricultural lands which can result in substantial losses of upland habitat for red-legged frogs. Significant conversion of rural, undeveloped land to agricultural land, particularly vineyards, is currently occurring in Sonoma County, resulting in loss of upland habitat for listed species. California red-legged frogs likely are exposed to a variety of pesticides and other chemicals throughout their ranges. This amphibian species could also die from starvation due to the loss of their prey base. Hydrocarbon and other contamination from oil production and road runoff; the application of numerous chemicals for roadside maintenance; urban/suburban landscape maintenance; and rodent and vector control programs may all have negative effects on red-legged

frog populations. In addition, red-legged frogs may be harmed through increased road kill due to the construction and use of new roads and increased traffic in the overall region and collection by amphibian enthusiast and others.

Further habitat fragmentation; additional non-native species introduction; translocation of infected individuals, and increased access to aquatic habitat could facilitate or increase the spread of amphibian diseases within the range of the California red-legged frog. The global mass extinction of amphibians primarily due to chytrid fungus continues to be of significant concern (Norris 2007; Skerratt *et al* 2007).

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger et al 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger et al. 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan et al. 2005, EPA Global Warming webpage http://yosemite.epa.gov; Adger et al. 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger et al. 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger et al. 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001).

The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders et al. 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007).

The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001,

2007; California Climate Action Team 2006; Lenihan et al. 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. As the global climate warms, terrestrial habitats are moving northward and upward, but in the future, range contractions are more likely than simple northward or upslope shifts. Ongoing global climate change (Anonymous 2007; Inkley et al. 2004; Adger et al. 2007; Kanter 2007) likely imperils the California red-legged frog and the resources necessary for its survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Numerous activities continue to eliminate habitats of salt marsh harvest mice. Habitat loss and degradation affecting this species continues as a result of urbanization, freshwater urban run-off, and contaminant inputs. Salt marsh harvest mice are also affected by increased predation associated with human development, and disturbance of breeding and foraging behavior. All of these non-Federal activities are expected to continue to adversely affect listed species considered in this opinion within the action area.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by FHWA so that they become binding conditions of any grant or permit issued to FHWA as appropriate, in order for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity covered by this Incidental Take Statement. If FHWA (1) fails to require Caltrans to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect because when California red-legged frogs are not in their breeding ponds, they inhabit the burrows of ground squirrels or other rodents; they may be difficult to locate due to their cryptic appearance and behavior; the juvenile and adult animals may be located a distance from the breeding ponds; the migrations occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Recent project monitoring suggests that California red-legged frogs are difficult to find during preconstruction clearance surveys that include excavation of potential upland salamander refugia in close proximity to breeding ponds and other aquatic habitat. Losses of California red-legged frogs may also be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as all of the California red-legged frogs inhabiting or utilizing the 206.94 acres of habitat identified within Segment B and Washington Creek and Lynch Creek in Segment C. The incidental take is expected to be in the form of harm, harassment, injury, and mortality to adult California red-legged frogs from habitat loss/degradation, construction-related disturbance, and capture and relocation.

The Service anticipates incidental take of the salt marsh harvest mouse will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, and the difficulty of finding killed or injured small mammals. The level of take of salt marsh harvest mice can be anticipated by the loss of available habitat. The Service considers the number of salt marsh harvest mice subject to harassment from noise and vibrations to be impracticable to estimate. Upon implementation of the Reasonable and Prudent Measures, incidental take associated with the proposed project in the form of harm, and harassment of the salt marsh harvest mouse caused by habitat loss and construction activities will become exempt from the prohibitions described under section 9 of the Act.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for the California red-legged frog and salt marsh harvest mouse will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service determined that this level of anticipated take is not likely to result in jeopardy to the California red-legged frog or the salt marsh harvest mouse. There is no designated or proposed critical habitat for the listed frog in the action area and critical habitat has not been designated for the salt marsh harvest mouse.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the proposed action on the California red-legged frog and the salt marsh harvest mouse. FHWA will be responsible for compliance with these measures which they will entrust Caltrans to implement:

1. FHWA will ensure the conservation measures in the project description as described in the May 2008, Biological Assessment, the August 27, 2008 revised project description, and this biological opinion will be implemented.

2. FHWA will ensure adverse effects to the California red-legged frog and the salt marsh harvest mouse will be minimized.

3. FHWA will ensure their compliance with this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, with implementation under the direction of Caltrans, FHWA shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):

    a. FHWA shall minimize the potential for harm, harassment, or killing of federally listed wildlife species resulting from project related activities by implementation of the conservation measures as described in the May 2008, Biological Assessment, the August 27, 2008 revised project description, and appearing in the *Project Description* of this biological opinion.

    b. FHWA/Caltrans shall include Special Provisions that include the Conservation Measures and the Terms and Conditions of this biological opinion in the solicitation for bid information. In addition, Caltrans shall educate and inform contractors involved in the project as to the requirements of the biological opinion.

    c. Caltrans and FHWA have proposed to provide 1:1 compensation for the effects to 203.78 acres of California red-legged frog habitat. Acceptable compensation shall be satisfied through in-perpetuity preservation of high quality red-legged frog habitat consisting of a breeding and/or significant dispersal habitat between breeding populations or a biological equivalent site similar to Lawson's Landing through

purchase of bank credits and/or acquisition of a conservation easement or fee title. Purchase of the site shall be reviewed and approved by the Service.

If a compensation bank is proposed in lieu of acquisition it shall be a Service-approved bank.

An approved ecologically-based conservation easement shall include restricted public access, a management plan, and an in-perpetuity endowment or other permanent non-wasting management fund based on a property analysis. The management plan shall include a description of the site, management needs (e.g. grazing plan, non-native vegetation and animal control, etc), when the management activities should be implemented, how often and to what level monitoring of the site shall occur, and a action/contingency plan to address potential management issues.

Proposed habitat acquisition shall also be accompanied by a Service-approved conservation easement that shall include restricted public access, a management plan, and an in-perpetuity endowment based on a property analysis.

Caltrans will demonstrate measurable progress in proving the Service approved compensation prior to initiating construction in Segment B in Phase 1, not no later than initiating construction on Phase 2.

d. Wildlife crossings established in Segment B shall be reviewed and approved by the Service.

e. FHWA/Caltrans shall prepare a relocation plan for moving California red-legged frogs that will be submitted to the Service for review and approval at least thirty (30) calendar days prior to the date of groundbreaking.

2. The following Terms and Conditions implement Reasonable and Prudent Measure two (2):

a. The Resident Engineer or their designee shall be responsible for implementing the conservation measures and Terms and Conditions of this biological opinion and shall be the point of contact for the project. The Resident Engineer or their designee shall maintain a copy of this biological opinion onsite whenever construction is taking place. Their name and telephone number shall be provided to the Service at least thirty (30) calendar days prior to groundbreaking at the project. Prior to ground breaking, the Resident Engineer must submit a letter to the Service verifying that they posses a copy of this biological opinion and have read the Terms and Conditions.

b. The Caltrans biologist shall have oversight over implementation of all the Terms and Conditions in this biological opinion, and shall have the authority to stop project

activities, through communication with the Resident Engineer or their designee, if any of the requirements associated with these Terms and Conditions are not being fulfilled. If biologist/construction liaison has requested a stop work due to take of any of the listed species the Service and the California Department of Fish and Game will be notified within one (1) working day via email or telephone.

c. Only Service-approved biologist(s) who are familiar with the biology and ecology of the California red-legged frog shall capture or handle this listed species.

d. To control erosion during and after implementation of the project, the applicant will implement erosion control BMPs. Erosion control measures and BMPs, which retain soil or sediment, runoff from dust control, and hazardous materials on the construction site and prevent these from entering aquatic habitat, will be placed, monitored, and maintained throughout the construction operations. These measures and BMPs may include, but are not limited to, silt fencing, sterile hay bales, vegetative strips, hydroseeding, and temporary sediment disposal.

e. Nets or bare hands may be used to capture California red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating red-legged frogs. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys or handling of red-legged frogs, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice." Service-approved biologists will limit the duration of handling and captivity of red-legged frogs. While in captivity, individual frogs shall be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults shall not contain any standing water. California red-legged frogs should not be moved outside their functional population in order to reduce translocation stress and the spread of disease.

f. Biologists shall take precautions to prevent introduction of amphibian diseases to the action area by disinfecting equipment and clothing as directed in the October 2003, California tiger salamander survey protocol titled, Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander and the recommended equipment decontamination procedures within the Service's California Red-Legged Frog Survey Guidance. Both items are available at the Service's Sacramento office website (http://www.fws.gov/sacramento/es/protocol.htm). Disinfecting equipment and clothing is especially important when biologists are coming to the action area to handle salamanders or frogs after working in other aquatic habitats.

g. All California red-legged frogs encountered in the action area should be relocated to a Service-approved location. The relocation site must be approved for the Marin Sonoma Narrows Project prior to ground breaking.

h. An outline of the employee environmental awareness program shall be submitted to the Deputy Assistant Field Supervisor of the Endangered Species Program at the Sacramento Fish and Wildlife Office within twenty (20) working days prior to the start of construction. Documentation of the training, including individual signed affidavits, will be kept of file and available on request.

i. Permanent and temporary disturbances and other types of project-related disturbance to the habitats of the California red-legged frog and the salt marsh harvest mouse shall be minimized to the maximum extent practicable by Caltrans. To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas also should be included in pre-construction surveys and, to the maximum extent possible, should be established in locations disturbed by previous activities to prevent further adverse effects.

j. Areas disturbed by project activities will be recontoured to pre-project conditions and reseeded with an appropriate erosion-control mixture. The seed mixture will include appropriate native grasses and forbs. Areas that will be subjected to ongoing maintenance are not areas of temporary effects even if they are restored within one year following the initial disturbance.

k. Construction activities shall not occur adjacent to the pickleweed wetland on the north side of the Petaluma River during high tide events of eight feet or greater (as determined by NAVD88 vertical datum) when salt marsh harvest mice might seek refuge outside of the adjacent inundated tidal marsh. Activities shall not resume until the water level has dropped below the eight foot NAVD88 elevation.

3. The following Terms and Conditions implement Reasonable and Prudent Measure three (3):

a. The following shall be implemented for staging, storage sites, vehicle parking, and access associated with the project:

1. Caltrans shall require as part of the construction contract that all contractors comply with the Act in the performance of the work as described in the project description of this biological opinion and conducted within the action area.

2. If a staging, storage, access, or vehicle parking area that is in compliance with the Act is not available, the agency with jurisdiction and the contractor would be responsible for compliance with the Act.

c. Caltrans shall report to the Service any information about take or suspected take of listed wildlife species not authorized by this biological opinion. Caltrans must notify the Service via electronic mail and telephone within 24 hours of receiving such information. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at (916) 414-6600, and Resident Agent-in-Charge Dan Crum of the Service's Law Enforcement Division at (916) 414-6660.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

The Service requests notification of the implementation of any conservation recommendations in order to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats. We propose the following conservation recommendations:

1. FHWA, Caltrans, Transportation Authority of Marin, and Sonoma County Transportation Authority should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (Service 2002).

2. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog, salt marsh harvest mouse, other listed species, and sensitive species.

3. FHWA, Caltrans, Transportation Authority of Marin, and Sonoma County Transportation Authority should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog, salt marsh harvest mouse, and other listed species. Such banking systems also could possibly be utilized for other required mitigation (i.e., seasonal wetlands, riparian habitats, etc.) where

appropriate. Efforts should be made to preserve habitat along roadways in association with wildlife crossings.

4. Roadways can constitute a major barrier to critical wildlife movement. Therefore, FHWA, Caltans, Transportation Authority of Marin, and Sonoma County Transportation Authority should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage by California red-legged frog, other listed animals, and wildlife. Photographs, plans, and other information in to the biological assessments if "wildlife friendly" crossings are incorporated into projects. Efforts should be made to establish upland culverts designed specifically for wildlife movement rather than accommodations for hydrology. Transportation agencies should also acknowledge the value of enhancing human safety by providing safe passage for wildlife in their early project design.

5. FHWA and Caltrans should continue to pursue multifaceted compensation packages such as the one developed for the proposed U.S. Interstate 580/Isabel Avenue Interchange Construction Project on future formal consultations with the Service.

6. Caltrans should continue to develop and implement their Early Statewide Biological Mitigation Planning Project that has been developed by the University of California at Davis, Road Ecology Center through Caltrans funding.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the proposed State Route 101 Marin-Sonoma Narrows HOV Widening Project, Marin and Sonoma Counties, California. As provided in 50 CFR §402.16 and in the terms and conditions of this biological opinion, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the final project design exceeds the described action area in the May 2008 Biological Assessment; (2) the amount or extent of incidental take is exceeded; (3) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (4) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (5) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions concerning this opinion on the proposed State Route 101 Marin-Sonoma Narrows HOV Widening Project, Marin and Sonoma Counties, California, please contact John Cleckler or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,

for Susan K. Moore
Field Supervisor

cc:
Larry Vinzant, Cesar Perez, Federal Highway Administration, Sacramento, California
Dale Jones, California Department of Transportation, Sacramento, California
Jim Richards, John Yeakel, Kevin Melanephy, California Department of Transportation, Oakland, California
Corinna Lu, CH2M Hill, Oakland, California
Scott Wilson, Melissa Escaron, California Department of Fish and Game, Yountville, California
Guy Preston, Preston Engineering Management Consulting, Ashland, Oregon
Bill Gamlen, Transportation Authority of Marin, San Rafael, California
John Maitland, Seana Gause, Sonoma County Transportation Authority, Santa Rosa, California

Literature Cited

Adger, N., P.Aggarwal, S. Agrawala, J.Alcamo, A. Allali, O. Anisimov, N. Arnell, M. Boko, O.Canziani, T. Carter, G. Cassa, U. Confalonieri, R. Cruz, E.de Alba Alcaraz, W. Eastreling, C. Field, A. Fischlin, B. Fitzharris, C.G. Garcia, C. Hanson, H. Harasawa, K. Hennessy, S.Huq, R. Jones, L. K. Bogataj, D. Karoly, R. Kliein, Z. Kundzewicz, M. Lal, R. Lasco, G. Love, X. Lu, G. Magrin, L.J. Mata, R. McLean, B. Menne, G. Midgley, N. Mimura, M.Q. Mirza, J. Moreno, L. Mortsch, I. Niang-Diop, R. Nichols, B. Novaky, L. Nurse, A. Nyon, M. Oppenheimer, J. Palutikof, M. Parry, A. Patwardhan, P. R. Lankao, C. Rosenzweig, S. Schneider, S. Semenov, J. Smith, J. Stone, J van Ypersele, D. Vaughan, C. Vogel, T. Wilbanks, P.Wong, S. Wu, and G. Yohe. 2007. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Climate Change 2007: Climate change impacts, adaptation and vulnerability. Brussels, Belgium.

Aleshire, P. 2007. Safe Crossing. High Country News November 12, 2007.

Anonymous. 2007. Global warming is changing the World. Science 316:188-190.

Buechner, M. 1987. Conservation in insular parks: simulation models of factors affecting the movement of animals across park boundaries. Biological Conservation 41:57-76.

Bulger, J. B., N. J. Scott Jr., and R. B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coastal forests and grasslands. Biological Conservation 110:85-95.

California Department of Transportation (Caltrans). 2007. Biological assessment for the restoration of the hydraulic capacity of the Cowan Storm Drain Canal within the U.S. Highway 101/Millbrae Avenue Interchange. EA 3A0400. December 2007. Caltrans District 4, Oakland, California.

California Climate Action Team. 2006. Climate Action Team Final Report to the Governor and Legislature. http://www.climatechange.ca.gov/climate_action_team/index.html.

Cayan, D.A., L. Leurs, M. Hanemann, G. Franco, and B. Croes. 2006. Sceanrios of climate change in California: an overview. A report from the California Climate Change Center, California Energy Commission and the California Environmental Protection Agency, Sacramento, California.

Carr, L.W., and L. Fahrig. 2001. Effect of road traffic on two amphibian species of differing vagility. Conservation Biology 15: 1071-1078.

Casagrandi, R., and M. Gatto. 1999. A mesoscale approach to extinction in fragmented habitats. Nature 400: 560-562.

Cornell University. Management of Wildlife Damage in Suburban and Rural Landscapes. http://wildlifecontrol.info/ne1005. Accessed December 2007.

Dodd, C. K. Jr., W. J. Barichivich, and L. L. Smith. 2004. Effectiveness of a barrier wall and culverts in reducing wildlife mortality on a heavily traveled highway in Florida. Biological Conservation 118 (2004) 619-631.

Drews, C. 1995. Road kills of animals by public traffic in Mikumi National Park, Tanzania, with notes on baboon mortality. African Journal of Ecology 33: 89-100.

Emlen, S. T. 1977. "Double clutching" and its possible significance in the bullfrog. Copeia 1977(4):749-751.

Fahrig, L. 1998, When does fragmentation of breeding habitat affect population survival? Ecological Modeling 105: 273-292.

Fahrig, L., and G. Merriam. 1985. Habitat patch connectivity and population survival. Ecology 66:1762-1768

Fahrig, L., J.H. Pedlar, S.E. Pope, P.D. Taylor, and J. F. Wegner. 1995. Effect of road traffic on amphibian density. Biological Conservation 73: 177-182.

Fellers, G. 2005. *Rana draytonii* Baird and Girard, 1852b California red-legged frog. Pages 552-554 *in* M. Lannoo (editor). Amphibian declines the conservation status of United States species. University of California Press. Berkeley, California.

Fellers, G. M. and P. M. Kleeman. 2007. California Red-Legged Frog (*Rana draytonii*) movement and habitat use: implications for conservation. Journal of Herpetology 41(2): 271-281

Findlay, C.S. and J. Houlahan. 1997. Anthropogenic correlates of species richness in southeastern Ontario wetlands. Conservation Biology 11: 1000-1009.

Fisler, G. F. 1965. Adaption and speciation in harvest mice of the marshes of San Francisco Bay. Univ. Calif. Publ. Zool. 77:1-108.

Forman, R. T., L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-231.

Gibbs, J.P. 1998. Amphibian movements in response to forest edges, roads, and streambeds in southern New England. Journal of Wildlife Management 62: 584-589.

Goals Project. 1999. Baylands ecosystem habitat goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, California, and San Francisco Bay Regional Water Quality Control Board, Oakland, California. 209 pp. plus appendices.

Hanski, I. 1982. Dynamics of regional distribution: the core and satellite hypothesis. Oikos 38:210-221.

_____ 1991. Single species metapopulation systematics: concepts, models and observations. Biological Journal of the Linnean Society 42:3-16.

_____ 1994. A practical model of metapopulation dynamics. Journal of Animal Ecology 63: 151-162.

Hayes, M. P., and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Pages 144-158 *in* R. Sarzo, K. E. Severson, and D. R. Patton (technical coordinators). Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, Rocky Mountain Range and Experiment Station, Fort Collins, Colorado. General Technical Report (RM-166): 1-458.

Hayes, M. P. and D. M. Krempels. 1986. Vocal sac variation among frogs of the genus *Rana* from western North America. Copeia 1986(4):927-936.

Hayes, M. P. and M. M. Miyamoto. 1984. Biochemical, behavioral and body size differences between *Rana aurora aurora* and *R. a. draytonii*. Copeia 1984(4):1018-1022.

Hayes, M. P., and M. R. Tennant. 1985. Diet and feeding behavior of the California red-legged frog, *Rana aurora draytonii* (Ranidae). Southwestern Naturalist 30(4): 601-605.

Hels, T. and E. Buchwald. 2001. The effect of road kills on amphibian populations. Biological Conservation 99: 331-340.

Highway Loss Data Institute. 2008. Collisions with deer and other animals spike in November; fatal crashes up 50% since 2000. October 30, 2008, news release. Available at http://www.iihs.org/news/2008/iihs_news_103008.pdf.

IFPC. 2001. Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change

[Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. Maskell, and C.A. Johnson (editors)]. Cambridge University Press, Cambridge, United Kingdom and New York, New York. 881 pp. Available at http://www.ipcc.ch/.

_____ 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Alley, R., T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidthaisong, P. Friedlingstein, J. Gregory, G. Hegerl, M. Heimann, B. Hewitson, B. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, M. Manning, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, D. Qin, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, S. Solomon, R. Somerville, T.F. Stocker, P. Stott, R.F. Stouffer, P. Whetton, R.A. Wood, D. Wratt. 21 pp. Available at http://www.ipcc.ch/.

Ingles, L.G. 1932a. Four new species of *Heamatoloechus* (Trematoda) from California. University of California Publications in Zoology 37: 189-201.

_____ 1932b. *Cephalogonimus brevicirrus*, a new species of trematoda from the intestine of *Rana aurora* from California. University of California Publications in Zoology 37:203-210.

_____ 1933. Studies on the structure and life history of *Ostiolum oxyorchis* (Ingles) from the California red-legged frog *Rana aurora draytonii*. University of California Publication in Zoology 39:135-162.

Inkley, D.B., M.G. Anderson, A.R. Blaustein, V.R. Burkett, B. Felzer, B. Griffin, J. Price, and T.L. Root. 2004. Global climate change and wildlife in North America. Wildlife Society Technical Review 04-2.

Jackson, S.D. 1996. Underpass systems for amphibians. 4 pages. In G.L. Evink, P. Garrett, D. Zeigler and J. Berry (editors) Trends in Addressing Transportation Related Wildlife Mortality, proceedings of the transportation related wildlife mortality seminar. State of Florida Department of Transportation, Tallahassee, Florida. FL-ER-58-96.

Jennings, M. R. 1988. Natural history and decline of native ranids in California. Pages 61-72 *in* H. F. De Lisle, P. R. Brown, B. Kaufman, and B. McGurty (editors). Proceedings of the Conference On California Herpetology. Southwestern Herpetologists Society, Special Publication 4:1-143.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (*Rana aurora draytonii*): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetological Review 31(1):94-103.

_____ 1990. Final report of the status of the California red-legged frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. Final report prepared for the California Department of Parks and Recreation, Sacramento, California, through Agreement (4-823-9018). Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, California. 30 pages.

Jennings, M. R., M. P. Hayes, and D. C. Holland. 1992. A petition to the U.S. Fish and Wildlife Service to place the California red-legged frog (*Rana aurora draytonii*) and the western pond turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants. 21 pages.

Kanter, J. 2007. Scientists detail climate changes, Poles to Tropics. New York Times. April 10, 2007.

Kruse, K. C. and M. G. Francis. 1977. A predation deterrent in larvae of the bullfrog, *Rana catesbeiana*. Transactions of the American Fisheries Society 106(3):248-252.

Kupferberg, S. J. 1996a. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (*Rana boylii*). Ecological Applications 6: 1322-1344.

_____ 1996b. The ecology of native tadpoles (*Rana boylii* and *Hyla regilla*) and the impacts of invading bullfrogs (*Rana catesbeiana*) in a northern California river. PhD dissertation. University of California, Berkeley, California.

Lenihan, J. M., R. Drapek, D. Bachelet, R. P. Neilson. 2003. Climate Change Effects on Vegetation Distribution, Carbon, and Fire in California. Ecological Applications 13(6): 1667-1681.

Lindenmayer, D.B., and H.P. Possingham. 1996. Modeling the interrelationships between habitat patchiness, dispersal capability and metapopulation persistence of the endangered species, Leadbeater's possum, in southeastern Australia. Landscape Ecology 11:79-105.

Mao, J., D. E. Green, G. M. Fellers, and V. G. Chincar. 1999. Molecular characterization of iridoviruses isolated from sympatric amphibians and fish. Virus Research 6: 45-52.

Mallick, S.A., G.J. Hocking, and M.M. Driessen. 1998. Road-kills of the eastern barred bandicoot (*Perameles gunnii*) in Tasmania: an index of abundance. Wildlife Research 25: 139-145.

Munguira, M.L. and J.A. Thomas. 1992. Use of road verges by butterfly and moth populations, and the effect of roads on adult dispersal and mortality. Journal of Applied Ecology 29: 316-329.

Ng, S.J., J.W. Dole, R.M. Savajot, S.R.D. Riley, and T.J. Valone. 2004. Use of highway undercrossings by wildlife in southern California. Biological Conservation 115: 499-507.

Portland State University. 2003. Wildlife crossing, rethinking road design to improve safety and reconnect habitat. Prepared for Metro. Portland State University Planning Workshop. June 2003.

Robbins, E. 2003. No more road kill: What it takes to make highways friendly to animals. Planning 69(2): 33-34.

Rodriguez, A., G. Crema, and M. Delibes. 1996. Use of non-wildlife passages across a high speed railway by terrestrial vertebrates. Journal of Applied Ecology 33: 1527-1540.

Rosen, P.C. and C.H. Lowe. 1994. Highway mortality of snakes in the Sonoran desert of southern Arizona. Biological Conservation 68: 143-148.

Rothermel, R.B. and R. D. Semlitsch. 2002. An experimental investigation of landscape resistance of forest versus old-field habitats to emigrating juvenile amphibians. Conservation Biology 16: 1324-1332.

Rubbo, M.J., and J.M. Kiesecker. 2005. Amphibian breeding distribution in an urbanized landscape. Conservation Biology 19: 504-511.

Ruediger, B., and M. DiGiorgio. Undated. Safe passage. A user's guide to developing effective highway crossings for carnivores and other wildlife. Southern Rockies Ecosystem Project.

Saunders, S., C. Montgomery, and T. Easley. 2008. Hotter and drier: The West's changing climate. The Rocky Mountain Climate Ortganization, and Natural Resources Defense Council. New York, New York.

Schoener, T.W. and D. A. Spiller. 1992. Is extinction rate related to temporal variability in population size? An empirical answer for orb spiders. The American Naturalist 139: 1176-1207.

Sherwood, A. 2007. As cars hit more animals on roads, toll rises. New York Times December 22, 2007.

Sjogren-Gulve, P. 1994. Distribution and extinction patterns within a northern metapopulation of the pool frog, *Rana lessonae*. Ecology 75: 1357-1367.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-1-342.

_____ 1933. Frogs and their commercial use. California Department of Fish and Game 19(3)203-213.

Stuart, J. M., M. L. Watson, T. L. Brown, and C. Eustice. 2001. Plastic netting: an entanglement hazard to snakes and other wildlife. Herpetological Review 32(3): 162-164.

Twedt, B. 1993. A comparative ecology of *Rana aurora* Baird and Girard and *Rana catesbeiana* Shaw at Freshwater Lagoon, Humboldt County, California. Unpublished. Master of Science thesis. Humboldt State University, Arcata, California. 53 pages plus appendix.

U.S. Fish and Wildlife Service (Service). 1970. United States List of Endangered Native Fish and Wildlife. October 13, 1970. Fed. Reg. 35(199): 16047-16048

_____ 1984. Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 141 pages.

_____ 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California red-legged frog. **Federal Register** 61:25813-25833.

_____ 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). Portland, Oregon. 173 pages.

_____ 2004. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the California red-legged frog (*Rana aurora draytonii*), proposed rule. **Federal Register** 69:19620-19642.

Van der Zande, A.N., W.J. ter Keurs, and W.J. Van der Weijden.. 1980. The impact of roads on the densities of four bird species in an open field habitat - evidence of a long-distance effect. Biological Conservation 18: 299-321.

Van Gelder, J.J. 1973. A quantitative approach to the mortality resulting from traffic in a population of *Bufo bufo* L. Oecologia 13:93-95.

Verboom, B., J., K. Lankester, and J.A. Metz. 1991. Linking local and regional dynamics in stochastic metapopulation models. Biological Journal Linnean Society 42:39-55.

Vos, C.C. and J.P. Chardon. 1998. Effects of habitat fragmentation and road density on the distribution pattern of the moor frog, *Rana arvalis*. Journal of Applied Ecology 35: 44-56.

Vos, C.C. and A.H.P. Stumpel. 1995. Comparison of habitat-isolation parameters in relation to fragmentation distribution patterns in the tree frog (*Hyla arborea*). Landscape Ecology 11: 203-214.

Wilcox, B.A. and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. The American Naturalist 125: 879-887.

With, K.A. and T. O. Crist. 1995. Critical thresholds in species' responses to landscape structure. Ecology 76: 2246-2459.

Wright, A. H. and A. A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Comstock Publishing Company, Inc., Ithaca, New York. 640 pages.

Yanes, M., J.M. Velasco, and Francisco Suarez. 1995. Permeability of roads and railways to vertebrates: the importance of culverts. Biological Conservation 71: 217-222.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No.				
Date: July 16, 2014		Freeway Yes [X] No [ ]		

No. 1780.1A

North Marin Water District
Mr. Drew McIntyre, P.E.
999 Rush Creek Place, P.O. Box 146
Novato, Ca 94948

Because of the State Highway construction project: Reconstruct and re-align, US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: Corda property service line and water meter located on the west side of US Route 101.

You are hereby ordered to: Prepare plans for the relocation of a water meter and installation of a service line for the Corda property along the east side of US Route 101 from approximately Engineer's Station "FR" Line 6565+60 southward to approximately 6300+00 (Frontage Road).

Your work schedule shall be as follows: Prepare relocation plans for said relocation/installation by July 22, 2014, and have it completed by August 15, 2014.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 and Christopher Blunk the Resident Engineer at 510 385-6886 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 100% State's expense in accordance with Section 703 of the Street and Highway Code.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: John O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WOR

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No. 1.7118.09				
Date: November 18, 2013		Freeway Yes [X] No [ ]		

No. 1780.1

North Marin Water District
Mr. Drew McIntyre, P.E.
999 Rush Creek Place, P.O. Box 146
Novato, Ca 94948

Because of the State Highway construction project: Reconstruct and re-align, US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: Approximately 11,611 feet of 30 inch aqueduct, along north-bound US Route 101 from engineer's station "A" line 6520+100 to 6665+100, in Marin and Sonoma Counties.

You are hereby ordered to: Relocate your 30 inch aqueduct and make all necessary preparations for said relocation as shown on your plan no. 1.7118.09 dated August 8, 2013.

Your work schedule shall be as follows: Commence your preparation work for said relocation by January 15, 2014 or as soon as possible and have it completed prior to April 30, 2015, or as directed by the State's Resident Engineer, whichever is later.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 and Christopher Blunk the Resident Engineer at 510 385-6886 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 100% State's expense in accordance with Section 703 of the Street and Highway code.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: John O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WOR

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120

Permit No.	0413-NUR2169
Dist/Co/Rte/PM	04-MRN/SON-101 27.0/27.6 and 0.0/1.9
Date	November 21, 2013
Fee Paid	$
Deposit	$
Performance Bond Amount (1)	$
Payment Bond Amount (2)	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (*Check one*):

☐ Your application of _____

☒ Utility Notice No. 1780.1 of Nov. 18, 2013

☐ Agreement No. _____ of _____

☐ R/W Contract No. _____ of _____

TO: North Marin Water District
999 Rush Creek Place
P.O. Box 146
Novato, CA 94948
Attn: Drew McIntyre
Phone:

, PERMITTEE

and subject to the following, **PERMISSION IS HEREBY GRANTED** to:

Relocate your company's 30-inch aqueduct to accommodate the construction of US Route 101 (State project EA: 264099) in the manner proposed. Relocate your facilities as shown on your plan no. 1.7118.09 dated August 8, 2013, on Highway 101, PM 27.0/27.6 and PM 0.0/1.9, in the Counties of Marin and Sonoma.

A minimum of one week prior to the start of work under this permit, notice shall be given and advance approval of construction detail, operations, public safety, and traffic control shall be obtained from State Representative Nasr Farag, (510) 376-8115 and Resident Engineer Christopher Blunk, (510) 385-6886 weekdays between 7:30 AM and 4:15 PM, Monday to Friday, holidays excluded

All utility work shall be performed in accordance with the appropriate provisions contained in the Department of Transportation Encroachment Permit Utility and Tree Trimming Special Provisions dated July 2009. All permitted work requires the permittee to apply for and obtain a work authorization number prior to start of work. See the attached "Encroachment Permit Work Scheduling Procedures" and the attached "Encroachment Permit Work Scheduling Request Form". Additional time beyond the minimum seven-day advance notice required in the above paragraph may be required for obtaining the traffic control approval. Immediately following completion of the work permitted herein, the permittee shall fill out and mail the Notice of Completion attached to this permit.

The following attachments are also included as part of this permit (*Check applicable*):

☒ Yes	☐ No	General Provisions
☐ Yes	☒ No	Utility Maintenance Provisions
☐ Yes	☒ No	Storm Water Special Provisions
☐ Yes	☒ No	A Cal-OSHA permit required prior to beginning work: # _____

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes	---------	Field Work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before As directed

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

FP
cc: W. Hauke (2),
Utility Coord - N. Farag
Resident Engr. - C. Blunk

APPROVED:

BIJAN SARTIPI, District Director

BY:

DAVID SALLADAY, District Permit Engineer

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No. 30762285				
Date: December 18, 2013 Revised : April 1, 2014		Freeway Yes [X] No [ ]		

No. 1780.2

Pacific Gas and Electric Company
Mr. David Kelly, Land Agent
111 Stony Circle
Santa Rosa, Ca 95401

Because of the State Highway construction project: Reconstruct and re-align US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: 35 aerial electric transmission and distribution poles located along the west side of US Route 101 south of the City of Petaluma.

You are hereby ordered to: Relocate your company's electric transmission and distribution facilities within the project area to accommodate construction of the re-alignment of US Route 101 as proposed. The relocation area is identified on PG&E's plan number 30762285 dated September 23, 2013, and on State's plans for this project.

Your work schedule shall be as follows: Coordinate your work with State's construction and commence by August 1, 2014, and have it completed prior to December 31, 2014.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 and Christopher Blunk the Resident Engineer at 510 385-6886 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 58.6% State expense and 41.4% OWNER's expense pursuant section 5(A) and 5 (C) of the Freeway Master Agreement dated November 1, 2004 and State's request that Owner relocate a portion of the gas pipeline to accommodate the North Marin Water District relocation.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: J. O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WOR

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (REV 6/2012)

Permit No.	0413-NUR2304
Dist/Co/Rte/PM	04-MRN&SON-101-27.0/27.6&0.0/1.9
DATE	December 19, 2013
Fee Paid	$ Exempt
Deposit	$
Performance Bond Amount	$
Payment Bond Amount	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (Check one):

☐ Your application of _____

☒ Utility Notice No. 1780.2 of Dec. 19, 2013

☐ Agreement No. _____ of _____

☐ R/W Contract No. _____ of _____

TO: PG&E Company
111 Stony Circle
Santa Rosa, CA 95401

Attn: Jim Dunlap
Phone: Not available

, **PERMITTEE**

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Relocate your company's electric transmission and distribution poles per your plan No. 30762285 to accommodate the construction of realignment of US Route 101 (State project EA: 264099) in the manner proposed on State Highway 04-Mrn & Son-101, Post Miles 27.0/27.6 & 0.0/1.9, in the counties of Marin and Sonoma.

A minimum of one week prior to the start of work under this permit or 24 hours prior to subsequent restart when interrupted, notice must be given to and advance approval of construction detail, operations, public safety, and traffic control must be obtained from State Representatives Nasr Faraq (Utility Construction Coordinator), (510) 376-8115, and Christopher Blunk (Resident Engineer), (510) 385-6886, weekdays between 7:30 AM and 4:00 PM, except holidays.

All work must comply with "Encroachment Permits Utility and Tree Trimming Special Provisions" (Rev. 03/2013), which includes "Encroachment Permit General Provisions" (TR-0049, Rev. 05/2007), and "Storm Water Special Provision for Minimal or No Impact" (TR-0400, REV. 09/2012) (available at http://www.dot.ca.gov/hq/traffops/developserv/permits/).

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (*Check applicable*):

☐ Yes	☒ No	General Provisions (TR-0045)
☒ Yes	☐ No	Utility & Tree Trimming Provisions (03/2013)
☒ Yes	☐ No	Storm Water Special Provisions (TR-0400)
☐ Yes	☒ No	A Cal-OSHA permit, if required: Permit No. _____
☐ Yes	☒ No	As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes	☒ No	Storm Water Pollution Prevention Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes	--------	Field Work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before As directed

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

JL
cc: WHauke
NFaraq/CBlunk

APPROVED:

BIJAN SARTIPI, District Director, District 4

BY:

DAVID SALLADAY, District Permit Engineer

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

NAME: PG&E Company
PERMIT #: 0413-NUR2304
DATE: December 19, 2013

All permitted work requires the permittee to apply for and obtain a work authorization number prior to start of work. See the attached "Encroachment Permit Work Scheduling Request Form." Additional time beyond the minimum seven-day advance notice required in this form may be required for obtaining the traffic control approval.

Immediately following completion of the work permitted herein, the permittee must fill out and mail the Notice of Completion attached to this permit.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No. 30760384				
Date: November 7, 2013		Freeway Yes [X] No [ ]		

No. 1780.3

Pacific Gas and Electric Company
Mr. Jim Dunlap, Land Agent
111 Stony Circle
Santa Rosa, Ca 95401

Because of the State Highway construction project: Reconstruct and re-align, US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: Phase 1: Approximately 550 feet of 8 inch gas distribution pipe line, located along the east side US Route 101 from engineer's station "A" line 6584+50 to 6590+00,. **Phase 2:** Approximately 1300 feet of 8 inch gas distribution pipe line under San Antonio Road and Klatte drive way from engineer's station "A" line 6571+75 to 6573+00, in Marin and Sonoma Counties.

You are hereby ordered to: Relocate your gas distribution facilities in both Phase 1 and 2 as shown on your company's plan no. 30760384 dated November 13, 2013.

Your work schedule shall be as follows: Coordinate your work with State's construction and commence your Phase 1: preparation work for said relocation by February 15, 2014 or as soon as possible and have it completed prior to June 30, 2014. Coordinate Phase 2 with State's construction after highway embankment is graded and prior paving Klatte drive way and complete it by August 1, 2015 or as directed by the State's Resident Engineer, whichever is later.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 and Christopher Blunk the Resident Engineer at 510 385-6886 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 63.5% State expense and 36.5% OWNER's expense pursuant section 5 (C) of the Freeway Master Agreement dated November 1, 2004 and State's request that Owner relocate a portion of the gas pipeline to accommodate the North Marin Water District relocation at 100% State's expense.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: John O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WOR

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (REV 6/2012)

Permit No.	0413-NUR2265
Dist/Co/Rte/PM	04-MRN&SON-101-27.0/27.6&0.0/1.9
DATE	December 12, 2013
Fee Paid: Exempt	Deposit: $
Performance Bond Amount: $	Payment Bond Amount: $
Bond Company	
Bond Number (1)	Bond Number (2)

In compliance with (Check one):

☐ Your application of _____

☒ Utility Notice No. 1780.3 of Dec. 11, 2013

☐ Agreement No. _____ of _____

☐ R/W Contract No. _____ of _____

TO: PG&E Company
111 Stony Circle
Santa Rosa, CA 95401

Attn: Jim Dunlap
Phone: Not available

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Relocate your company's gas distribution facilities per your plan No. 30760384 to accommodate the construction of reconstruction and realignment of US Route 101 at the San Antonio Road curve (State project EA: 264099) in the manner proposed on State Highway 04-Mrn & Son-101, Post Miles 27.0/27.6 & 0.0/1.9, in the counties of Marin and Sonoma.

A minimum of one week prior to the start of work under this permit or 24 hours prior to subsequent restart when interrupted, notice must be given to and advance approval of construction detail, operations, public safety, and traffic control must be obtained from State Representatives Nasr Faraq (Utility Construction Coordinator), (510) 376-8115, and Christopher Blunk (Resident Engineer), (510) 385-6886, weekdays between 7:30 AM and 4:00 PM, except holidays.

All work must comply with "Encroachment Permits Utility and Tree Trimming Special Provisions" (Rev. 03/2013), which includes "Encroachment Permit General Provisions" (TR-0049, Rev. 05/2007), and "Storm Water Special Provision for Minimal or No Impact" (TR-0400, REV. 09/2012) (available at http://www.dot.ca.gov/hq/traffops/developserv/permits/).

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (*Check applicable*):

☐ Yes	☒ No	General Provisions (TR-0045)
☒ Yes	☐ No	Utility & Tree Trimming Provisions (03/2013)
☒ Yes	☐ No	Storm Water Special Provisions (TR-0400)
☐ Yes	☒ No	A Cal-OSHA permit, if required: Permit No. _____
☐ Yes	☒ No	As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes	☒ No	Storm Water Pollution Prevention Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes	--------	Field Work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before As directed

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

JL
cc: WHauke
NFaraq/CBlunk

APPROVED:

BIJAN SARTIPI, District Director, District 4

BY:

DAVID SALLADAY, District Permit Engineer

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

NAME: PG&E Company
PERMIT #: 0413-NUR2265
DATE: December 12, 2013

All permitted work requires the permittee to apply for and obtain a work authorization number prior to start of work. See the attached "Encroachment Permit Work Scheduling Request Form." Additional time beyond the minimum seven-day advance notice required in this form may be required for obtaining the traffic control approval.

Immediately following completion of the work permitted herein, the permittee must fill out and mail the Notice of Completion attached to this permit.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No. 8852096				
Date: December 18, 2013		Freeway Yes [X] No [ ]		

No. 1780.4

AT&T California
Ms. Anita Gabrielson, Public Works Coordinator
2125 Occidental Rd.
Santa Rosa, Ca 95401

Because of the State Highway construction project: Reconstruct and re-align US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: 44 telecommunication poles located along the east side of US Route 101 south of the City of Petaluma.

You are hereby ordered to: Relocate your company's telecommunication facilities within the project area to accommodate construction of the re-alignment of US Route 101 as proposed. The relocation area is identified on AT&T's plan number 8852096 dated September 23, 2013, and on State's plans for this project.

Your work schedule shall be as follows: Coordinate your work with State's construction and commence by April 28, 2014, and have it completed prior to June 20, 2014 or as directed by State's Resident Engineer.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 and Christopher Blunk the Resident Engineer at 510 385-6886 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 93% STATE's expense, 7% OWNER's expense pursuant section 5 (C) of the Freeway Master Agreement dated November 15, 2004 and consequential displacement of OWNER's facilities by PG&E's joint pole relocation to the east side of US Route 101.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: John O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WOR

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (REV 6/2012)

Permit No.	0413-NUR2318
Dist/Co/Rte/PM	04-MRN&SON-101-27.0/27.6&0.0/1.9
DATE	December 20, 2013
Fee Paid	$ Exempt
Deposit	$
Performance Bond Amount	$
Payment Bond Amount	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (Check one):

☐ Your application of _____

☒ Utility Notice No. 1780.4 of Dec. 20, 2013

☐ Agreement No. _____ of _____

☐ R/W Contract No. _____ of _____

TO: AT&T California
2125 Occidental Road
Santa Rosa, CA 95401

Attn: Anita Gabrielson
Phone: Not available

, **PERMITTEE**

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Relocate your company's telecommunication facilities per your plan No. 8852096 to accommodate the construction of realignment of US Route 101 (State project EA: 264099) in the manner proposed on State Highway 04-Mrn & Son-101, Post Miles 27.0/27.6 & 0.0/1.9, in the counties of Marin and Sonoma.

A minimum of one week prior to the start of work under this permit or 24 hours prior to subsequent restart when interrupted, notice must be given to and advance approval of construction detail, operations, public safety, and traffic control must be obtained from State Representatives Nasr Faraq (Utility Construction Coordinator), (510) 376-8115, and Christopher Blunk (Resident Engineer), (510) 385-6886, weekdays between 7:30 AM and 4:00 PM, except holidays.

All work must comply with "Encroachment Permits Utility and Tree Trimming Special Provisions" (Rev. 03/2013), which includes "Encroachment Permit General Provisions" (TR-0049, Rev. 05/2007), and "Storm Water Special Provision for Minimal or No Impact" (TR-0400, REV. 09/2012) (available at http://www.dot.ca.gov/hq/traffops/developserv/permits/).

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (*Check applicable*):

☐ Yes	☒ No	General Provisions (TR-0045)
☒ Yes	☐ No	Utility & Tree Trimming Provisions (03/2013)
☒ Yes	☐ No	Storm Water Special Provisions (TR-0400)
☐ Yes	☒ No	A Cal-OSHA permit, if required: Permit No. _____
☐ Yes	☒ No	As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes	☒ No	Storm Water Pollution Prevention Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes	---------	Field Work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before As directed

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

JL
cc: WHauke
NFaraq/CBlunk

APPROVED:

BIJAN SARTIPI, District Director, District 4

BY:

DAVID SALLADAY, District Permit Engineer

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

NAME: AT&T California
PERMIT #: 0413-NUR2318
DATE: December 20, 2013

All permitted work requires the permittee to apply for and obtain a work authorization number prior to start of work. See the attached "Encroachment Permit Work Scheduling Request Form." Additional time beyond the minimum seven-day advance notice required in this form may be required for obtaining the traffic control approval.

Immediately following completion of the work permitted herein, the permittee must fill out and mail the Notice of Completion attached to this permit.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

NOTICE TO OWNER

RW 13-4 (1/2012)

DIST.	COUNTY	ROUTE	P.M.	E.A.
4	Mrn / Son	101	27.0 / 27.6 0.0 / 1.9	264099
Federal Aid No. N/A				
Owner's File No. CR# 175153				
Date: June 26, 2014		Freeway Yes [X] No [ ]		

No. 1780.6

AT&T California
Mr. Bob Keating, Public Works Coordinator
2125 Occidental Rd.
Santa Rosa, Ca 95401

Because of the State Highway construction project: Reconstruct and re-align US Route 101 at the San Antonio Road curve in Marin and Sonoma Counties (PM 27.0/27.6, 0.0/1.9).

Which affects your facilities: 9 telecommunication poles located along the northeast side of US Route 101 south of the City of Petaluma.

You are hereby ordered to: Temporarily relocate your company's telecommunication facilities within the project area to accommodate NMWD's water line relocation schedule and the re-alignment of US Route 101 as proposed. The temporary relocation area is identified on AT&T's plan number CR#175153, and on State's plans for this project.

Your work schedule shall be as follows: Commence your company's relocation work by July 1, 2014, and have it completed prior to August 30, 2014.

Notify: Nasr Faraq the Utility Construction Coordinator at (510) 376-8115 , Unless otherwise approved by State's Engineer a minimum of one week prior to initial start of work under this permit, and 24 hours prior to subsequent restart when the work schedule is interrupted.

Liability for the cost of work is: 100% STATE's expense pursuant to section (12) of the Freeway Master Contract dated November 15, 2004 and second relocation of OWNER's facilities within a four year period.

BIJAN SARTIPI
District Director

MARK L. WEAVER
Deputy District Director

By: John O. Carlston
JOHN O. CARLSTON
District Branch Chief

cc: Utility Construction Coordinator
Permits

THIS NOTICE DOES NOT CONSTITUTE A PERMIT. OBTAIN AN ENCROACHMENT PERMIT BEFORE STARTING WORK

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (REV 6/2012)

Permit No.	0414-NUR1283
Dist/Co/Rte/PM	04- MRN/SON-101-27.0/27.6, 0.0/1.9
DATE	July 01, 2014
Fee Paid	$ Exempt
Deposit	$
Performance Bond Amount	$
Payment Bond Amount	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (Check one):

☐ Your application of _____

☒ Utility Notice No. 1780.6 of July 01, 2014

☐ Agreement No. _____ of _____

☐ R/W Contract No. _____ of _____

TO: AT&T California
2125 Occidental Rd
Santa Rosa, CA, 95401

Attn: Mr. Bob Keating
Phone:

, **PERMITTEE**

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Temporarily relocate your company's telecommunication facilities within the project area to accommodate NMWD's water line relocation schedule and the re-alignment of US Route 101 as identified on AT&T's Plan No. CR#175153 and on State's contractor's plan No. 04-264099 on State Highway 04- MRN/SON-101-27.0/27.6, 0.0/1.9 in Marin and Sonoma Counties.

A minimum of one week prior to the start of work under this permit, notice shall be given and advance approval of construction detail, operations, public safety, and traffic control shall be obtained from State Representative Nasr Faraq, (510) 376-8115 weekdays between 7:30 AM and 4:15 PM, holidays excluded.
All utility work shall be performed in accordance with the appropriate provisions contained in the Department of Transportation Encroachment Permit Utility and Tree Trimming Special Provisions dated March 2013. All permitted work requires the permittee to apply for and obtain a work authorization number prior to start of work. See the attached "Encroachment Permit Work Scheduling Procedures" and the attached "Encroachment Permit Work Scheduling Request Form". Additional time beyond the minimum seven-day advance notice required in the above paragraph may be required for obtaining the traffic control approval. Immediately following completion of the work permitted herein, the permittee shall fill out and mail the Notice of Completion attached to this permit.

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (*Check applicable*):

☐ Yes	☒ No	General Provisions (TR-0045)
☒ Yes	☐ No	Utility & Tree Trimming Provisions (03/2013)
☒ Yes	☐ No	Storm Water Special Provisions (TR-0400)
☐ Yes	☒ No	A Cal-OSHA permit, if required: Permit No. _____
☐ Yes	☒ No	As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes	☒ No	Storm Water Pollution Prevention Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes	☒ No	Review
☐ Yes	☒ No	Inspection
☒ Yes	---------	Field Work

(If any Caltrans effort expended)

☐ Yes ☒ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before As directed

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.
No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

AG
cc: WHauke
NFaraq

APPROVED:

BIJAN SARTIPI, District Director, District 4

BY:

DAVID SALLADAY, District Permit Engineer

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State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: SHAWN ENJILY
District Office Chief
Design Santa Clara County B

Attn: James Chuang

Date: February 18, 2011

File: 04-MRN 101 PM 26.5/27.6
04-SON 101 PM 0.2/1.2
04-264091
Marin / Sonoma Narrows
San Antonio Creek Curve Correction

From: PAULA KINDINGER-WILCOX
Materials Design Engineer
Engineering Services I - Materials B

Concurred by: ASHOK DAS, P.E.
District Materials Engineer
District Branch Chief, Materials B

Subject: Final Pavement and Corrosion Recommendations

This memo is in response to your request for final Materials Recommendations for the above mentioned project. This project proposes to realign Hwy 101 beginning approximately 2700 feet south of the existing San Antonio Creek Bridge and extending north to approximately 500 feet south of Kastania Rd. Hwy 101, within these limits, will also be upgraded from the existing expressway to a controlled access freeway with standard shoulders and frontage roads on both sides of Route 101.

EXISTING FACILITY

Route 101 within the proposed project limits is a divided expressway with 2 lanes in each direction.

Based on a review of our Materials Files and the available as-builts, this portion of Route 101 was originally constructed under as a PCC pavement which was eventually overlaid with fabric and AC(A). See table below:

Year and Contract #	Route and Postmiles	As-Built Information
1954 54-4TC-63F	SON 101 PM 1.3/9.8	0.67' PCC over 0.33' CTB / 0.5' select material shoulders and shoulders consisting of 0.17' AC over imported base material
1964	MRN 101 SB from PM 27.13A to 27.63A and NB from PM 24.09A to 27.63A	shoulder reconstruction was performed which added permeable material and underdrains
1984 04-183574	SON 101 SB shoulder starting at PM 0.7, extending for 865' was reconstructed	underdrains, PM(3) and filter fabric.
1978 04-431604	MRN 101 PM 23.5 / 27.6 SON PM 0.0 / 3.2	mainline PCC pavement in the NB direction was overlaid with 0.1' OGAC / 0.2' AC(A) / Reinforcement fabric /1' AC(A)
1983 04-109814	SB SON 101 PM 0.0/0.6 and SB MRN PM 25.35 / 26.52	SB SON 101 PM 0.0/0.6 and SB MRN PM 25.35 / 26.52 were overlaid with reinforcing fabric and 0.1' of AC(A)
1984 04-134061	SB MRN 101 PM 26.5 / 27.6	SB MRN 101 was overlaid with reinforcing fabric and 0.08' of AC(A)
1989 04-189334	SON 101 from PM 0.0 to 1.5	08' AC(A) overlay
1999 04- 0C22U1	SON 101 from PM 0.0 to 20.4	60 mm Rubberized Asphalt Concrete Type G (RAC-G) overlay
2008 04-0E0504	MRN 101 from PM 23.0 to 27.6	30mm RAC-G overlay

I. CRITERIA FOR STRUCTURAL SECTION DESIGN

Design Factors

A. Traffic Index

The 40-year design TI for mainline widening, provided by Advanced Planning and Traffic Forecasting, is 14.5 according to the Highway Design Manual dated July 1, 2008, The 40 year TI for medium duty ramps is 11. For the Frontage Roads TI of 6.5 shall be used based on engineering experience and judgment.

B. R-value

Based on test results provided by personnel from the Eureka Materials Lab of District 1, and R-value tests performed in the District 4 Materials Lab, R-values within this project range from 12 to 27. See table below.

- From Sta 6540 to Sta 6620 a R-value of 15 was used for the pavement design. This area is mainly fill with only a small portion in MRN CO, on level ground.
- From Station 6620 to 6670 an R-value of 27 was used for the pavement design
- All Structural Sections with imported borrow / fill will also use a design R-value of 15.

County and Route	Postmile	R-value
MRN 101	26.5	25
MRN 101	26.86	16
MRN 101	26.9	25
SON 101	0.19	27
SON 101	0.20	23
SON 101	1.01	12
SON 101	1.35	42
SON 101 (new Front. Rd. Alignment)	1.40	27
SON 101	1.44	29

II. ADDITIONAL DESIGN RECOMMENDATIONS

- In accordance with CT HDM Section 613.5, we recommend using the same structural section for traveled way, and shoulders.
- We recommend overlaying the existing and new mainline structural section with Open Graded Friction Course for ease of restriping.
- Dig out and repair localized distressed areas to a depth of 0.50' and clean and seal all cracks wider than 1/4" before placing the recommended overlays.
- For Maintenance Vehicles / CHP pull-outs we recommend a structural section consisting of 0.50' HMA-A / 0.50'AB(2).
- For the Bike Path we recommend a structural section of 0.25' HMA / 0.50' AB(2).
- In Cut Areas: An 8" diameter underdrain will be necessary. The depth of the underdrain trench shall be a minimum of 3' below the proposed structural section. Encapsulate both the PM (3) and the underdrain trench with filter fabric.
- In the areas of MRN 101, which will be slightly realigned, maintain the existing underdrain systems.

- Alternative for RHMA (G): 0.15' of HMA (A) may be substituted for 0.15' of RHMA (G) in the widening or new structural sections if quantities of RHMA-G are insufficient.
- In areas where the new roadway will be built on embankment over the existing roadway, scarify the existing roadway as specified in the Standard Specifications under section 19-6.

III. STRUCTURAL SECTION DESIGN

A. FRONTAGE ROADS

1. Frontage Roads on Fill and Existing Ground

Design Factors: $TI_{20} = 6.5$, $R_v = 15$, G.E. = 1.77

	T/W & Shoulder Thickness	G.E.
	0.35' HMA(A)	0.75'
	1.00' AB(2)	1.10'
Total	1.35'	1.85'

B. MAINLINE

1. Sta. 6538 to Sta. 6620

a. Mainline on Existing Ground or Fill

Design Factors: $TI_{40} = 14.5$, $R_v = 15$, G.E. = 3.94

	T/W & Shoulder Thickness	G.E.
	0.10' OGFC	
	0.15' RHMA-G	0.22'
	0.50' HMA-A	0.73'
	0.75' LCB	1.43'
	1.50' AS(4)	1.50'
Total	3.00'	3.88'

b. Mainline in Cut Areas

Design Factors: TI_{40} = 14.5, R_v=15, G.E. =3.94

	T/W & Shoulder Thickness	G.E.
	0.10' OGFC	
	0.15' RHMA-G	0.22'
	0.50' HMA-A	0.73'
	0.75' LCB	1.43'
	0.50' AS(4)	0.50'
	1.00'PM(3)	1.00'
Total	3.00'	3.88

2. Sta. 6620 to Sta. 6670

a. Mainline on Existing Ground or Fill

Design Factors: TI_{40} = 14.5, R_v=27, G.E. =3.39

	T/W & Shoulder Thickness	G.E.
	0.10' OGFC	
	0.15' RHMA-G	0.22'
	0.50' HMA-A	0.73'
	0.75' LCB	1.43'
	1.10' AS(4)	1.10'
Total	2.60'	3.48

b. Mainline in Cut Areas

Design Factors: TI_{40} = 14.5, R_v=27, G.E. =3.39

	T/W & Shoulder Thickness	G.E.
	0.10' OGFC	
	0.15' RHMA-G	0.22'
	0.50' HMA-A	0.73'
	0.75' LCB	1.43'
	0.35' AS(4)	0.35'
	0.75' PM(3)	0.75'
Total	2.60'	3.48

C. RESURFACING from MSN Sta 6532+43.99 to Sta 6538+03.99

The pavement from MSN Sta 6532+43.99 to Sta 6538+03.99 is in good condition with few signs of distress. The Pavement Condition Survey agrees with our findings showing no distress and acceptable ride scores well below 140, which Caltrans finds unacceptable.

We recommend a 0.10' OGFC / 0.15' RHMA-G overlay be placed on the existing pavement. This will match the realigned pavement adjacent to this area. Dig out and repair localized distressed areas to a depth of 0.50' and clean and seal all cracks wider than 1/4" before placing the recommended overlays.

D. RESURFACING NB SON 101 from MSN Sta 6620 to Sta 6628+54

We recommend a 0.10' OGAC / 0.15' RHMA-G overlay be placed on the existing SB SON 101 which will become the new NB SON 101 to extend the life of this pavement and match the realigned pavement adjacent to this area. Dig out and repair localized distressed areas to a depth of 0.50' and clean and seal all cracks wider than 1/4" before placing the recommended overlays.

D. CORROSION INVESTIGATIONS

In January 2005, Caltrans Eureka Materials Laboratory performed a corrosion study analysis in accordance with the requirements of California Test Method 643, and using California culvert criteria and CULVERT4.EXE. The corrosion information was also analyzed using the Altpipe program. The analysis used test data from samples collected at each existing culvert location and other requested locations to determine alternative pipe culverts allowed, giving a 50 year service life. The pH values and resistivity readings (Ohms-cms) range from 5.4 to 7.4 and 1000 to 3950, respectively. Two locations, SON PM 1.01 and PM 1.55, were shown to be corrosive environments. Based on the analysis of the study, the attached table of alternative pipe recommendations should be used.

Specifications:

- Corrugated steel, corrugated aluminum pipe (CAP), or corrugated aluminized steel pipe (CASP) shall conform to Section 66 of the Standard Specifications.

- Standard Reinforced Concrete Pipe may be used and shall conform to Section 65 of the Standard Specifications.

- For concrete facilities, use Type IP Modified Cement or Type II modified cement. Cement must conform to Section 90 of the Standard Specifications.

- Plastic Pipe may be used for a 50 year service life. It shall be high density polyethylene (HDPE), conforming to Section 64 of the Standard Specifications. Reference should be made regarding durability in Section 854.8 of the Highway Design Manual.

If you have any questions, please call Paula Kindinger-Wilcox at 510-286-4692.
c: ADas, PKindinger-Wilcox, Route File, Daily File

PRELIMINARY SITE INVESTIGATION REPORT

US 101 MARIN-SONOMA NARROWS
SEGMENT B3 – CURVE CORRECTION
MARIN AND SONOMA COUNTIES, CALIFORNIA

PREPARED FOR:
MARK THOMAS & COMPANY, INC.
3000 OAK ROAD, SUITE 650
WALNUT CREEK, CALIFORNIA

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON

GEOCON PROJECT No. E8469-06-02

MARCH 2012

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. E8469-06-02
March 20, 2012

Sasha Dansky
Mark Thomas & Company, Inc.
3000 Oak Road, Suite 650
Walnut Creek, CA 94597

Subject: PRELIMINARY SITE INVESTIGATION REPORT
US HIGHWAY 101, MARIN-SONOMA NARROWS
SEGMENT B3 – CURVE CORRECTION
MARIN AND SONOMA COUNTIES, CALIFORNIA

Dear Mr. Dansky:

Geocon has performed environmental engineering services at the subject site. The site investigation was performed along the northbound and southbound shoulders, median, adjacent private property, and one overcrossing structure within the project limits of United States Highway 101 (US-101), Marin-Sonoma Narrows, Segment B3, in Marin and Sonoma Counties, California.

The accompanying report summarizes the services performed including limited soil sample collection from borings advanced using hand-auger and direct-push drilling equipment, and laboratory testing.

The contents of this report reflect the views of Geocon Consultants, Inc., who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

If there are any questions concerning the contents of this report, or if Geocon may be of further service, please contact the undersigned at your convenience.

Sincerely,

GEOCON CONSULTANTS, INC.

Luann Beadle
Senior Staff Scientist

Richard Day, CEG, CHG
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PROFESSIONAL GEOLOGIST
RICHARD W. DAY
No. 5479
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STATE OF CALIFORNIA

(1) Addressee

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PRELIMINARY SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Preliminary Site Investigation Report for the United States Highway 101 (US-101) Marin-Sonoma Narrows (MSN) Segment B3 Curve Correction project was prepared by Geocon Consultants, Inc. at the request of Mark Thomas & Company, Inc.

1.1 Project Description and Proposed Improvements

The site area consists of the Segment B3 – Curve Correction portion of the MSN Project. The Segment B3 project extends from the southern intersection of San Antonio Road north to Kastania Road and consists of approximately 2.3 miles (the Site).

The US-101 MSN Project – Segment B3 is proposed to include the following:

- Outside widening and construction of a new segment of southbound SR101 requiring partial ROW acquisition of private property between approximate station 6547+00 and 6613+00.
- Conversion of the existing northbound US-101 roadway into frontage road between approximate station 6552+00 and 6670+00.
- Construction of a bridge over San Antonio Creek that will serve as a portion of US-101 southbound.
- Construction of a new water pipeline adjacent to US-101 northbound (approximate station 6565+50 to 6653+00). The pipeline will cross beneath US-101 just north of San Antonio Creek and extend along the southbound shoulder, in the vicinity of the existing water pipeline. Partial ROW acquisition of private property is proposed between approximate station 6547+00 and 6566+00 for the North Marin Water District (NMWD) easement.

The proposed construction activities will be conducted within existing Caltrans ROW and at adjacent private properties proposed for partial acquisition. Specifically, sampling was conducted on the northbound and southbound shoulders, median, and one overcrossing within the project limits of US-101 in Marin and Sonoma Counties, California, which includes Post Miles (PM) MRN-101 PM 26.5/27.6 and SON-101 PM 0.0/1. The site location is depicted on the Vicinity Map, Figure 1.

1.2 Purpose

The purpose of the proposed scope of services was to evaluate whether impacts due to ADL exist in the surface and near surface soil in the road-widening areas, to determine if soil and groundwater in the vicinity of the proposed San Antonio Creek Bridge have been impacted with petroleum hydrocarbons and metals, and determine if soil at proposed private properties has been impacted through agricultural use with metals, petroleum hydrocarbons, and pesticides. The information

obtained from this investigation will be used by Mark Thomas & Company, Inc. to evaluate soil and groundwater reuse/disposal options.

The project also included a survey of the southbound San Antonio Creek bridge structure to assess the potential presence and quantity of asbestos and potential presence of lead paint prior to planned renovation activities. The results of the survey are provided in our report entitled *Asbestos and Deteriorated Lead-Containing Paint Survey, San Antonio Creek Bridge (20-0019L/R), 04-MRN-101, Post Mile 27.62, Marin County, California*, dated September 1, 2011.

2.0 BACKGROUND

2.1 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the representative total metal content equals or exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the representative soluble metal content equals or exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test WET. A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the representative soluble metal content equals or exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., representative lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

2.2 DTSC Variance

The DTSC issued a statewide Variance effective July 1, 2009, regarding the management of ADL-impacted soils within Caltrans right-of-way. Under the Variance, soil that is classified as a

non-RCRA hazardous waste, based primarily on ADL content, may be suitable for reuse within Caltrans right-of-way. ADL soil that is classified as a RCRA hazardous waste is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste (Caltrans Type Z-3).

ADL soil reused under the Variance must always be at least five feet above the highest groundwater elevation and, depending on lead concentrations, must be covered with at least one foot of non-hazardous soil or a pavement structure. The ADL soil may not be placed in areas where it might contact groundwater or surface water (such as streams and rivers), and must be buried in locations that are protected from erosion that may result from storm water run-on and run-off.

Review of the statewide Variance indicates the following conditions regarding the reuse and management of ADL-impacted soil as fill material for construction and maintenance operations. If ADL soil meets the Variance criteria but is not intended to be reused within Caltrans right-of-way, then the excavated soil must be disposed of as a California hazardous waste (Caltrans Type Z-2). A copy of the Variance is presented as Appendix A.

Caltrans Type Y-1: ADL soil exhibiting a total lead concentration less than or equal to 1,411 milligrams per kilogram (mg/kg), a DI-WET (WET using deionized water as extractant) lead concentration less than or equal to 1.5 milligrams per liter (mg/l), and a pH value greater than or equal to 5.5 may be reused within the same Caltrans corridor and must be covered with at least one foot of non-hazardous soil.

Caltrans Type Y-2: ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET lead concentration less than or equal to 1.5 mg/l, and a pH value greater than 5 and less than 5.5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET lead concentration greater than 1.5 mg/l and less than or equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration greater than 1,411 mg/kg and less than or equal to 3,397 mg/kg, a DI-WET lead concentration less than or equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

Caltrans Type Z-2: ADL soil exhibiting a total lead concentration greater than 3,397 mg/kg, a DI-WET lead concentration greater than 150 mg/l, or a pH value less than or equal to 5 is not eligible for reuse under the Variance and must be disposed of as a California hazardous waste.

Caltrans Type Z-3: ADL soil exhibiting a TCLP lead concentration greater than or equal to 5 mg/l is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste.

2.3 Naturally Occurring Asbestos

As defined in current California Air Resources Board (CARB) rules, serpentine material refers to any material that contains at least 10% serpentine, and asbestos-containing serpentine refers to serpentine materials with an asbestos content greater than 5% as determined by CARB Test Method 435 (CARB 435). The use of serpentine material for road surfacing is prohibited in California by Title 17 of the California Code of Regulations (CCR) Section 93106, Asbestos Airborne Toxic Control Measure (ATCM) for Surfacing Application (ATCM 93106), unless the material has been tested and determined to have an asbestos content of less than 0.25%. Materials found to contain asbestos of 0.25% or more are considered to be designated waste if transported offsite, requiring disposal at a landfill facility designated to accept asbestos waste. Alternatively, asbestos-containing materials may be reused onsite if buried beneath a minimum 6 inches of soil.

The CARB specifies mitigation practices for construction, grading, quarrying, and surface mining operations that contain natural occurrences of asbestos outlined in Title 17, Section 93105, Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (ATCM 93105). Based on Part (e) Subpart (2) of ATCM 93105 an asbestos dust mitigation plan is required and must be implemented for a project if NOA is disturbed after the start of construction. Additionally, ATCM 93105 specifies that the air pollution control district (APCD) must be notified and an asbestos dust mitigation plan submitted to the APCD. The ATCM states that air monitoring may be required on the property. NOA potentially posses a health hazard when it becomes an airborne particulate.

The construction/maintenance activities mentioned above could disturb NOA-laden debris and soil, thereby potentially creating an airborne hazard. Mitigation practices can reduce the risk of exposure to airborne NOA containing dust. Dust suppression practices include wetting the materials being disturbed and wearing approved respirators with high-efficiency particulate air (HEPA) filters during construction activities.

2.4 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and*

Groundwater, Interim Final (May 2008), which presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or "may be" warranted (SFRWQCB, 2008).

The most conservative ESL table was used for this characterization: Table A – Shallow Soil (≤3 meters below ground surface; bgs) – Groundwater is a Current or Potential Source of Drinking Water. The respective ESLs are listed at the end of Tables 3 through 7 for comparative purposes.

3.0 SCOPE OF SERVICES

We performed the following scope of services:

3.1 Pre-field Activities

- Prepared a site-specific health and safety plan to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Retained the services of Cal Safety to provide traffic control during field operations.
- Retained the services of Advanced Technology Laboratories (ATL) and EMSL Analytical (EMSL) to perform the sample analyses.
- Notified Underground Service Alert (USA) at least 48 hours prior to fieldwork.

3.2 Field Activities

Geocon performed the site investigation between July 26 and August 2, 2011, which consisted of the following field activities:

- Advanced 81 direct push soil borings along the shoulders and median of northbound and southbound US-101. Soil borings were advanced to a maximum depth of 2 feet.
- Advanced 21 hand auger soil borings on privately-owned property proposed for partial ROW acquisition adjacent to southbound US-101. Soil borings were advanced to a maximum depth of 2 feet.
- Collected a groundwater sample from piezometer well PW1 using hand-bailing techniques.
- Collected 91 soil samples for analysis of CAM 17 metals.
- Collected 194 soil samples for analysis of total lead.
- Collected 44 soil samples for analysis of pH.

- Collected 21 soil samples for analysis of total petroleum hydrocarbons as gasoline (TPHg), as diesel (TPHd), and as motor oil (TPHmo), benzene, ethylbenzene, toluene and total xylenes (BTEX), and methyl tert-butyl ether (MTBE).
- Collected 11 soil samples for analysis of pesticides.
- Collected 10 soil samples for analysis of naturally-occurring asbestos (NOA).
- Collected 1 groundwater sample for analysis of CAM 17 metals.
- Collected 1 groundwater sample for analysis of TPHg. TPHd, TPHmo, BTEX and MTBE.
- Transported samples to ATL and EMSL for analysis under standard chain-of-custody (COC) documentation.

4.0 INVESTIGATIVE METHODS

4.1 Sampling Procedures

Soil samples were collected from a total of 102 boring locations, which are shown on the Site Plan, Figures 2a through 2j. The boring locations were surveyed using Differential Global Positioning System (DGPS) equipment, and coordinates are presented on Table 1.

The soil samples for analysis of CAM 17 metals, TPHg, TPHd, TPHmo, BTEX, MTBE, and pesticides were collected in new glass jars, new stainless steel tubes or acetate liners sealed with Teflon tape and plastic end-caps. Soil samples for total lead were collected into glass jars or new resealable plastic bags. Soil samples for NOA analyses were collected into new resealable plastic bags. Sample containers were labeled and transported to Caltrans-approved, certified environmental laboratories using standard COC documentation. Hand auger soil borings were backfilled to surface with soil cuttings. Direct-push soil borings were backfilled with neat cement.

Geocon provided QA/QC procedures during the field activities. These procedures included washing the sampling equipment with a Liqui-Nox® solution followed by a double rinse with deionized water. Decontamination water was disposed of to the ground surface within Caltrans ROW in a manner not to create runoff, away from drain inlets or potential water bodies.

4.2 Laboratory Analyses

Laboratory analyses performed by ATL and EMSL were under standard seven-day and ten-day turn-around-times, respectively. Reproductions of the laboratory reports and COC documentation are presented as Appendix B.

The soil samples were analyzed as follows:

- 195 samples for total lead using Environmental Protection Agency (EPA) Method 6010 ICAP.

- 91 samples for CAM 17 metals according to Title 22 CCR, EPA Test Methods 6010 ICAP and 7471A.
- 73 samples with total lead concentrations greater than 50 mg/kg (i.e., greater than ten times the STLC of 5.0 mg/l) were further analyzed for WET lead.
- 44 samples with WET lead concentrations greater than 5.0 mg/l were further analyzed for DI-WET lead.
- 19 samples with total lead concentrations exceeding 100 mg/kg and WET lead concentrations exceeding 5 mg/l were further analyzed for TCLP lead using EPA Method 1311/7420.
- 30 samples with total chromium concentrations exceeding 50 mg/kg (i.e., ten times the STLC of 5.0 mg/l for hexavalent chromium) were further analyzed for WET chromium.
- 6 samples with total nickel concentrations exceeding ten times the STLC of 20 mg/l were further analyzed for WET nickel.
- 21 samples for TPHg, BTEX, and MTBE using EPA Test Method 8021B.
- 21 samples for TPH as diesel (TPHd) and as motor oil (TPHmo) using EPA Test Method 8015M.
- 11 samples for chlorinated pesticides using EPA Test Method 8081.
- 10 samples for NOA using Polarized Light Microscopy (PLM) - EPA Test Method 600/R-93/116.
- 44 samples for pH using EPA Method 9045.

The groundwater sample was analyzed for:

- CAM 17 metals according to Title 22 CCR, EPA Test Methods 6010 ICAP and 7471A.
- TPHg, TPHd, and TPHmo using EPA Test Method 8015M.
- BTEX and MTBE using EPA Test Method 8021B.

4.3 Laboratory QA/QC

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever was more frequent, with spike made at ten times the detection limit or at the analyte level.

Prior to submitting the samples to the laboratories, the COC documentation was reviewed for accuracy and completeness.

5.0 INVESTIGATIVE RESULTS

5.1 Subsurface Conditions

Observations during field activities indicated that surface soil at the project location generally consist of coarse gravel/rock to a depth of 0.5 to 1.0 feet, and dark grey clay from a depth of between 0.5 and 1.0 to 3 feet. Groundwater was measured in piezometer PW1 at a depth of 9.36 feet.

5.2 Laboratory Analytical Results

A summary of the analytical results are presented in Tables 2 to 7. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix B.

5.2.1 Soil

5.2.1.1 Northbound Shoulder (NBS1 to NBS31)

- Total lead was reported at concentrations ranging from 2.9 mg/kg to 1,200 mg/kg, with 29 samples exceeding 50 mg/kg (i.e., exceeding ten times the STLC of 5 mg/l).
- WET lead was reported at concentrations ranging from 0.54 to 45 mg/l.
- DI-WET lead was reported at concentrations ranging from <0.25 to 0.31 mg/l.
- TCLP lead was reported at concentrations ranging from 0.40 to 2.3 mg/l.
- Total chromium was reported at concentrations ranging from 27 to 270 mg/kg, with 8 samples exceeding 50 mg/kg (i.e., ten times the STLC of 5 mg/l for hexavalent chromium).
- WET chromium was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- Nickel was reported in the samples at concentrations ranging from 13 to 400 mg/kg, with one sample exceeding 200 mg/kg (i.e., ten times the STLC of 20 mg/l).
- WET nickel was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- The following metals were not detected above their respective laboratory reporting limits: arsenic, beryllium, cadmium, molybdenum, selenium, silver, and thallium. Remaining CAM 17 metals were reported at concentrations less than ten times their respective STLCs.

5.2.1.2 Southbound Shoulder (SBS32 to SBS45 and SBS70 to SBS81)

- Total lead was reported at concentrations ranging from 2.2 to 2,800 mg/kg, with 21 samples exceeding 50 mg/kg (i.e., exceeding ten times the STLC of 5 mg/l).
- WET lead was reported at concentrations ranging from 1.1 to 130 mg/l.
- DI-WET lead was not reported in the samples at or above the laboratory reporting limit of 0.25 mg/l.
- TCLP lead was reported at concentrations ranging from <0.25 to 11 mg/l.
- Total chromium was reported at concentrations ranging from 18 to 320 mg/kg, with 6 samples exceeding 50 mg/kg (i.e., ten times the STLC of 5 mg/l for hexavalent chromium).

- WET chromium was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- Nickel was reported at concentrations ranging from 13 to 470 mg/kg, with 3 samples exceeding 200 mg/kg (i.e., ten times the STLC of 20 mg/l).
- WET nickel was reported at concentrations ranging from <1.0 to 1.2 mg/l.
- The following metals were not detected above their respective laboratory reporting limits: beryllium, molybdenum, selenium, silver and thallium. Remaining CAM 17 metals were reported at concentrations less than ten times their respective STLCs.

5.2.1.3 Median (NBM47 to NBM68)

- Total lead was reported at concentrations ranging from 1.6 to 1,100 mg/kg, with 21 samples exceeding 50 mg/kg (i.e., exceeding ten times the STLC of 5 mg/l).
- WET lead was reported at concentrations ranging from 0.55 to 29 mg/l.
- DI-WET lead was not detected at or above the laboratory reporting limit of 0.25 mg/l.
- TCLP lead was reported at concentrations ranging from <0.25 to 1.6 mg/l.
- Total chromium was reported at concentrations ranging from 13 to 160 mg/kg, with 4 samples exceeding 50 mg/kg (i.e., ten times the STLC of 5.0 mg/l for hexavalent chromium).
- WET chromium was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- Nickel was reported at concentrations ranging from 15 to 250 mg/kg, with 1 sample exceeding 200 mg/kg (i.e., ten times the STLC of 20 mg/l).
- WET nickel was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- The following metals were not detected above their respective laboratory reporting limits: beryllium, molybdenum, selenium, silver and thallium. Remaining CAM 17 metals were reported at concentrations less than ten times their respective STLCs.

5.2.1.4 Private Property Borings (P1 to P21)

- Total lead was reported at concentrations ranging from 1.1 to 150 mg/kg, with 1 sample exceeding 50 mg/kg (i.e., exceeding ten times the STLC of 5 mg/l).
- WET lead was reported at a concentration of 8.4 mg/l in the sample analyzed.
- TCLP lead was not detected at or above the laboratory reporting limit of 0.50 mg/l in the sample analyzed.
- Total chromium was reported at concentrations ranging from 26 to 170 mg/kg, with 26 samples equal to or exceeding 50 mg/kg (i.e., ten times the STLC of 5.0 mg/l for hexavalent chromium).
- WET chromium was not detected at or above the laboratory reporting limit of 1.0 mg/l.
- Nickel was reported at concentrations ranging from 9.4 to 270 mg/kg, with 1 sample exceeding 200 mg/kg (i.e., ten times the STLC of 20 mg/l).
- WET nickel was not detected at or above the laboratory reporting limit of 1.0 mg/l.

- The following metals were not detected above their respective laboratory reporting limits: beryllium, cadmium, molybdenum, selenium, silver and thallium. Remaining CAM 17 metals were reported at concentrations less than ten times their respective STLCs.
- TPHg was not detected at or above the laboratory reporting limit of 1.0 mg/kg.
- TPHd was reported at concentrations ranging from 1.8 to 13 mg/kg.
- TPHmo was reported at concentrations ranging from 5.5 to 91 mg/kg.
- BTEX and MTBE were not detected at or above the laboratory reporting limits.
- Chlorinated pesticides were not detected at or above the laboratory reporting limits.
- NOA was not detected in the samples above the target laboratory sensitivity of 0.25%.

5.2.2 Groundwater (PW1)

- The following metals were not detected above their respective laboratory reporting limits: beryllium, selenium, silver and thallium. Remaining CAM 17 metals were reported at concentrations ranging from 0.0013 mg/l to 3.7 mg/l.
- TPH as gasoline, BTEX and MTBE were not detected above the laboratory reporting limits for these compounds.
- TPH as diesel was reported at a concentration of 0.094 mg/l.
- TPH as motor oil was reported at a concentration of 0.099 mg/l.

5.3 Laboratory Quality Assurance/Quality Control

We reviewed the QA/QC results provided with the laboratory analytical reports. The data indicate several detection results for the method blanks below the reporting limits. The Matrix Spike (MS) and/or Matrix Spike Duplicate was outside recovery criteria for several samples, however, the analytical batch was validated by the Laboratory Control Sample (LCS). The relative percent differences (RPDs) of the duplicate samples for several of the analyses were outside criteria. The RPDs for several of the matrix spike duplicate samples for the analyses were outside criteria. The Case Narratives in the laboratory reports state that each analytical batch was validated by the laboratory control sample (LCS). The data showed acceptable recoveries and RPDs for the remainder of the duplicates and matrix spikes. Dilution was necessary for several analyses due to internal standard failure. Dilution was necessary for several samples due to sample matrix.

Based on this limited data review, no additional qualifications of the soil data are necessary, and the data are of sufficient quality for the purposes of this report.

5.4 Statistical Evaluation for Lead Detected in Soil Samples

The lead data for the Site were treated as four sample populations for statistical evaluation that consisted of the following:

A) Northbound Shoulder (borings NBS1 to NBS31)

B) Southbound Shoulder (borings SBS32 to SBS45 and SBS70 to SBS81)

C) Northbound Median (borings NBM46 to NBM69)

D) Private Property (borings P1 to P21)

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and WET lead concentrations exists that would allow the prediction of WET lead concentrations based on calculated UCLs.

5.4.1 Calculating the UCLs for the Arithmetic Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques were used to calculate the UCLs. For those samples in which total lead was not detected at concentrations exceeding the laboratory reporting limit, a value equal to one-half of the detection limit was used in the UCL calculation. The bootstrap test results are included in Appendix C. The following tables present the calculated UCLs and statistics for each data set.

Northbound Shoulder (NBS1 to NBS31)

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	190.6	206.3	140.6	4.9	1,200
1.0 to 1.5	61.4	66.4	43.4	2.5	380
2.0 to 2.5	29.2	31.6	20.1	2.5	180

Southbound Shoulder (SBS32 to SBS45 and SBS70 to SBS81)

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	502.3	542.8	334.3	8.3	2,800
1.0 to 1.5	27.3	29.1	20.6	2.5	100
2.0 to 2.5	9.3	9.9	7.5	2.2	37

Median (NBM46 to NBM69)

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	282.7	299.5	224.2	5.3	1,100
1.0 to 1.5	52.8	59.8	32.4	2.5	340
2.0 to 2.5	6.3	6.6	5.3	1.6	15

Private Properties (P1 to P21)

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	25.7	28.1	17.5	3.3	150
1.5 to 2.0	5.6	5.9	4.8	1.1	11

5.4.2 Correlation of Total and WET Lead

Total and corresponding WET lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of WET lead concentrations based on the UCLs calculated above in Section 5.4.1.

To estimate the degree of interrelation between total and corresponding WET lead values (x and y, respectively), the *correlation coefficient [r]* is used. The correlation coefficient is a ratio that ranges from +1 to –1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of –1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all. The *correlation coefficient* was calculated for the 72 (x, y) data points (i.e., soil samples analyzed for both total lead [x] and WET lead [y]) that were collected at the Site. The resulting *coefficient of determination* (r^2) equaled 0.9185, which yields a corresponding *correlation coefficient* (r) of 0.9584.

For the *correlation coefficient* that indicates a linear relationship between total and WET lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by

forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be $y = 0.0445(x)$, where x represents total lead concentrations and y represents predicted WET lead concentrations.

This equation was used to estimate the expected WET lead concentrations for the UCLs calculated in for samples collected from the Site (see Section 5.4.1). Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression line are included in Appendix C. The predicted WET lead concentrations are summarized in Tables 8a through 8c.

6.0 CONCLUSIONS

Waste classifications are evaluated based on the 90% UCL of the lead content for the relevant excavation depths; this has historically been considered sufficient to satisfy a good faith effort by the EPA as discussed in SW-846. Risk assessment characterization is based on the 95% UCL of the lead content in the waste for the relevant depths; this is in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, the 90% UCLs are to be used to evaluate onsite reuse and the 95% UCLs are to be used to evaluate offsite disposal.

6.1 Lead in Soil

6.1.1 Northbound Shoulder (borings NBS1 to NBS31)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs for data collected from this portion of the Site. Weighted averages are calculated by using the total lead UCL concentration for each 0.5-foot depth interval as the value for the underlying 0.5-foot depth interval (unless a sample was collected from the underlying depth interval). The total and WET lead calculations are summarized in Table 8a.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1.0 foot	190.6	**8.5**	**206.3**	**Hazardous**
Underlying soil (1.0 to 2.5 feet)	*50.7*	*2.3*	*54.8*	*Non-Hazardous*
0 to 2.0 feet	126	**5.6**	136	**Hazardous**
Underlying Soil (2.0 to 2.5 feet)	*29.1*	*1.3*	*31.6*	*Non-Hazardous*
0 to 2.5 feet	107	4.7	115	Non-Hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.0 foot would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.0 foot may be reused onsite (as Caltrans Type Y-1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Underlying soil below a depth of 1.0 foot would be classified as non-hazardous based on lead content.

Excavated soil may be considered non-hazardous if excavation depths are 2.5 feet or greater and soil is managed as a whole, as the 90% UCL-predicted WET lead concentration is less than the STLC of 5.0 mg/l.

6.1.2 Southbound Shoulder (borings SBS32 to SBS45 and SBS70 to SBS81)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs for data collected from this portion of the Site. The total and WET lead calculations are summarized in Table 8b.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1.0 foot	502.3	**22.4**	**542.8**	**Hazardous**
Underlying soil (1.0 to 2.5 feet)	*21.3*	*0.9*	*22.7*	*Non-Hazardous*
0 to 2.0 feet	265	**11.8**	286	**Hazardous**
Underlying Soil (2.0 to 2.5 feet)	*9.3*	*0.4*	*9.9*	*Non-Hazardous*
0 to 2.5 feet	214	**9.5**	231	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.0 foot would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.0 foot may be reused onsite (as Caltrans Type Y-1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Underlying soil below a depth of 1.0 foot would be classified as non-hazardous based on lead content.

6.1.3 Median (borings NBM46 to NBM69)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs for data collected from this portion of the Site. The total and WET lead calculations are summarized in Table 8c.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1.0 foot	282.7	**12.6**	**299.5**	**Hazardous**

Underlying soil (1.0 to 2.5 feet)	*37.3*	*1.7*	*42.1*	*Non-Hazardous*
0 to 2.0 feet	168	**7.5**	180	**Hazardous**
Underlying Soil (2.0 to 2.5 feet)	*6.3*	*0.3*	*6.6*	*Non-Hazardous*
0 to 2.5 feet	135	**6.0**	145	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.0 foot would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.0 foot may be reused onsite (as Caltrans Type Y-1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Underlying soil below a depth of 1.0 foot would be classified as non-hazardous based on lead content.

6.1.4 Private Properties (borings P1 to P21)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs for data collected from this portion of the Site.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1.0 foot	25.7	1.1	28.1	Non-Hazardous
Underlying soil (1.0 to 2.0 feet)	*15.7*	*0.7*	*17*	*Non-Hazardous*
0 to 2.0 feet	20.7	0.9	22.6	Non-Hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, excavated soil would not be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are less than the lead STLC of 5.0 mg/l.

6.2 CAM 17 Metals

CAM 17 metals results for soil samples are summarized in Table 3 and for the groundwater sample in Table 6.

6.2.1 Soil

Based on the reported WET chromium and nickel results, soil would not be classified as hazardous waste.

Arsenic, cobalt, lead, nickel and vanadium had reported concentrations greater than their respective ESL values and 95% UCLs were calculated for the full set of arsenic, cobalt, nickel and vanadium data collected at the Site. The UCLs were compared with the residential and commercial/industrial land use ESLs and with published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996). The bootstrap results are included in Appendix C. The calculated standard bootstrap UCLs, ESLs and published background concentrations are summarized in the table below:

Metal	95% UCL	RESIDENTIAL ESL	COMMERCIAL/ INDUSTRIAL ESL	CONSTRUCTION EXPOSURE ESL	PUBLISHED BACKGROUND MEAN[1]	PUBLISHED BACKGROUND RANGE [1]
Arsenic	1.1	0.39	1.6	15	3.5	0.6 to 11.0
Cobalt	23.5	40	80	94	14.9	2.7 to 46.9
Nickel	89.3	150	150	260	57	9 to 509
Vanadium	53.8	16	200	770	112	39 to 288

Concentrations reported in milligrams per kilogram (mg/kg)

[1] Kearney Foundation of Soil Science, March 1996

The 95% UCL arsenic value is greater than the residential land use ESL; however, it is less than the commercial/industrial land use and construction exposure ESLs and within the published background range. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally specific established background levels.

The 95% UCL cobalt and nickel concentrations are less than their respective residential land use ESLs and within the published background ranges.

The 95% UCL vanadium concentration is greater than the residential land use ESL; however, it is less than the commercial/industrial land use ESL and within the published background range.

6.2.2 Groundwater

The CAM 17 metals concentrations in Site groundwater collected from piezometer PW1 were compared to ESLs (Tables A, B and F, SFRWQCB, May 2008). Antimony, arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium and zinc were reported at concentrations greater than their respective ESLs values for groundwater as a current/potential source for drinking water, groundwater not as a current or potential source for drinking water, and freshwater, marine and estuarine surface waters. Concentrations of remaining metals were below their respective ESL values.

If groundwater is encountered during excavation activities, then disposal may be restricted based on metals content.

6.3 Total Petroleum Hydrocarbons, BTEX and MTBE

Petroleum hydrocarbon results for soil samples are summarized in Table 4 and for the groundwater sample in Table 7.

6.3.1 Soil

Soil samples collected from the private property portion of the Site were analyzed for TPHg, TPHd, TPHmo, BTEX and MTBE. TPHg was not detected in soil samples collected from the Site at or above the laboratory reporting limit of 1.0 mg/kg. TPHd concentrations ranged from 1.8 to 13 mg/kg, below the residential and commercial/industrial land use ESL of 83 mg/kg. TPHmo was reported at concentrations ranging from 5.5 to 91 mg/kg, with 1 of the 21 samples analyzed exceeding the residential and commercial/industrial land use ESLs of 83 mg/kg. The calculated 95% UCL for the TPHmo results is 34.2 mg/kg and is less than the residential and commercial/industrial land use ESLs. BTEX and MTBE were not reported in the soil samples collected at the Site at or above the laboratory reporting limits for these compounds.

6.3.2 Groundwater

TPHg, BTEX, or MTBE were not detected in groundwater sample PW1. TPHd was reported at a concentration of 0.094 mg/l, below the ESL for groundwater as a current or potential source of drinking water. BTEX and MTBE were not detected at or above the laboratory reporting limits.

Disposal of groundwater at the Site should not be restricted on the basis of TPH range, BTEX or MTBE content.

6.4 Pesticides

Pesticides were not detected in Site soil above their respective ESLs (see Table 4).

6.5 Naturally Occurring Asbestos

The mapped geology of the general area of the Site is indicative of a metamorphic regime where NOA minerals are likely to occur. However, the soil sample results indicate that NOA was not detected at a target laboratory sensitivity of 0.25% (see Table 5).

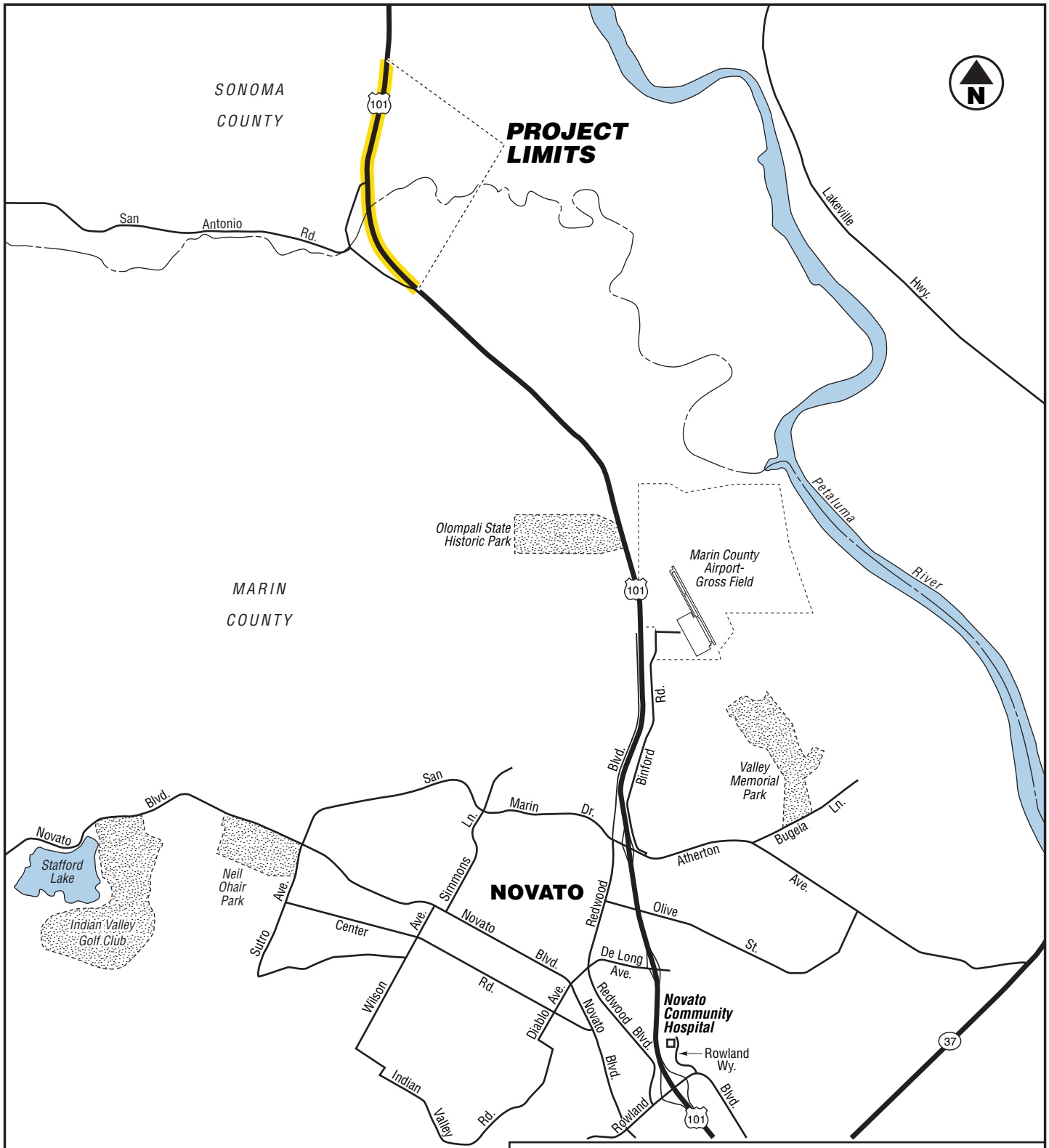
6.6 Worker Protection

Per Caltrans' requirements, the contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of impacted soil.

7.0 REPORT LIMITATIONS

This report has been prepared exclusively for Mark Thomas & Company, Inc. The information contained herein is only valid as of the date of the field sampling and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.



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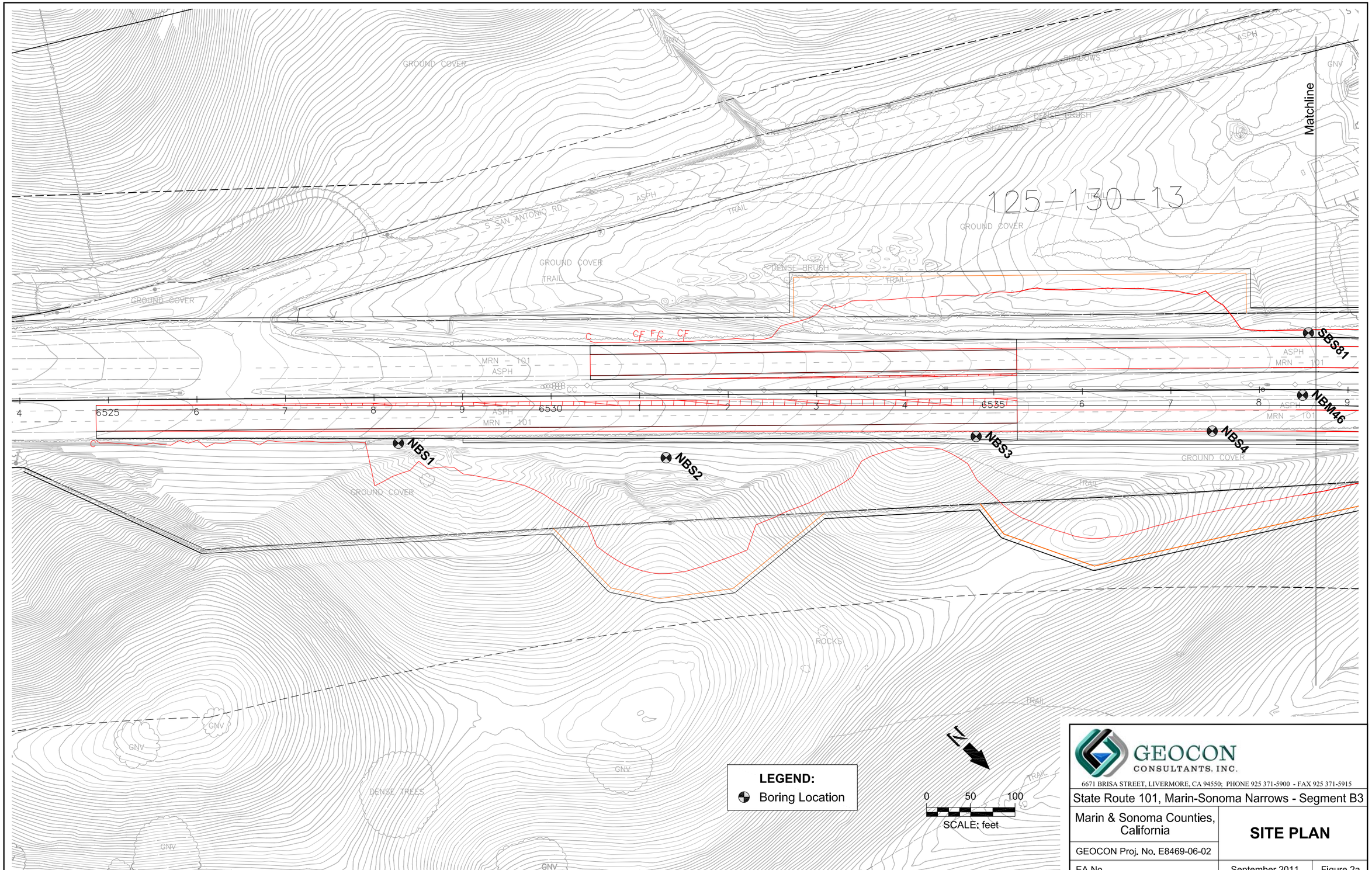
SR 101 Marin Sonoma Narrows, Segment B3

Sonoma and Marin Counties,
California

VICINITY MAP

E8469-06-02	April 2009	Figure 1



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SITE PLAN

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Figure 2a

SITE0911

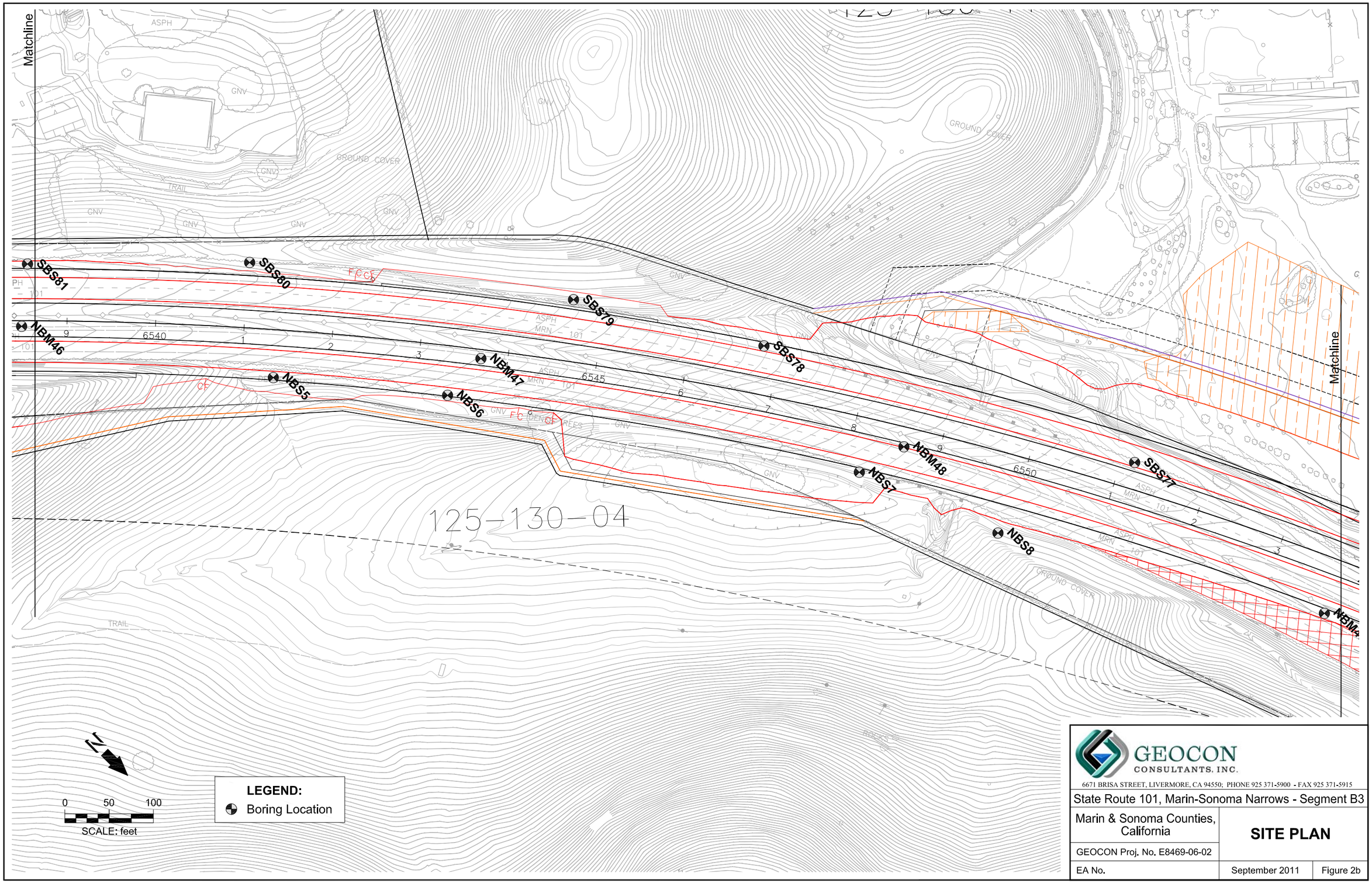

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Figure 2b

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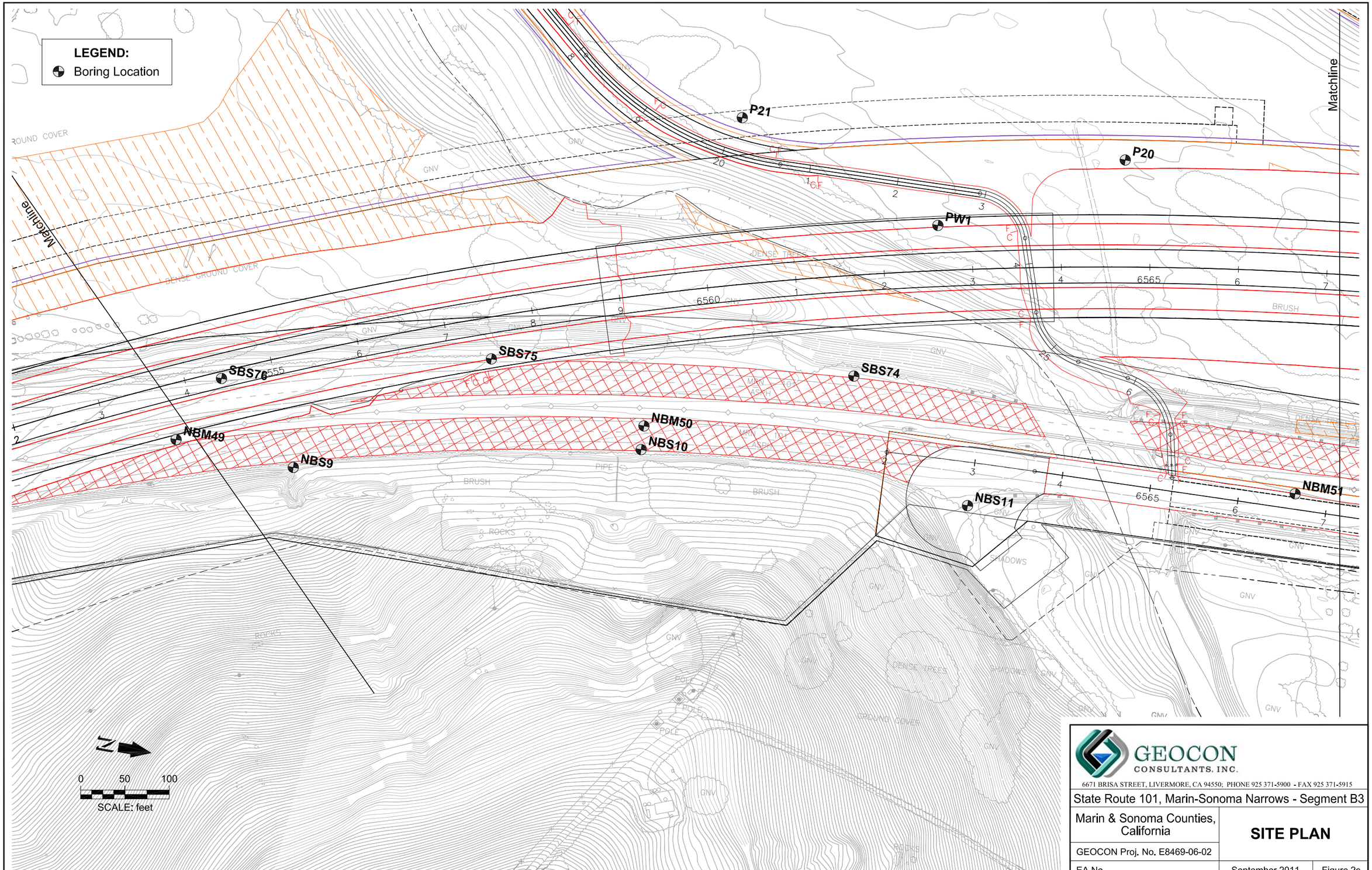

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Figure 2c

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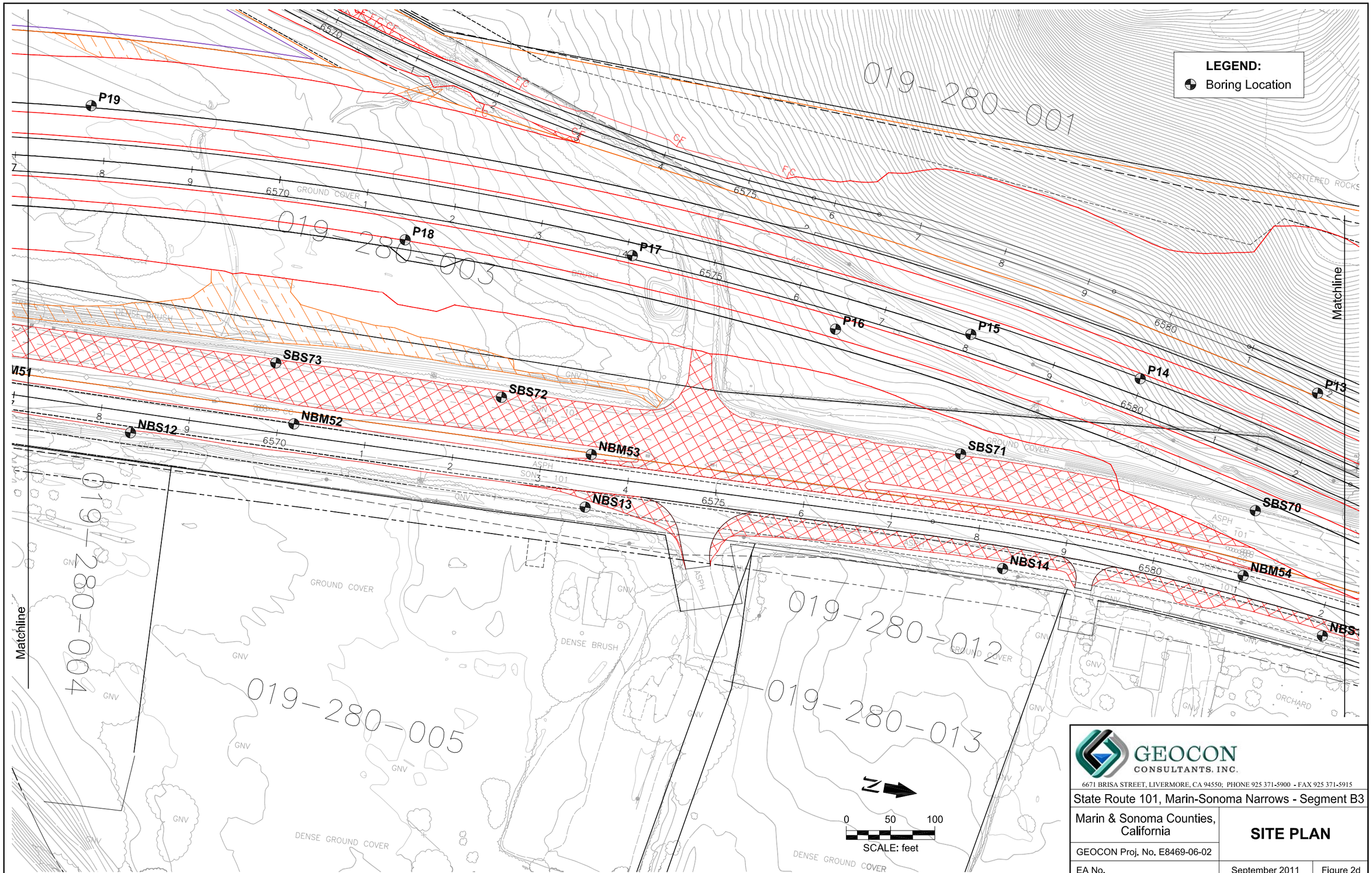

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Figure 2d

SITE0911

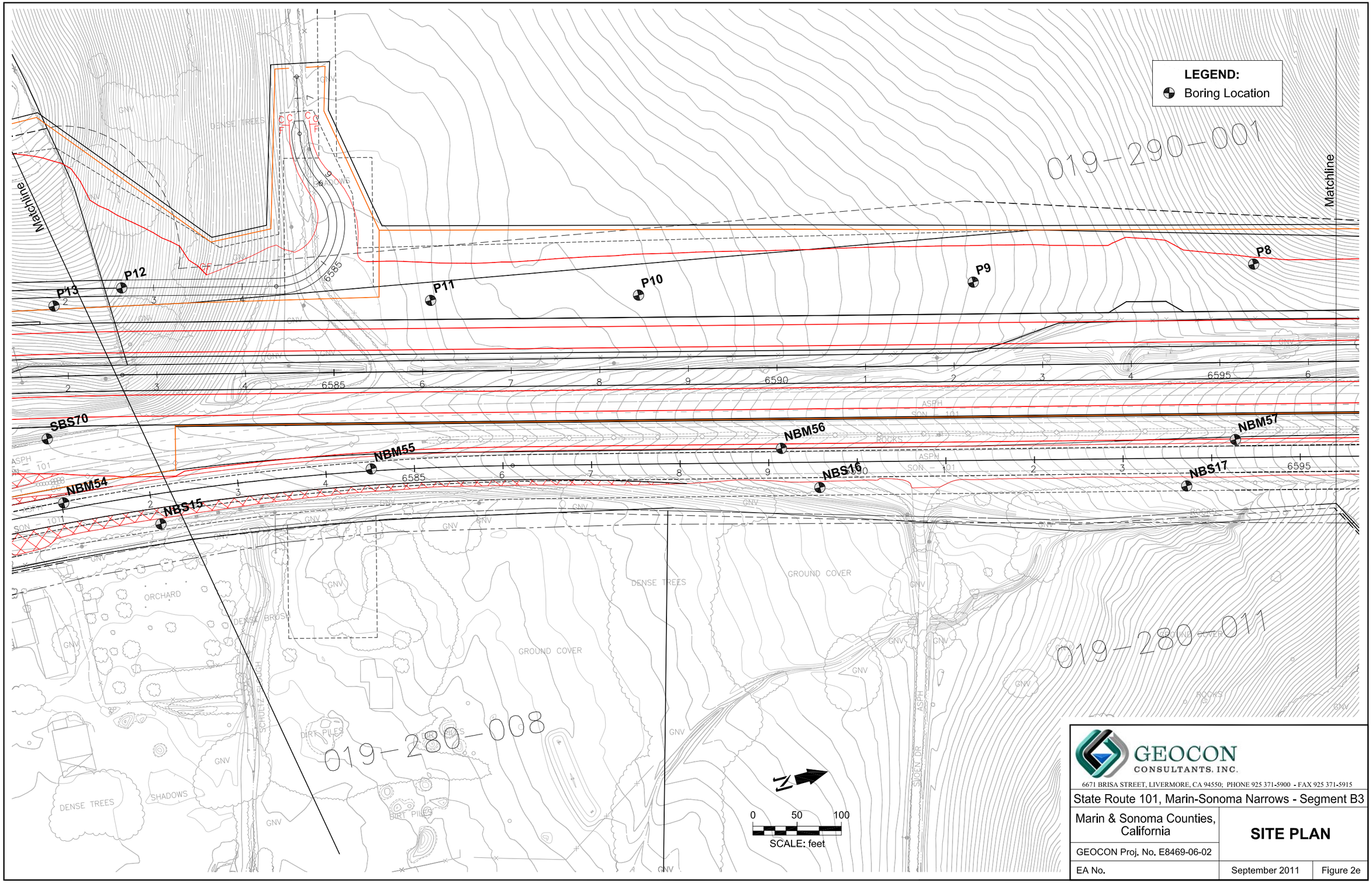

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Figure 2e

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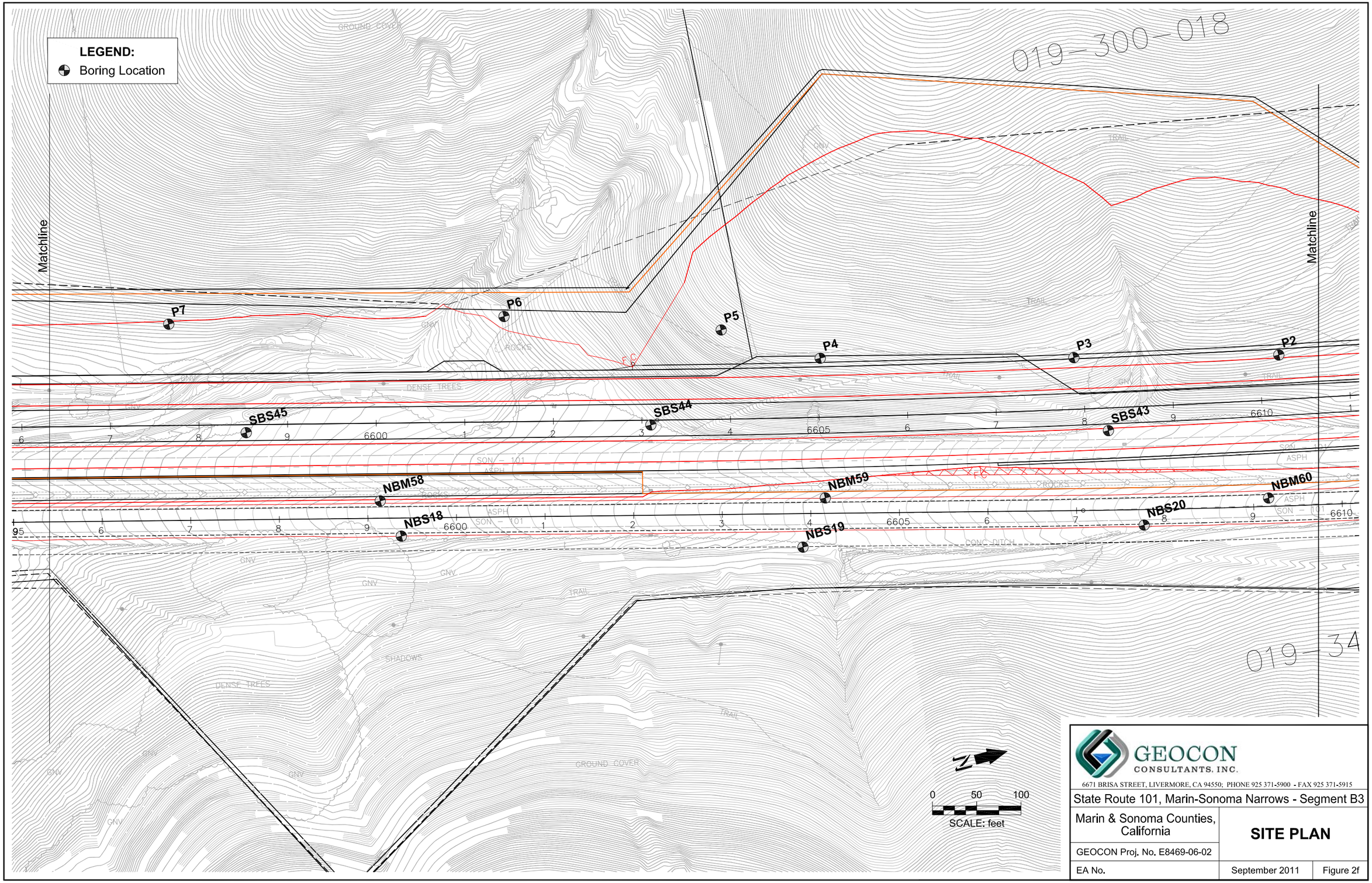

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Figure 2f

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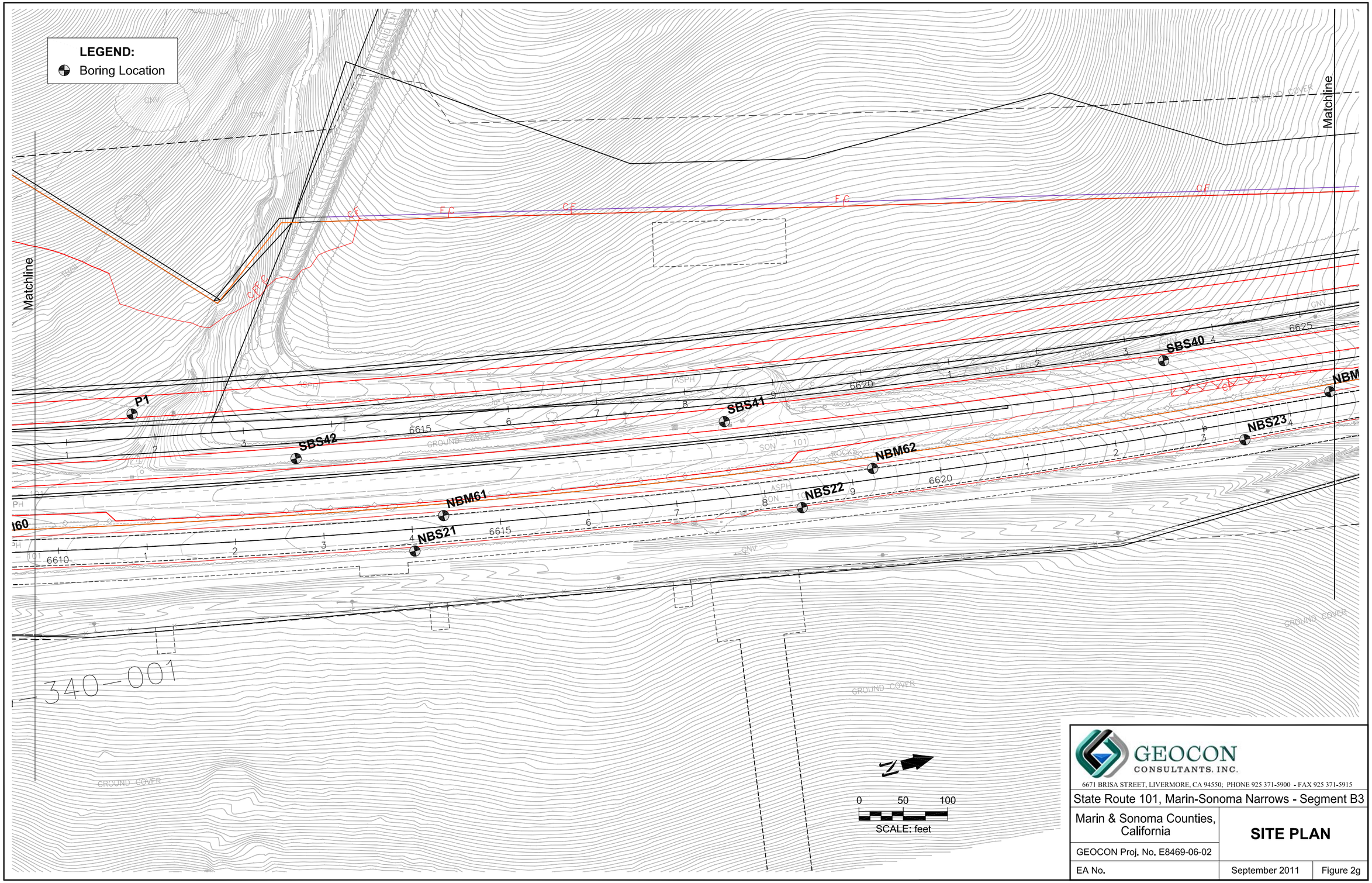

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Marin & Sonoma Counties, California	**SITE PLAN**	
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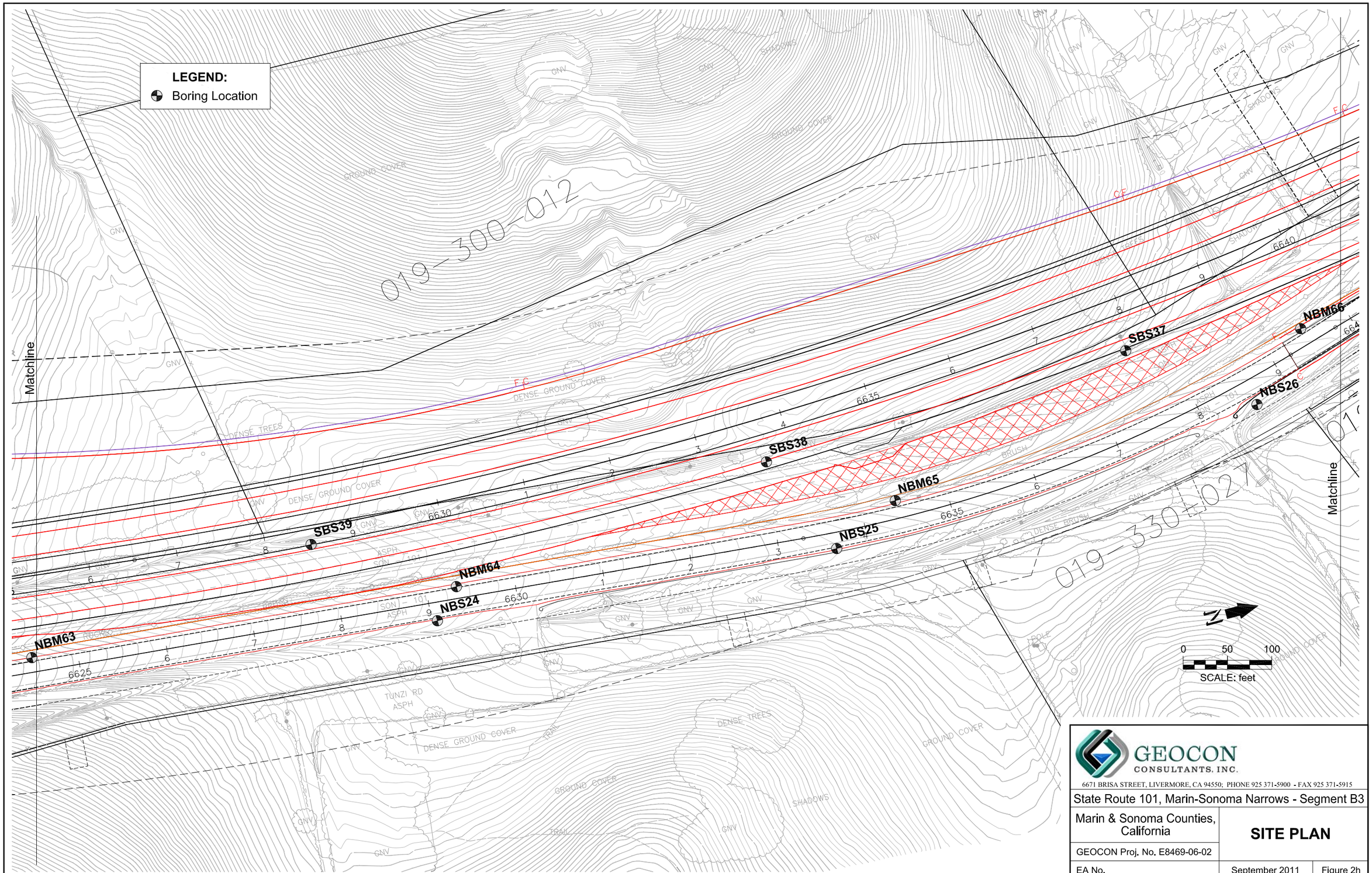
SITE0911



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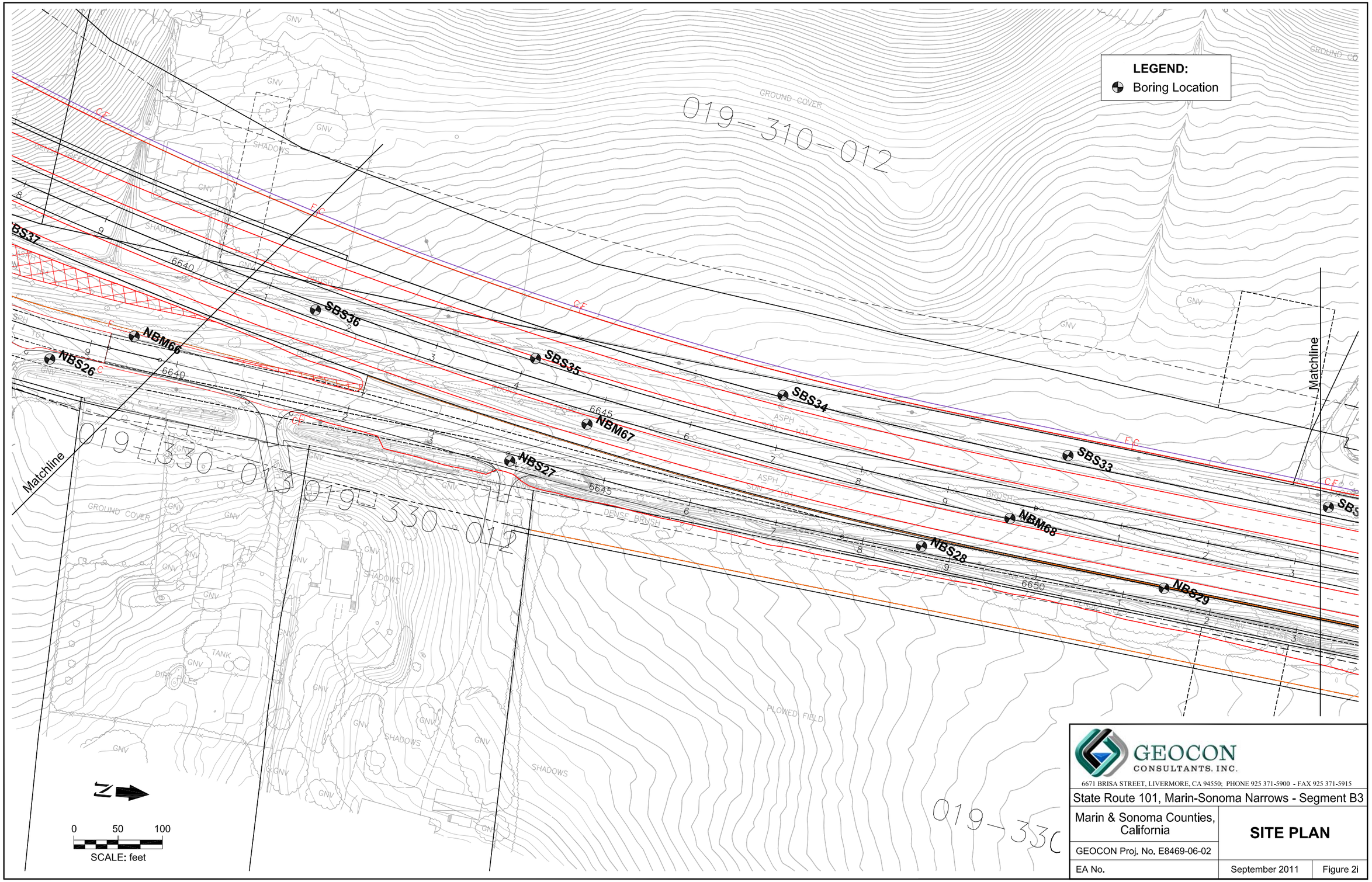
Marin & Sonoma Counties, California	SITE PLAN	
GEOCON Proj. No. E8469-06-02		
EA No.	September 2011	Figure 2h

SITE0911



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Marin & Sonoma Counties, California

SITE PLAN

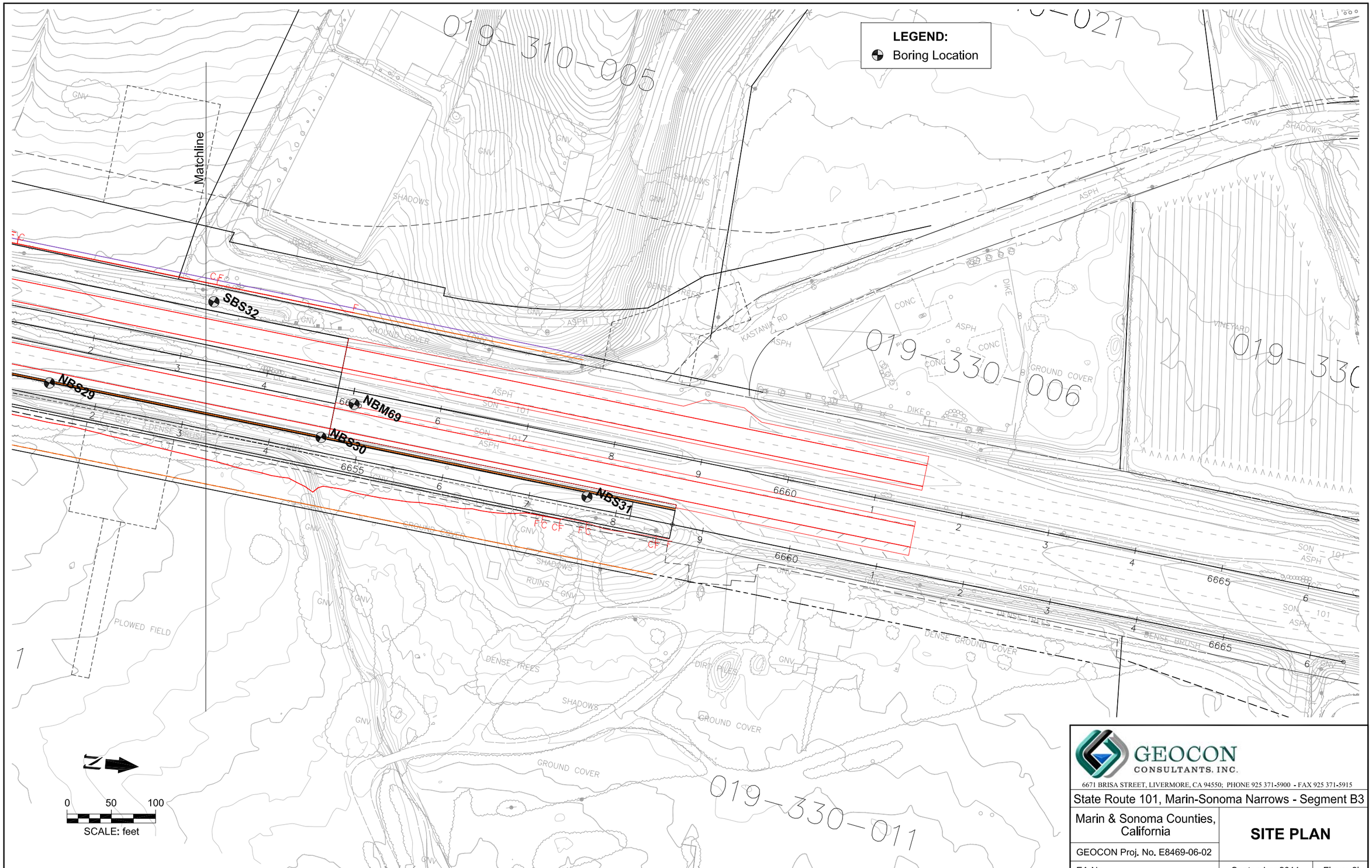
GEOCON Proj. No. E8469-06-02

EA No.

September 2011

Figure 2i

SITE0911



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Marin & Sonoma Counties, California	SITE PLAN	
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EA No.	September 2011	Figure 2j

SITE0911

TABLE 1
Boring Coordinates
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Boring	Northing	Easting	Latitude	Longitude
NBS 1	2,257,834.134	5,959,633.559	38.177142671	-122.594560013
NBS 2	2,258,059.483	5,959,431.523	38.177748921	-122.595280225
NBS 3	2,258,289.997	5,959,167.094	38.178365511	-122.596217850
NBS 4	2,258,474.151	5,958,974.409	38.178859230	-122.596902355
NBS 5	2,258,759.375	5,958,713.871	38.179626243	-122.597830744
NBS 6	2,258,912.566	5,958,588.984	38.180039122	-122.598277051
NBS 7	2,259,302.504	5,958,321.894	38.181093203	-122.599236428
NBS 8	2,259,461.653	5,958,259.846	38.181526304	-122.599464653
NBS 9	2,259,921.888	5,958,071.639	38.182778226	-122.600155187
NBS 10	2,260,304.922	5,957,983.762	38.183824382	-122.600490746
NBS 11	2,260,678.586	5,957,982.149	38.184850127	-122.600525534
NBS 12	2,261,214.832	5,957,940.496	38.186319754	-122.600712288
NBS 13	2,261,734.587	5,957,934.221	38.187746288	-122.600774706
NBS 14	2,262,210.547	5,957,920.785	38.189052144	-122.600858614
NBS 15	2,262,579.002	5,957,932.849	38.190064432	-122.600845423
NBS 16	2,263,307.714	5,958,085.704	38.192074433	-122.600370616
NBS 17	2,263,708.006	5,958,191.171	38.193179881	-122.600034989
NBS 18	2,264,258.705	5,958,321.016	38.194699750	-122.599626292
NBS 19	2,264,693.221	5,958,450.352	38.195900621	-122.599210276
NBS 20	2,265,071.445	5,958,526.027	38.196943643	-122.598976535
NBS 21	2,265,681.716	5,958,665.187	38.198627625	-122.598540036
NBS 22	2,266,116.455	5,958,731.048	38.199825195	-122.598344829
NBS 23	2,266,618.770	5,958,786.408	38.201207640	-122.598191419
NBS 24	2,267,178.086	5,958,837.271	38.202746293	-122.598058094
NBS 25	2,267,634.295	5,958,875.241	38.204001087	-122.597961581
NBS 26	2,268,134.448	5,958,841.045	38.205372080	-122.598119575
NBS 27	2,268,641.759	5,958,681.209	38.206754986	-122.598715271
NBS 28	2,269,092.421	5,958,532.222	38.207983038	-122.599268819
NBS 29	2,269,353.218	5,958,436.520	38.208693122	-122.599622160
NBS 30	2,269,649.295	5,958,336.525	38.209499796	-122.599993202
NBS 31	2,269,942.669	5,958,244.623	38.210299549	-122.600335883
SBS 32	2,269,468.137	5,958,264.465	38.208998014	-122.600229782
SBS 33	2,269,184.463	5,958,360.991	38.208225177	-122.599871779
SBS 34	2,268,871.789	5,958,463.009	38.207373064	-122.599492409
SBS 35	2,268,609.075	5,958,566.440	38.206658192	-122.599112033
SBS 36	2,268,366.505	5,958,643.119	38.205996973	-122.598826314
SBS 37	2,268,007.111	5,958,744.029	38.205016522	-122.598447179

TABLE 1
Boring Coordinates
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Boring	Northing	Easting	Latitude	Longitude
SBS 38	2,267,583.068	5,958,760.213	38.203853369	-122.598357785
SBS 39	2,267,062.687	5,958,717.175	38.202422088	-122.598466920
SBS 40	2,266,553.244	5,958,676.544	38.201020983	-122.598568527
SBS 41	2,266,056.739	5,958,614.585	38.199654083	-122.598745338
SBS 42	2,265,579.185	5,958,529.681	38.198337798	-122.599003447
SBS 43	2,265,060.106	5,958,412.666	38.196905531	-122.599370015
SBS 44	2,264,563.070	5,958,272.796	38.195532372	-122.599817795
SBS 45	2,264,119.868	5,958,162.939	38.194308853	-122.600165358
SBS 70	2,262,479.986	5,957,806.918	38.189784835	-122.601275742
SBS 71	2,262,141.418	5,957,801.599	38.188855013	-122.601267796
SBS 72	2,261,620.089	5,957,828.460	38.187425429	-122.601133639
SBS 73	2,261,362.613	5,957,834.410	38.186718930	-122.601092833
SBS 74	2,260,526.917	5,957,860.474	38.184426241	-122.600936907
SBS 75	2,260,120.804	5,957,912.358	38.183314507	-122.600724726
SBS 76	2,259,824.724	5,957,986.881	38.182506252	-122.600442405
SBS 77	2,259,514.447	5,958,094.573	38.181661061	-122.600043614
SBS 78	2,259,125.611	5,958,297.132	38.180606041	-122.599308748
SBS 79	2,258,936.793	5,958,412.214	38.180094752	-122.598893753
SBS 80	2,258,648.635	5,958,640.841	38.179317726	-122.598076108
SBS 81	2,258,472.620	5,958,819.304	38.178845484	-122.597441687
NBM 46	2,258,517.625	5,958,873.711	38.178972386	-122.597255969
NBM 47	2,258,909.882	5,958,533.104	38.180028316	-122.598471193
NBM 48	2,259,317.786	5,958,266.072	38.181131720	-122.599431773
NBM 49	2,259,786.201	5,958,063.595	38.182405219	-122.600172573
NBM 50	2,260,303.425	5,957,956.977	38.183818622	-122.600583794
NBM 51	2,261,040.287	5,957,904.832	38.185838365	-122.600822710
NBM 52	2,261,394.689	5,957,898.662	38.186810949	-122.600871846
NBM 53	2,261,731.149	5,957,874.551	38.187733170	-122.600981991
NBM 54	2,262,479.155	5,957,881.527	38.189787153	-122.601016149
NBM 55	2,262,824.302	5,957,934.368	38.190737964	-122.600859299
NBM 56	2,263,277.302	5,958,031.850	38.191987622	-122.600555579
NBM 57	2,263,774.661	5,958,154.915	38.193360639	-122.600166315
NBM 58	2,264,245.990	5,958,276.461	38.194662097	-122.599780294
NBM 59	2,264,731.855	5,958,403.268	38.196003783	-122.599377089
NBM 60	2,265,214.993	5,958,532.932	38.197338159	-122.598963715
NBM 61	2,265,723.359	5,958,634.956	38.198740090	-122.598648457
NBM 62	2,266,204.746	5,958,708.875	38.200066221	-122.598428855

TABLE 1
Boring Coordinates
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Boring	Northing	Easting	Latitude	Longitude
NBM 63	2,266,725.327	5,958,758.975	38.201498488	-122.598295173
NBM 64	2,267,208.738	5,958,805.671	38.202828499	-122.598170428
NBM 65	2,267,712.199	5,958,840.162	38.204212802	-122.598089703
NBM 66	2,268,204.210	5,958,771.123	38.205559297	-122.598368291
NBM 67	2,268,696.476	5,958,601.661	38.206900307	-122.598996311
NBM 68	2,269,163.127	5,958,455.225	38.208172408	-122.599542238
NBM 69	2,269,662.818	5,958,285.382	38.209533772	-122.600172206
P1	2,265,413.551	5,958,433.307	38.197877135	-122.599325793
P2	2,265,267.873	5,958,380.074	38.197473919	-122.599499614
P3	2,265,043.750	5,958,323.048	38.196855108	-122.599680505
P4	2,264,767.139	5,958,249.619	38.196091186	-122.599914354
P5	2,264,667.421	5,958,189.868	38.195813741	-122.600114430
P6	2,264,434.750	5,958,111.725	38.195170162	-122.600368106
P7	2,264,067.107	5,958,022.141	38.194155326	-122.600651032
P8	2,263,845.731	5,957,969.131	38.193544301	-122.600818146
P9	2,263,534.858	5,957,906.772	38.192687000	-122.601010792
P10	2,263,166.325	5,957,823.153	38.191670087	-122.601272883
P11	2,262,938.229	5,957,768.121	38.191040486	-122.601446496
P12	2,262,605.154	5,957,664.251	38.190119669	-122.601781790
P13	2,262,526.144	5,957,664.160	38.189902753	-122.601775933
P14	2,262,326.288	5,957,682.738	38.189355220	-122.601695692
P15	2,262,129.374	5,957,666.673	38.188813627	-122.601736189
P16	2,261,977.928	5,957,687.414	38.188399132	-122.601652209
P17	2,261,737.762	5,957,645.299	38.187737191	-122.601779938
P18	2,261,482.252	5,957,672.312	38.187037387	-122.601666015
P19	2,261,107.120	5,957,584.617	38.186002103	-122.601941739
P20	2,260,786.225	5,957,567.304	38.185120061	-122.601976883
P21	2,260,352.369	5,957,595.281	38.183930693	-122.601845673
PW1	2,260,590.832	5,957,676.641	38.184608488	-122.601553515

Coordinates are shown in feet, NAD 83 (Zone 3)

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBS 1-0	0	84	2.4	---	---	---
NBS 1-1	1	28	---	---	---	---
NBS 1-2	2	13	---	---	---	---
NBS 2-0	0	22	---	---	---	---
NBS 2-1	1	120	8.1	<0.25	---	8.1
NBS 2-2	2	11	---	---	---	---
NBS 3-0	0	85	5.6	<0.25	---	8.1
NBS 3-1	1	16	---	---	---	---
NBS 3-2	2	6.5	---	---	---	---
NBS 4-0	0	220	9.0	<0.25	---	8.1
NBS 4-1	1	23	---	---	---	---
NBS 4-2	2	7.8	---	---	---	---
NBS 5-0	0	21	---	---	---	---
NBS 5-1	1	6.4	---	---	---	---
NBS 5-2	2	11	---	---	---	---
NBS 6-0	0	16	---	---	---	---
NBS 6-1	1	6.8	---	---	---	---
NBS 6-2	2	<5.0	---	---	---	---
NBS 7-0	0	140	5.5	<0.25	---	8.0
NBS 7-1	1	15	---	---	---	---
NBS 7-2	2	11.0	---	---	---	---
NBS 8-0	0	230	9.7	0.29	---	8.3
NBS 8-1	1	11	---	---	---	---
NBS 8-2	2	7.6	---	---	---	---
NBS 9-0	0	43	---	---	---	---
NBS 9-1	1	19	1.7	---	---	---
NBS 9-2	2	5.9	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBS 10-0	0	7.0	---	---	---	---
NBS 10-1	1	160	6.9	0.30	---	8.3
NBS 10-2	2	6.7	---	---	---	---
NBS 11-0	0	16	---	---	---	---
NBS 11-1	1	32	---	---	---	---
NBS 11-2	2	100	3.4	---	---	---
NBS 12-0	0	120	8.6	0.31	---	10
NBS 12-1	1	380	15	<0.25	---	7.7
NBS 12-2	2	2.7	---	---	---	---
NBS 13-0	0	29	---	---	---	---
NBS 13-1	1	34	---	---	---	---
NBS 13-2	2	55	1.7	---	---	---
NBS 14-0	0	120	3.8	---	---	---
NBS 14-1	1	6.4	---	---	---	---
NBS 14-2	2	7.2	---	---	---	---
NBS 15-0	0	58	1.3	---	---	---
NBS 15-1	1	180	5.8	<0.25	---	7.3
NBS 15-2	2	180	3.4	---	---	---
NBS 16-0	0	1,200	42	<0.25	1.7	7.4
NBS 16-1	1	55	0.54	---	---	---
NBS 16-2	2	7.0	---	---	---	---
NBS 17-0	0	530	45	<0.25	2.3	7.7
NBS 17-1	1	13	---	---	---	---
NBS 17-2	2	<5.0	---	---	---	---
NBS 18-0	0	74	2.7	---	---	---
NBS 18-1	1	34	---	---	---	---
NBS 18-2	2	120	1.5	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBS 19-0	0	34	---	---	---	---
NBS 19-1	1	<5.0	---	---	---	---
NBS 19-2	2	<5.0	---	---	---	---
NBS 20-0	0	60	5.1	<0.25	---	7.6
NBS 20-1	1	7.5	---	---	---	---
NBS 20-2	2	5.1	---	---	---	---
NBS 21-0	0	4.9	---	---	---	---
NBS 21-1	1	5.1	---	---	---	---
NBS 21-2	2	<5.0	---	---	---	---
NBS 22-0	0	59	7.2	---	---	---
NBS 22-1	1	<5.0	---	---	---	---
NBS 22-2	2	2.9	---	---	---	---
NBS 23-0	0	310	12	<0.25	0.40	7.1
NBS 23-1	1	<5.0	---	---	---	---
NBS 23-2	2	<5.0	---	---	---	---
NBS 24-0	0	35	---	---	---	---
NBS 24-1	1	150	2.5	---	---	---
NBS 24-2	2	24	---	---	---	---
NBS 25-0	0	96	7.0	<0.25	---	7.4
NBS 25-1	1	<5.0	---	---	---	---
NBS 25-2	2	<5.0	---	---	---	---
NBS 26-0	0	100	7.0	<0.25	---	7.7
NBS 26-1	1	7.5	---	---	---	---
NBS 26-2	2	<5.0	---	---	---	---
NBS 27-0	0	9.5	---	---	---	---
NBS 27-1	1	<5.0	---	---	---	---
NBS 27-2	2	<5.0	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBS 28-0	0	130	4.0	---	---	---
NBS 28-1	1	4.9	---	---	---	---
NBS 28-2	2	<5.0	---	---	---	---
NBS 29-0	0	270	12	<0.25	---	7.8
NBS 29-1	1	10	---	---	---	---
NBS 29-2	2	8.7	---	---	---	---
NBS 30-0	0	200	12	<0.25	0.48	6.6
NBS 30-1	1	<5.0	---	---	---	---
NBS 30-2	2	5.9	---	---	---	---
NBS 31-0	0	36	---	---	---	---
NBS 31-1	1	5.8	---	---	---	---
NBS 31-2	2	<5.0	---	---	---	---
SBS 32-0	0	380	16	<0.25	0.26	6.7
SBS 32-1	1	24	---	---	---	---
SBS 32-2	2	8.3	---	---	---	---
SBS 33-0	0	40	---	---	---	---
SBS 33-1	1	86	1.4	---	---	---
SBS 33-2	2	37	---	---	---	---
SBS 34-0	0	110	1.9	---	---	---
SBS 34-1	1	84	2.9	---	---	---
SBS 34-2	2	5.6	---	---	---	---
SBS 35-0	0	68	1.1	---	---	---
SBS 35-1	1	3.7	---	---	---	---
SBS 35-2	2	<5.0	---	---	---	---
SBS 36-0	0	39	---	---	---	---
SBS 36-1	1	100	1.7	---	---	---
SBS 36-2	2	20	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
SBS 37-0	0	120	2.7	---	---	---
SBS 37-1	1	14	---	---	---	---
SBS 37-2	2	<5.0	---	---	---	---
SBS 38-0	0	64	1.5	---	---	---
SBS 38-1	1	14	---	---	---	---
SBS 38-2	2	4.2	---	---	---	---
SBS 39-0	0	210	10	<0.25	0.45	7.7
SBS 39-1	1	39	---	---	---	---
SBS 39-2	2	9.5	---	---	---	---
SBS 40-0	0	220	10	<0.25	0.41	7.4
SBS 40-1	1	15	---	---	---	---
SBS 40-2	2	5.1	---	---	---	---
SBS 41-0	0	35	---	---	---	---
SBS 41-1	1	<5.0	---	---	---	---
SBS 41-2	2	3.5	---	---	---	---
SBS 42-0	0	2,800	120	<0.25	5.0	7.6
SBS 42-1	1	<5.0	---	---	---	---
SBS 42-2	2	<5.0	---	---	---	---
SBS 43-0	0	40	---	---	---	---
SBS 43-1	1	5.5	---	---	---	---
SBS 43-2	2	<5.0	---	---	---	---
SBS 44-0	0	47	---	---	---	---
SBS 44-1	1	8.6	---	---	---	---
SBS 44-2	2	<5.0	---	---	---	---
SBS 45-0	0	170	5.6	<0.25	---	7.8
SBS 45-1	1	17	---	---	---	---
SBS 45-2	2	3.5	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
SBS 70-0	0	45	---	---	---	---
SBS 70-1	1	14	---	---	---	---
SBS 70-2	2	12	---	---	---	---
SBS 71-0	0	180	5.0	<0.25	---	7.6
SBS 71-1	1	8.8	---	---	---	---
SBS 71-2	2	2.2	---	---	---	---
SBS 72-0	0	16	---	---	---	---
SBS 72-1	1	5.5	---	---	---	---
SBS 72-2	2	6.0	---	---	---	---
SBS 73-0	0	8.3	---	---	---	---
SBS 73-1	1	<5.0	---	---	---	---
SBS 73-2	2	8.9	---	---	---	---
SBS 74-0	0	210	10	<0.25	<0.25	7.2
SBS 74-1	1	6.7	---	---	---	---
SBS 74-2	2	6.0	---	---	---	---
SBS 75-0	0	240	10	<0.25	<0.25	8.1
SBS 75-1	1	5.8	---	---	---	---
SBS 75-2	2	7.1	---	---	---	---
SBS 76-0	0	340	17	<0.25	0.48	8.3
SBS 76-1	1	10	---	---	---	---
SBS 76-2	2	7.6	---	---	---	---
SBS 77-0	0	190	8.7	<0.25	---	8.1
SBS 77-1	1	7.6	---	---	---	---
SBS 77-2	2	14	---	---	---	---
SBS 78-0	0	170	4.8	---	---	---
SBS 78-1	1	5.1	---	---	---	---
SBS 78-2	2	6.5	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
SBS 79-0	0	2,300	130	<0.25	11	7.9
SBS 79-1	1	9.5	---	---	---	---
SBS 79-2	2	<5.0	---	---	---	---
SBS 80-0	0	150	9.6	<0.25	---	8.3
SBS 80-1	1	33	---	---	---	---
SBS 80-2	2	7.7	---	---	---	---
SBS 81-0	0	500	16	<0.25	0.43	8.3
SBS 81-1	1	9.9	---	---	---	---
SBS 81-2	2	5.8	---	---	---	---
NBM 46-0	0	120	4.0	---	---	---
NBM 46-1	1	11	---	---	---	---
NBM 46-2	2	11	---	---	---	---
NBM 47-0	0	220	7.7	<0.25	---	7.6
NBM 47-1	1	8.7	---	---	---	---
NBM 47-2	2	4.8	---	---	---	---
NBM 48-0	0	37	---	---	---	---
NBM 48-1	1	6.3	---	---	---	---
NBM 48-2	2	<5.0	---	---	---	---
NBM 49-0	0	24	---	---	---	---
NBM 49-1	1	8.2	---	---	---	---
NBM 49-2	2	7.9	---	---	---	---
NBM 50-0	0	170	4.8	---	---	---
NBM 50-1	1	<5.0	---	---	---	---
NBM 50-2	2	<5.0	---	---	---	---
NBM 51-0	0	160	5.1	<0.25	---	7.9
NBM 51-1	1	4.1	---	---	---	---
NBM 51-2	2	11	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBM 52-0	0	5.3	---	---	---	---
NBM 52-1	1	240	5.2	<0.25	---	7.8
NBM 52-2	2	11	---	---	---	---
NBM 53-0	0	220	8.5	<0.25	---	7.7
NBM 53-1	1	6.6	---	---	---	---
NBM 53-2	2	<5.0	---	---	---	---
NBM 54-0	0	390	13	<0.25	---	7.1
NBM 54-1	1	16	---	---	---	---
NBM 54-2	2	7.6	---	---	---	---
NBM 55-0	0	9.0	---	---	---	---
NBM 55-1	1	6.1	---	---	---	---
NBM 55-2	2	<5.0	---	---	---	---
NBM 56-0	0	190	15	<0.25	---	7.9
NBM 56-1	1	5.2	---	---	---	---
NBM 56-2	2	1.6	---	---	---	---
NBM 57-0	0	1,100	29	<0.25	1.6	8.0
NBM 57-1	1	6.2	---	---	---	---
NBM 57-2	2	<5.0	---	---	---	---
NBM 58-0	0	250	9.3	<0.25	0.88	8.2
NBM 58-1	1	<5.0	---	---	---	---
NBM 58-2	2	2.5	---	---	---	---
NBM 59-0	0	11	---	---	---	---
NBM 59-1	1	<5.0	---	---	---	---
NBM 59-2	2	<5.0	---	---	---	---
NBM 60-0	0	440	13	<0.25	0.39	8.2
NBM 60-1	1	<5.0	---	---	---	---
NBM 60-2	2	15	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
NBM 61-0	0	47	---	---	---	---
NBM 61-1	1	5.3	---	---	---	---
NBM 61-2	2	9.9	---	---	---	---
NBM 62-0	0	350	12	<0.25	---	8.2
NBM 62-1	1	25	---	---	---	---
NBM 62-2	2	5.5	---	---	---	---
NBM 63-0	0	400	7.6	<0.25	---	8.3
NBM 63-1	1	5.7	---	---	---	---
NBM 63-2	2	<5.0	---	---	---	---
NBM 64-0	0	360	20	<0.25	0.73	8.4
NBM 64-1	1	7.0	---	---	---	---
NBM 64-2	2	4.2	---	---	---	---
NBM 65-0	0	210	5.0	<0.25	---	8.1
NBM 65-1	1	340	3.6	---	---	---
NBM 65-2	2	8.0	---	---	---	---
NBM 66-0	0	72	2.4	---	---	---
NBM 66-1	1	<5.0	---	---	---	---
NBM 66-2	2	<5.0	---	---	---	---
NBM 67-0	0	360	9.5	<0.25	<0.25	8.0
NBM 67-1	1	5.4	---	---	---	---
NBM 67-2	2	2.2	---	---	---	---
NBM 68-0	0	86	2.8	---	---	---
NBM 68-1	1	4.3	---	---	---	---
NBM 68-2	2	<5.0	---	---	---	---
NBM 69-0	0	150	4.6	---	---	---
NBM 69-1	1	54	0.55	---	---	---
NBM 69-2	2	<5.0	---	---	---	---
P1-0.0	0	8.2	---	---	---	---
P1-1.5	1.5	2.8	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
P2-0.0	0	9.8	---	---	---	---
P2-1.5	1.5	2.2	---	---	---	---
P3-0.0	0	12	---	---	---	---
P3-1.5	1.5	1.9	---	---	---	---
P4-0.0	0	11	---	---	---	---
P4-1.5	1.5	1.5	---	---	---	---
P5-0.0	0	5.3	---	---	---	---
P5-1.5	1.5	1.1	---	---	---	---
P6-0.0	0	3.3	---	---	---	---
P6-1.5	1.5	1.9	---	---	---	---
P7-0.0	0	11	---	---	---	---
P7-1.5	1.5	2.1	---	---	---	---
P8-0.0	0	11	---	---	---	---
P8-1.5	1.5	1.4	---	---	---	---
P9-0.0	0	13	---	---	---	---
P9-1.5	1.5	2.1	---	---	---	---
P10-0.0	0	20	---	---	---	---
P10-1.5	1.5	3.2	---	---	---	---
P11-0.0	0	14	---	---	---	---
P11-1.5	1.5	6.7	---	---	---	---
P12-0.0	0	13	---	---	---	---
P12-1.5	1.5	7.0	---	---	---	---
P13-0.0	0	16	---	---	---	---
P13-1.5	1.5	9.3	---	---	---	---
P14-0.0	0	17	---	---	---	---
P14-1.5	1.5	7.5	---	---	---	---

TABLE 2
Summary of Lead Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
P15-0.0	0	8.9	---	---	---	---
P15-1.5	1.5	6.0	---	---	---	---
P16-0.0	0	11	---	---	---	---
P16-1.5	1.5	1.5	---	---	---	---
P17-0.0	0	150	8.4	---	<0.50	---
P17-0.0R	0	*83*	---	---	---	---
P17-1.5	1.5	6.1	---	---	---	---
P18-0.0	0	11	---	---	---	---
P18-1.5	1.5	6.8	---	---	---	---
P19-0.0	0	8.7	---	---	---	---
P19-1.5	1.5	11	---	---	---	---
P20-0.0	0	7.5	---	---	---	---
P20-1.5	1.5	10	---	---	---	---
P21-0.0	0	6.2	---	---	---	---
P21-1.5	1.5	7.7	---	---	---	---
Hazardous Waste Criteria						
TTLC (mg/kg)		1,000		---	---	
STLC (mg/l)		---	5.0	---	---	
TCLP (mg/l)		---	---	---	5.0	

Notes:

mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
--- = Not analyzed
<5.0 = Not detected above the laboratory reporting limit
WET = Waste Extraction Test using citric acid as the extraction fluid
DI-WET = Waste Extraction Test using deionized water as the extraction fluid
TCLP = Toxicity Characteristic Leaching Procedure
TTLC = Total Threshold Limit Concentration
Italics = Values listed in italics are results for re-analysis of sample for laboratory confirmation
STLC = Soluble Threshold Limit Concentration

TABLE 3
Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
NBS 2-0	0	<2.0	<1.0	120	<1.0	<1.0	58 *<1.0*	14	28	22	0.12	<1.0	89	<1.0	<1.0	<1.0	39	62
NBS 4-2	2	<2.0	<1.0	340	<1.0	<1.0	27	15	22	7.8	<0.10	<1.0	47	<1.0	<1.0	<1.0	30	56
NBS 5-0	0	<2.0	<1.0	63	<1.0	<1.0	45	15	19	21	<0.10	<1.0	56	<1.0	<1.0	<1.0	44	48
NBS 6-1	1	3.8	<1.0	5.9	<1.0	<1.0	270 *<1.0*	36	41	6.8	<0.10	<1.0	400 *<1.0*	<1.0	<1.0	<1.0	73	69
NBS 8-2	2	<2.0	<1.0	180	<1.0	<1.0	72 *<1.0*	16	24	7.6	<0.10	<1.0	98	<1.0	<1.0	<1.0	38	49
NBS 9-0	0	<2.0	<1.0	81	<1.0	<1.0	51 *<1.0*	19	28	43	<0.10	<1.0	72	<1.0	<1.0	<1.0	49	46
NBS 11-1	1	<2.0	<1.0	79	<1.0	<1.0	59 *<1.0*	15	20	32	0.20	<1.0	77	<1.0	<1.0	<1.0	44	47
NBS 12-2	2	<2.0	<1.0	58	<1.0	<1.0	28	13	30	2.7	<0.10	<1.0	13	<1.0	<1.0	<1.0	61	22
NBS 14-0	0	<2.0	<1.0	95	<1.0	<1.0	41	15	28	120	0.18	<1.0	48	<1.0	<1.0	<1.0	43	71
NBS 16-2	2	<2.0	<1.0	66	<1.0	<1.0	32	21	26	7.0	<0.10	<1.0	33	<1.0	<1.0	<1.0	47	46
NBS 18-1	1	<2.0	<1.0	53	<1.0	<1.0	38	19	19	34	<0.10	<1.0	43	<1.0	<1.0	<1.0	52	33
NBS 19-0	0	<2.0	<1.0	86	<1.0	<1.0	41	21	32	34	<0.10	<1.0	21	<1.0	<1.0	<1.0	79	35

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Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
NBS 21-0	0	<2.0	<1.0	160	<1.0	<1.0	55 *<1.0*	29	24	4.9	<0.10	<1.0	60	<1.0	<1.0	<1.0	49	50
NBS 22-2	2	<2.0	<1.0	180	<1.0	<1.0	51 *<1.0*	22	32	2.9	<0.10	<1.0	39	<1.0	<1.0	<1.0	34	53
NBS 26-2	2	<10	<5.0	78	<5.0	<5.0	47	39	20	<5.0	<0.10	<5.0	51	<5.0	<5.0	<5.0	50	51
NBS 27-0	0	<2.0	<1.0	59	<1.0	<1.0	42	22	16	9.5	<0.10	<1.0	42	<1.0	<1.0	<1.0	42	44
NBS 28-1	1	<2.0	<1.0	110	<1.0	<1.0	110 *<1.0*	26	22	4.9	<0.10	<1.0	150	<1.0	<1.0	<1.0	51	37
NBS 29-2	2	<2.0	<1.0	150	<1.0	<1.0	43	17	34	8.7	<0.10	<1.0	45	<1.0	<1.0	<1.0	46	58
SBS 32-2	2	<2.0	1.4	100	<1.0	<1.0	46	25	20	8.3	<0.10	<1.0	31	<1.0	<1.0	<1.0	54	35
SBS 34-0	0	<2.0	<1.0	81	<1.0	<1.0	45	19	26	110	<0.10	<1.0	53	<1.0	<1.0	<1.0	37	60
SBS 35-1	1	<2.0	<1.0	110	<1.0	<1.0	48	37	18	3.7	<0.10	<1.0	45	<1.0	<1.0	<1.0	53	29
SBS 36-0	0	<2.0	<1.0	80	<1.0	<1.0	53 *<1.0*	21	18	39	<0.10	<1.0	42	<1.0	<1.0	<1.0	45	47
SBS 38-2	2	<2.0	<1.0	100	<1.0	<1.0	48	20	12	4.2	<0.10	<1.0	34	<1.0	<1.0	<1.0	54	24
SBS 40-0	0	<2.0	<1.0	120	<1.0	<1.0	18	13	13	220	<0.10	<1.0	13	<1.0	<1.0	<1.0	28	42
SBS 41-2	2	<2.0	<1.0	39	<1.0	<1.0	26	15	13	3.5	<0.10	<1.0	17	<1.0	<1.0	<1.0	46	23

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Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SBS 42-0	0	<2.0	<1.0	160	<1.0	1.1	35	16	39	2,800	<0.10	<1.0	41	<1.0	<1.0	<1.0	35	240
SBS 44-1	1	<2.0	<1.0	73	<1.0	<1.0	27	21	26	8.6	<0.10	<1.0	19	<1.0	<1.0	<1.0	64	39
SBS 45-2	2	<2.0	<1.0	77	<1.0	<1.0	38	29	35	3.5	<0.10	<1.0	20	<1.0	<1.0	<1.0	92	30
SBS 71-2	2	<2.0	<1.0	110	<1.0	<1.0	69 *<1.0*	15	20	2.2	<0.10	<1.0	57	<1.0	<1.0	<1.0	36	35
SBS 73-0	0	4.9	<2.0	6.6	<2.0	<2.0	320 *<1.0*	42	45	8.3	0.23	<2.0	470 *<1.0*	<2.0	<2.0	<2.0	83	82
SBS 75-2	2	<2.0	<1.0	67	<1.0	<1.0	150 *<1.0*	52	51	7.1	<0.10	<1.0	240 *<1.0*	<1.0	<1.0	<1.0	48	63
SBS 76-1	1	<2.0	<1.0	100	<1.0	<1.0	93 *<1.0*	21	26	10	<0.10	<1.0	140	<1.0	<1.0	<1.0	48	48
SBS 78-2	2	3.4	<1.0	150	<1.0	<1.0	220 *<1.0*	26	23	6.5	<0.10	<1.0	340 *1.2*	<1.0	<1.0	<1.0	58	50
SBS 79-0	0	<2.0	<1.0	130	<1.0	1.3	46	13	36	2,300	<0.10	<1.0	55	<1.0	<1.0	<1.0	39	250
SBS 81-1	1	<2.0	<1.0	84	<1.0	<1.0	39	19	18	9.9	<0.10	<1.0	43	<1.0	<1.0	<1.0	41	46
NBM 47-2	2	2.1	<1.0	13	<1.0	<1.0	160 *<1.0*	23	44	4.8	<0.10	<1.0	250 *<1.0*	<1.0	<1.0	<1.0	65	58
NBM 49-0	0	<2.0	<1.0	57	<1.0	<1.0	30	14	17	24	<0.10	<1.0	33	<1.0	<1.0	<1.0	41	37

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Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
NBM 51-1	1	<2.0	<1.0	88	<1.0	<1.0	44	25	31	4.1	<0.10	<1.0	54	<1.0	<1.0	<1.0	48	39
NBM 52-0	0	<2.0	1.7	83	<1.0	<1.0	44	11	13	5.3	0.18	<1.0	48	<1.0	<1.0	<1.0	39	37
NBM 55-0	0	<2.0	<1.0	87	<1.0	<1.0	34	22	25	9.0	<0.10	<1.0	31	<1.0	<1.0	<1.0	56	37
NBM 56-2	2	<2.0	<1.0	62	<1.0	<1.0	36	20	38	1.6	<0.10	<1.0	17	<1.0	<1.0	<1.0	73	30
NBM 58-2	2	<2.0	<1.0	80	<1.0	<1.0	51 *<1.0*	25	27	2.5	<0.10	<1.0	18	<1.0	<1.0	<1.0	77	26
NBM 59-0	0	<2.0	<1.0	22	<1.0	<1.0	13	6.1	5.5	11	<0.10	<1.0	15	<1.0	<1.0	<1.0	19	29
NBM 61-1	1	<2.0	<1.0	46	<1.0	<1.0	68 *<1.0*	17	19	5.3	<0.10	<1.0	77	<1.0	<1.0	<1.0	38	39
NBM 62-2	2	<2.0	<1.0	59	<1.0	<1.0	98 *<1.0*	16	21	5.5	<0.10	<1.0	49	<1.0	<1.0	<1.0	42	52
NBM 64-2	2	<2.0	<1.0	110	<1.0	1.3	41	46	73	4.2	<0.10	<1.0	29	<1.0	<1.0	<1.0	60	24
NBM 66-0	0	<2.0	<1.0	64	<1.0	<1.0	33	14	15	72	<0.10	<1.0	44	<1.0	<1.0	<1.0	41	42
NBM 67-2	2	<2.0	<1.0	97	<2.0	<1.0	16	30	23	2.2	<0.10	<1.0	16	<1.0	<1.0	<1.0	47	30
NBM 68-1	1	<2.0	<1.0	76	<1.0	<1.0	37	26	19	4.3	<0.10	<1.0	21	<1.0	<1.0	<1.0	65	27
P1-0.0	0	<2.0	<1.0	110	<1.0	<1.0	38	27	18	8.2	<0.10	<1.0	23	<1.0	<1.0	<1.0	65	36
P1-1.5	1.5	<2.0	<1.0	120	<2.0	<1.0	35	32	21	2.8	<0.10	<1.0	22	<1.0	<1.0	<1.0	69	31

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Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
P2-0.0	0	<2.0	<1.0	73	<1.0	<1.0	26	24	15	9.8	<0.10	<1.0	9.4	<1.0	<1.0	<1.0	71	25
P2-1.5	1.5	<2.0	<1.0	66	<1.0	<1.0	28	26	15	2.2	<0.10	<1.0	9.4	<1.0	<1.0	<1.0	73	18
P3-0.0	0	<2.0	<1.0	50	<1.0	<1.0	34	17	31	12	<0.10	<1.0	11	<1.0	<1.0	<1.0	84	27
P3-1.5	1.5	<2.0	<1.0	45	<1.0	<1.0	32	17	33	1.9	<0.10	<1.0	11	<1.0	<1.0	<1.0	83	22
P4-0.0	0	<2.0	<1.0	79	<1.0	<1.0	34	18	35	11	<0.10	<1.0	13	<1.0	<1.0	<1.0	75	59
P4-1.5	1.5	<2.0	<1.0	73	<1.0	<1.0	36	18	38	1.5	<0.10	<1.0	14	<1.0	<1.0	<1.0	71	30
P5-0.0	0	<2.0	<1.0	91	<1.0	<1.0	35	22	47	5.3	<0.10	<1.0	17	<1.0	<1.0	<1.0	69	42
P5-1.5	1.5	<2.0	<1.0	86	<1.0	<1.0	33	26	46	1.1	<0.10	<1.0	18	<1.0	<1.0	<1.0	67	37
P6-0.0	0	<2.0	<1.0	77	<1.0	<1.0	58	29	31	3.3	<0.10	<1.0	48	<1.0	<1.0	<1.0	59	49
							<1.0											
P6-1.5	1.5	<2.0	<1.0	70	<1.0	<1.0	43	24	23	1.9	<0.10	<1.0	39	<1.0	<1.0	<1.0	48	45
P7-0.0	0	<2.0	<1.0	72	<1.0	<1.0	58	38	26	11	<0.10	<1.0	61	<1.0	<1.0	<1.0	47	45
							<1.0											
P7-1.5	1.5	<2.0	<1.0	61	<1.0	<1.0	58	34	28	2.1	<0.10	<1.0	58	<1.0	<1.0	<1.0	49	37
P8-0.0	0	<2.0	<1.0	49	<1.0	<1.0	49	29	31	11	<0.10	<1.0	63	<1.0	<1.0	<1.0	34	46
P8-1.5	1.5	<2.0	<1.0	31	<1.0	<1.0	44	25	36	1.4	<0.10	<1.0	58	<1.0	<1.0	<1.0	33	34
P9-0.0	0	<2.0	<1.0	94	<1.0	<1.0	46	21	28	13	<0.10	<1.0	36	<1.0	<1.0	<1.0	53	40
P9-1.5	1.5	<2.0	<1.0	95	<1.0	<1.0	47	30	25	2.1	<0.10	<1.0	41	<1.0	<1.0	<1.0	56	30
P10-0.0	0	<2.0	<1.0	100	<1.0	<1.0	58	16	27	20	<0.10	<1.0	43	<1.0	<1.0	<1.0	46	45
							<1.0											
P10-1.5	1.5	<2.0	<1.0	120	<1.0	<1.0	79	25	26	3.2	<0.10	<1.0	58	<1.0	<1.0	<1.0	60	34

TABLE 3
Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
P11-0.0	0	<2.0	1.4	97	<1.0	<1.0	52	19	15	14	<0.10	<1.0	46	<1.0	<1.0	<1.0	37	29
P11-1.5	1.5	<2.0	2.0	130	<1.0	<1.0	85	19	17	6.7	<0.10	<1.0	80	<1.0	<1.0	<1.0	51	25
							<1.0											
P12-0.0	0	2.6	2.1	130	<1.0	<1.0	130	22	34	13	<0.10	<1.0	180	<1.0	<1.0	<1.0	46	60
P12-1.5	1.5	2.8	<1.0	120	<1.0	<1.0	170	24	32	7.0	<0.10	<1.0	270	<1.0	<1.0	<1.0	52	56
							<1.0						*<1.0*					
P13-0.0	0	<2.0	3.7	160	<1.0	<1.0	63	19	32	16	<0.10	<1.0	95	<1.0	<1.0	<1.0	40	58
P13-1.5	1.5	<2.0	5.6	180	<1.0	<1.0	43	14	32	9.3	<0.10	<1.0	60	<1.0	<1.0	<1.0	37	43
P14-0.0	0	<2.0	<1.0	130	<1.0	<1.0	99	19	25	17	<0.10	<1.0	130	<1.0	<1.0	<1.0	46	50
P14-1.5	1.5	2.1	<1.0	160	<1.0	<1.0	120	23	23	7.5	<0.10	<1.0	170	<1.0	<1.0	<1.0	55	39
							<1.0											
P15-0.0	0	<2.0	<1.0	120	<1.0	<1.0	83	24	20	8.9	<0.10	<1.0	100	<1.0	<1.0	<1.0	54	42
P15-1.5	1.5	<2.0	<1.0	130	<1.0	<1.0	96	25	21	6.0	<0.10	<1.0	120	<1.0	<1.0	<1.0	55	35
							<1.0											
P16-0.0	0	2.1	<1.0	110	<1.0	<1.0	100	25	35	11	<0.10	<1.0	110	<1.0	<1.0	<1.0	55	47
P16-1.5	1.5	<2.0	<1.0	69	<1.0	<1.0	50	17	39	1.5	<0.10	<1.0	44	<1.0	<1.0	<1.0	65	25
P17-0.0	0	2.1	3.2	130	<1.0	<1.0	76	25	17	150	<0.10	<1.0	100	<1.0	<1.0	<1.0	46	32
P17-1.5	1.5	<2.0	2.7	150	<1.0	<1.0	95	23	15	6.1	<0.10	<1.0	120	<1.0	<1.0	<1.0	53	21
							<1.0											
P18-0.0	0	<2.0	2.9	170	<1.0	<1.0	75	19	28	11	0.25	<1.0	110	<1.0	<1.0	<1.0	43	53
P18-1.5	1.5	2.2	2.3	180	<1.0	<1.0	110	27	20	6.8	<0.10	<1.0	150	<1.0	<1.0	<1.0	53	31
							<1.0											

TABLE 3
Summary of CAM 17 Metals Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
P19-0.0	0	2.1	3.1	180	<1.0	<1.0	79	19	30	8.7	0.32	<1.0	120	<1.0	<1.0	<1.0	45	52
P19-1.5	1.5	<2.0	3.7	180	<1.0	<1.0	71	15	27	11	0.19	<1.0	100	<1.0	<1.0	<1.0	39	46
							<1.0											
P20-0.0	0	<2.0	3.0	170	<1.0	<1.0	70	17	27	7.5	0.24	<1.0	110	<1.0	<1.0	<1.0	40	48
P20-1.5	1.5	<2.0	2.9	160	<1.0	<1.0	67	15	25	10	0.39	<1.0	100	<1.0	<1.0	<1.0	38	45
							<1.0											
P21-0.0	0	<2.0	2.1	130	<1.0	<1.0	56	15	19	6.2	0.22	<1.0	81	<1.0	<1.0	<1.0	34	38
P21-1.5	1.5	<2.0	2.3	130	<1.0	<1.0	56	15	19	7.7	0.28	<1.0	84	<1.0	<1.0	<1.0	33	38
							<1.0											
ESLs																		
Residential Land Use		6.3	0.39	750	4.0	1.7	750	40	230	200	1.3	40	150	10	20	1.3	16	600
Comm/Ind Land Use		40	1.6	1,500	8.0	7.4	750	80	230	750	10	40	150	10	40	16	200	600
Construction Exposure		310	15	2,600	98	39	######	94	310,000	750	58	78	260	3,900	3,900	62	770	230,000
Hazardous Waste Criteria																		
TTLC		500	500	10,000	75	100	2,500*	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
STLC		15	5.0	100	0.75	1.0	5.0**	80	25	5.0	0.2	350	20	1.0	5.0	7.0	24	250
TCLP		---	5.0	100	---	1.0	6.0	---	---	5.0	0.2	---	---	1.0	5.0	---	---	---

Notes:

Results are shown in milligrams per kilogram (mg/kg).
Values listed for chromium are for Chromium III, as there is no standard for total chromium.
< = Analyte was not detected above the laboratory reporting limit.
ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, Revised May 2008.
TTLC = total threshold limit concentration
STLC = soluble threshold limit concentration
TCLP = toxicity characteristic leaching procedure
Soluble chromium and nickel concentrations shown in italics in mg/l

TABLE 4
Summary of Organics Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	BTEX (ug/kg)	MTBE (ug/kg)	Pesticides (ug/kg)
P1-0.0	0	---	3.2	18	---	---	ND
P1-1.5	1.5	<1.0	---	---	ND	<5.0	---
P2-0.0	0	---	3.8	18	---	---	---
P2-1.5	1.5	<1.0	---	---	ND	<5.0	---
P3-0.0	0	---	5.0	32	---	---	ND
P3-1.5	1.5	<1.0	---	---	ND	<5.0	---
P4-0.0	0	---	4.4	24	---	---	---
P4-1.5	1.5	<1.0	---	---	ND	<5.0	---
P5-0.0	0	---	3.1	16	---	---	ND
P5-1.5	1.5	<1.0	---	---	ND	<5.0	---
P6-0.0	0	---	1.8	5.5	---	---	---
P6-1.5	1.5	<1.0	---	---	ND	<5.0	---
P7-0.0	0	---	6.1	31	---	---	ND
P7-1.5	1.5	<1.0	---	---	ND	<5.0	---
P8-0.0	0	---	3.8	36	---	---	---
P8-1.5	1.5	<1.0	---	---	ND	<5.0	---
P9-0.0	0	---	2.4	9.3	---	---	ND
P9-1.5	1.5	<1.0	---	---	ND	<5.0	---

TABLE 4
Summary of Organics Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	BTEX (ug/kg)	MTBE (ug/kg)	Pesticides (ug/kg)
P10-0.0	0	---	13	91	---	---	---
P10-1.5	1.5	<1.0	---	---	ND	<5.0	---
P11-0.0	0	---	4.4	35	---	---	ND
P11-1.5	1.5	<1.0	---	---	ND	<5.0	---
P12-0.0	0	---	5.5	52	---	---	---
P12-1.5	1.5	<1.0	---	---	ND	<5.0	---
P13-0.0	0	---	4.3	34	---	---	ND
P13-1.5	1.5	<1.0	---	---	ND	<5.0	---
P14-0.0	0	---	6.0	44	---	---	---
P14-1.5	1.5	<1.0	---	---	ND	<5.0	---
P15-0.0	0	---	3.0	18	---	---	ND
P15-1.5	1.5	<1.0	---	---	ND	<5.0	---
P16-0.0	0	---	3.5	27	---	---	---
P16-1.5	1.5	<1.0	---	---	ND	<5.0	---
P17-0.0	0	---	3.4	17	---	---	ND
P17-1.5	1.5	<1.0	---	---	ND	<5.0	---
P18-0.0	0	---	4.7	17	---	---	---
P18-1.5	1.5	<1.0	---	---	ND	<5.0	---

TABLE 4
Summary of Organics Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	BTEX (ug/kg)	MTBE (ug/kg)	Pesticides (ug/kg)
P19-0.0	0	---	4.4	20	---	---	ND
P19-1.5	1.5	<1.0	---	---	ND	<5.0	---
P20-0.0	0	---	4.3	19	---	---	---
P20-1.5	1.5	<1.0	---	---	ND	<5.0	---
P21-0.0	0	---	5.4	20	---	---	ND
P21-1.5	1.5	<1.0	---	---	ND	<5.0	---
	ESLs						
	Residential	83	83	370	---	23	---
	Commercial/Industrial	83	83	2,500	---	23	---
	Construction Exposure	4,200	4,200	12,000	---	2,800,000	---

Notes:
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
BTEX = Benzene, toluene, ethylbenzene, and xylenes
MTBE = Methyl tert-butyl ether
--- = Not Analyzed or no standard for thi compound
< = Not detected above the stated laboratory reporting limit
ND = None detected
ESLs = Environmental Screening Levels

TABLE 5
Summary of Naturally Occurring Asbestos Results - Soil
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Sample Depth (ft)	Asbestos Content
P2-1.5	1.5	ND
P4-1.5	1.5	ND
P6-1.5	1.5	ND
P8-1.5	1.5	ND
P10-1.5	1.5	ND
P12-1.5	1.5	ND
P14-1.5	1.5	ND
P16-1.5	1.5	ND
P18-1.5	1.5	ND
P20-1.5	1.5	ND

Notes:
ND = none detected at 0.25% target analytical sensitivity

TABLE 6
Summary of CAM 17 Metals Results - Groundwater
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Private Property																	
PW1	0.019	0.25	3.7	<0.003	0.0082	0.78	0.12	0.38	0.12	0.0013	0.014	1.1	<0.010	<0.0030	<0.015	0.37	0.53
ESLs																	
GW is current/potential source	0.006	0.036	1.0	0.00053	0.00025	0.05	0.003	0.0031	0.0025	0.000025	0.035	0.0082	0.005	0.00019	0.002	0.015	0.081
N not current/potential source	0.030	0.036	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081
Surface Water - Freshwater	0.006	0.00014	1.0	0.0027	0.00025	0.05	0.003	0.009	0.0025	0.000025	0.035	0.052	0.005	0.00034	0.002	0.015	0.12
Surface Water - Marine	0.5	0.00014	1.0	0.00053	0.0093	0.18	0.003	0.0031	0.0056	0.000025	0.24	0.0082	0.071	0.00019	0.004	0.019	0.081
Surface Water - Estuarine	0.03	0.00014	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081

Notes:

Data are shown in units of milligrams per liter (mg/l).

--- = Not Analyzed or Not Applicable

< = Not detected above the stated laboratory reporting limit

ESLs = Environmental Screening Levels, Tables A, B, & F, SFRWQCB, May 2008.

Values listed for chromium are for Chromium III, as there is no standard for total chromium.

< = Analyte was not detected above the laboratory reporting limit.

TABLE 7
Summary of Petroleum Hydrocarbons Results - Groundwater
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Sample ID	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	BTEX (ug/l)	MTBE (ug/l)
PW1	<0.050	0.094	0.099	ND	<0.50
ESLs					
GW is current/potential source	0.10	0.10	0.10	---	5.0
GW not current/potential source	0.21	0.21	0.21	---	1,800
Surface Water - Freshwater	0.10	0.10	0.10	---	5.0
Surface Water - Marine	0.21	0.21	0.21	---	180
Surface Water - Estuarine	0.21	0.21	0.21	---	180

Notes:
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
BTEX = Benzene, toluene, ethylbenzene, and xylenes
MTBE = Methyl tert-butyl ether
--- = Not Analyzed
< = Not detected above the stated laboratory reporting limit
ND = None detected
ESLs = Environmental Screening Levels

TABLE 8a
Summary of Lead Statistical Analysis
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Northbound Shoulder (borings NBS 1 to NBS 31)

TOTAL LEAD UCLs

	Total Lead (mg/kg)	
	90% UCL	**95% UCL**
0 to 0.5 foot	190.6	206.3
1.0 to 1.5 feet	61.4	66.4
2.0 to 2.5 feet	29.2	31.6

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**WET Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 foot	190.6	8.5	206.3
Underlying Soil (1.0 to 2.5 feet)	*50.7*	*2.3*	*54.8*
0 to 2.0 feet	126	5.6	136
Underlying Soil (2.0 to 2.5 feet)	*29.2*	*1.3*	*31.6*
0 to 2.5 feet	107	4.7	115

Notes:
Weighted average values are based upon calculated UCLs for each depth interval.
UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: y = 0.0445 x

TABLE 8b
Summary of Lead Statistical Analysis
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Southbound Shoulder (borings SBS 32 to SBS 45 and SBS 70 to SBS 81)

TOTAL LEAD UCLs

	Total Lead (mg/kg)	
	90% UCL	**95% UCL**
0 to 0.5 foot	502.3	542.8
1.0 to 1.5 feet	27.3	29.1
2.0 to 2.5 feet	9.3	9.9

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**WET Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 foot	502.3	22.4	542.8
Underlying Soil (1.0 to 2.5 feet)	*21.3*	*0.9*	*22.7*
0 to 2.0 feet	265	11.8	286
Underlying Soil (2.0 to 2.5 feet)	*9.3*	*0.4*	*9.9*
0 to 2.5 feet	214	9.5	231

Notes:
Weighted average values are based upon calculated UCLs for each depth interval.
UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: y = 0.0445 x

TABLE 8c
Summary of Lead Statistical Analysis
US-101 Marin-Sonoma Narrows, Segment B3
Marin and Sonoma Counties, California

Median (borings NBM 46 to NBM 69)

TOTAL LEAD UCLs

	Total Lead (mg/kg)	
	90% UCL	**95% UCL**
0 to 0.5 foot	282.7	299.5
1.0 to 1.5 feet	52.8	59.8
2.0 to 2.5 feet	6.3	6.6

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**WET Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 foot	282.7	12.6	299.5
Underlying Soil (1.0 to 2.5 feet)	*37.3*	*1.7*	*42.1*
0 to 2.0 feet	168	7.5	180
Underlying Soil (2.0 to 2.5 feet)	*6.3*	*0.3*	*6.6*
0 to 2.5 feet	135	6.0	145

Notes:
Weighted average values are based upon calculated UCLs for each depth interval.
UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: y = 0.0445 x

APPENDIX A

California Environmental Protection Agency
Department of Toxic Substances Control

VARIANCE

Applicant Names:

State of California
Department of Transportation
(Caltrans)
1120 N Street
Sacramento, California 95814

Variance No. V09HQSCD006

Effective Date: July 1, 2009

Expiration Date: July 1, 2014

Modification History:

Pursuant to California Health and Safety Code, Section 25143, the Department of Toxic Substances Control hereby issues the attached Variance consisting of 9 pages to the Department of Transportation.

Beverly Rikala
Team Leader, Operating Facilities Team
Department of Toxic Substances Control

Date: 6/30/09

1. INTRODUCTION.

a) Pursuant to Health and Safety Code, section 25143, the California Department of Toxic Substances Control (DTSC) grants this variance to the applicant below for waste considered to be hazardous solely because of its lead concentrations and as further specified herein.

b) DTSC hereby grants this variance only from the requirements specified herein and only in accordance with all terms and conditions specified herein.

2. IDENTIFYING INFORMATION.

APPLICANT/OWNER/OPERATOR

State of California
Department of Transportation, (Caltrans)
All Districts

3. TYPE OF VARIANCE.

Generation, Manifest, Transportation, Storage and Disposal.

4. ISSUANCE AND EXPIRATION DATES.

DATE ISSUED: July 1, 2009 EXPIRATION DATE: July 1, 2014

5. APPLICABLE STATUTES AND REGULATIONS. The hazardous waste that is the subject of this variance is fully regulated under Health and Safety Code, section 25100, et seq. and California Code of Regulations, title 22, division 4.5 except as specifically identified in Section 8 of this variance.

6. DEFINITION. For purposes of this variance, "lead-contaminated soil(s)" shall mean soil that meets the criteria for hazardous waste but contains less than 3397 mg/kg total lead and is hazardous primarily because of aerially-deposited lead contamination associated with exhaust emissions from the operation of motor vehicles.

7. FINDINGS/DETERMINATIONS. DTSC has determined that the variance applicant meets the requirements set forth in Health and Safety Code, section 25143 for a variance from specific regulatory requirements as outlined in Section 8 of this variance. The specific determinations and findings made by DTSC are as follows:

a) Caltrans intends to excavate, stockpile, transport, bury and cover large volumes of soil associated with highway construction projects. In the more urbanized highway corridors around the State this soil is contaminated with lead, primarily due to historic emissions from automobile exhausts. In situ sampling and laboratory testing has shown that some of the soil contains concentrations of lead in excess of State regulatory thresholds, and thus any generated waste from disturbance of the soil

would be regulated as hazardous waste. Such soil contains a Total Threshold Limit Concentration (TTLC) of 1000 milligrams per kilogram (mg/kg) or more lead and/or it meets or exceeds the Soluble Threshold Limit Concentration (STLC) for lead of 5 milligrams per liter (mg/l). A Human Health Risk Assessment prepared for this variance concludes that soil contaminated with elevated concentrations of lead can be managed in a way that presents no significant risk to human health.

b) The lead-contaminated soil will be placed only in Caltrans' right-of-way. Depending on concentration levels, the wastes will be covered with a minimum thickness of one (1) foot of non-hazardous soil or asphalt/concrete cover and will always be at least five (5) feet above the highest groundwater elevation. Caltrans will assure that proper health and safety procedures will be followed for workers, including any persons engaged in maintenance work in areas where the waste has been buried and covered.

c) DTSC finds and requires that the lead-contaminated soil excavated, stockpiled, transported, buried and covered pursuant to this variance is a non-RCRA hazardous waste, and that the waste management activity is insignificant as a potential hazard to human health and safety and the environment, when managed in accordance with the conditions, limitations and other requirements specified in this variance.

8. PROVISIONS WAIVED.

Provided Caltrans meets the terms and conditions of this variance, DTSC waives the hazardous waste management requirements of Health and Safety Code, Chapter 6.5 and California Code of Regulations, title 22 for the lead-contaminated soil that Caltrans reuses in projects that would require Caltrans to obtain a permit for a disposal facility and any other generator requirements that concern the transportation, manifesting, storage and land disposal of hazardous waste.

9. SPECIFIC CONDITIONS, LIMITATIONS AND OTHER REQUIREMENTS.

In order for the provisions discussed in section 8 to be waived, lead-contaminated soil must not exceed the contaminant concentrations discussed below and Caltrans management practices must meet all the following conditions:

a) Caltrans implementation of this variance shall comply with all applicable state laws and regulations for water quality control, water quality control plans, waste discharge requirements (including storm water permits), and others issued by the State Water Resources Control Board (SWRCB) and/or a California Regional Water Quality Control Board (RWQCB). Caltrans shall provide written notification to the appropriate RWQCB at least 30 days prior to advertisement for bids of projects that involve invocation of this variance, or as otherwise negotiated with the SWRCB or appropriate RWQCB.

b) The waivers in this variance shall only be applied to lead-contaminated soil that is not a RCRA hazardous waste and is hazardous primarily because of aerially-

deposited lead contamination associated with exhaust emissions from the operation of motor vehicles. The variance is not applicable to any other hazardous waste.

c) Soil containing 1.5 mg/l extractable lead or less (based on a modified waste extraction test using deionized water as the extractant) and 1411 mg/kg or less total lead may be used as fill provided that the lead-contaminated soil is placed a minimum of five (5) feet above the maximum historic water table elevation and covered with at least one (1) foot of nonhazardous soil that will be maintained by Caltrans to prevent future erosion.

d) Soil containing 150 mg/L extractable lead or less (based on a modified waste extraction test using deionized water as the extractant) and 3397 mg/kg or less total lead may be used as fill provided that the lead-contaminated soils are placed a minimum of five (5) feet above the maximum historic water table elevation and protected from infiltration by a pavement structure which will be maintained by Caltrans.

e) Lead-contaminated soil with a pH less than 5.5 but greater than 5.0 shall only be used as fill material under the paved portion of the roadway. Lead-contaminated soil with a pH at or less than 5.0 shall be managed as a hazardous waste.

f) For each project that has the potential to generate waste by disturbing lead-contaminated soil (as defined in 6), Caltrans shall conduct sampling and analysis to adequately characterize the soils containing aerially deposited lead in the areas of planned excavation along the project route. Such sampling and analysis shall include the Toxicity Characteristic Leaching Procedure (TCLP) as prescribed by the United States Environmental Protection Agency to determine whether concentrations of contaminants in soil exceed federal criteria for classification as a hazardous waste.

g) Lead-contaminated soil managed pursuant to this variance shall not be moved outside the designated corridor boundaries (see paragraph t) below. All lead-contaminated soil not buried and covered within the same Caltrans corridor where it originated is not eligible for management under this variance and shall be managed as a hazardous waste.

h) Lead-contaminated soil managed pursuant to this variance shall not be placed in areas where it would become in contact with groundwater or surface water (such as streams and rivers).

i) Lead-contaminated soil managed pursuant to this variance shall be buried and covered only in locations that are protected from erosion that may result from storm water run-on and run-off.

j) The lead-contaminated soil shall be buried and covered in a manner that will prevent accidental or deliberate breach of the asphalt, concrete, and/or cover soil.

k) The presence of lead-contaminated soil shall be incorporated into the projects' as-built drawings. The as-built drawings shall be annotated with the location, representative analytical data, and volume of lead-contaminated soil. The as-built drawings shall also state the depth of the cover. These as-built drawings shall be retained by Caltrans.

l) Caltrans shall ensure that no other hazardous wastes, other than the lead-contaminated hazardous waste soil, are placed in the burial areas.

m) Lead-contaminated soil shall not be buried within ten (10) feet of culverts or locations subject to frequent worker exposure.

n) Excavated lead-contaminated soil not placed into the designated area (fill area, roadbed area) by the end of the working day shall be stockpiled and covered with sheets of polyethylene or at least one foot of non-hazardous soil. The lead-contaminated soil, while stockpiled or under transport, shall be protected from contacting surface water and from being dislodged or transported by wind or storm water. The stockpile covers shall be inspected at least once a week and within 24 hours after rainstorms. If the lead-contaminated soil is stockpiled for more than 4 days from the time of excavation, Caltrans shall restrict public access to the stockpile by using barriers that meet the safety requirements of the construction zone. The lead-contaminated soil shall be stockpiled for no more than 90 days from the time the soil is first excavated. If the contaminated soil is stockpiled beyond the 90 day limit Caltrans shall:

1. notify DTSC in writing of the 90 day exceedance and expected date of removal;
2. perform weekly inspections of the stockpiled material to ensure that there is adequate protection from run-on, runoff, public access, and wind dispersion; and
3. notify DTSC on weekly basis of the stockpile status until the stockpile is removed.

The lead-contaminated soil shall be stockpiled for no more than 180 days from the time the soil is first excavated.

o) Caltrans shall ensure that all stockpiling of lead-contaminated soil remains within the project area of the specified corridor. Stockpiling of lead-contaminated soil within the specified corridor, but outside the project area, is prohibited.

p) Caltrans shall conduct confirmatory sampling of any stockpile area in areas not known or expected to contain lead-contaminated soil after removal of the lead-contaminated soil to ensure that contamination has not been left behind or has not migrated from the stockpiled material to the surrounding soils.

q) Caltrans shall stockpile lead-contaminated soil only on high ground (i.e. no sump areas or low points) so that stockpiled soil will not come in contact with surface

water run-on or run-off.

r) Caltrans shall not stockpile lead-contaminated soil in environmentally and ecologically sensitive areas.

s) Caltrans shall ensure that storm/rain run-off that has come into contact with stockpiled lead-contaminated soil will not flow to storm drains, inlets, or waters of the State.

t) Caltrans may dispose of the lead-contaminated soil only within the operating right-of-way of an existing highway, as defined in Streets and Highways Code, section 23. Caltrans may move lead-contaminated soil from one Caltrans project to another Caltrans project only if the lead-contaminated soil remains within the same designated corridor.

Caltrans shall record any movement of lead-contaminated soil by using a bill of lading. The bill of lading must contain: 1) the US DOT description including shipping name, hazard class and ID number; 2) handling codes; 3) quantity of material; 4) volume of material; 5) date of shipment; 6) origin and destination of shipment; and 7) any specific handling instructions. The bill of lading shall be referenced in and kept on file with the project's as-built drawings. The lead-contaminated soil must be kept covered during transportation.

u) For each specific corridor where this variance is to be implemented, all of the following information shall be submitted in writing to DTSC at least five (5) days before construction of any project begins:

1. plan drawing designating the boundaries of the corridor where lead-contaminated soils will be excavated, stockpiled, buried and covered;

2. a list of the Caltrans projects that the corridor encompasses;

3. a list of Caltrans contractors that will be conducting any phase of work on any project affected by this variance;

4. duration of corridor construction;

5. location where sampling and analytical data used to make lead concentration level determinations are kept (e.g. a particular Caltrans project file);

6. name and phone number (including area code) of project resident engineer and project manager;

7. location where Caltrans and contractor health and safety plan and records are kept;

8. location of project special provisions (including page or section number) for soil excavation, transportation, stockpile, burial and placement of cover material;

9. location of project drawings (including drawing page number) for soil excavation, burial and placement of cover in plan and cross section (for example, "The project plans are located at the resident engineer's office located at 5th and Main Streets, City of Fresno, See pages xxxxx of contract xxxx");

10. updated information if a Caltrans project within the corridor is added, changed or deleted; and

11. type of environmental document prepared for each project, date of adoption, document title, Clearing House number and where the document is available for review. A copy of the Caltrans Categorical Exemption, Categorical Exclusion Form, or if filed, the Notice of Exemption for any project shall be submitted to the DTSC Headquarters Project Manager.

v) Changes in location of lead-contaminated soil placement, quantities or protection measures (field changes) shall be noted in the resident engineer's project log within five (5) days of the field change.

w) Caltrans shall ensure that field changes are in compliance with the requirements of this variance.

x) Operational procedures described in the California Environmental Quality Act (CEQA) Special Initial Study shall be followed by Caltrans for activities conducted under this variance.

y) Caltrans shall implement appropriate health and safety procedures to protect its employees and the public, and to prevent or minimize exposure to potentially hazardous wastes. A project-specific health and safety plan must be prepared and implemented. The monitoring and exposure standards shall be based on construction standards for exposure to lead in California Code of Regulations, title 8, section 1532.1.

z) Caltrans shall provide a district Coordinator for this variance. This Coordinator will be the primary point of contact for information flowing to, or received from, DTSC regarding any matter or submission under this variance. Caltrans shall promptly notify DTSC of the name of Coordinator and any change in the Coordinator.

aa) Caltrans shall conduct regular inspections, consistent with Caltrans' Maintenance Division's current Pavement Inspection and Slope Inspection programs, of the locations where lead-contaminated soil has been buried and/or covered pursuant to this variance. If site inspection reveals deterioration of cover so that conditions in the variance are not met, Caltrans shall repair or replace the cover.

bb) Caltrans shall develop and implement a record keeping mechanisms to record and retain permanent records of all locations where lead-contaminated soil has been buried per this variance. The records shall be made available to DTSC.

cc) If areas subject to the terms of this variance are sold, relinquished or abandoned (including roadways), all future property owners shall be notified in writing in advance by Caltrans of the requirements of this variance, and Caltrans shall provide the owner with a copy of the variance. A copy of such a notice shall be sent to DTSC and contain the corridor location and project. Caltrans shall also disclose to DTSC and the new owner the location of areas where lead-contaminated soil has been buried. Future property owners shall be subject to the same requirements as Caltrans.

dd) For the purposes of informing the public about instances where the variance is implemented, Caltrans shall:

1. maintain current fact sheets at all Caltrans resident engineer offices and the Caltrans District office. Caltrans shall make the fact sheets available to anyone expressing an interest in variance-related work.

2. maintain a binder(s) containing copies of all reports submitted to DTSC at the District office. Caltrans shall ensure that the binders are readily accessible to the public.

3. carry out the following actions when it identifies additional projects:

(A) notify the public via a display advertisement in a newspaper of general circulation in that area.

(B) update and distribute the fact sheet to the mailing list and repository locations.

ee) Lead-contaminated soil may be buried only in areas where access is limited or where lead-contaminated soil is covered and contained by a pavement structure.

ff) Dust containing lead-contaminated soil must be controlled. Water or dust palliative may be applied to control dust. If visible dust migration occurs, all excavation, stockpiling and truck loading and burying must be stopped. The granting of this variance confers no relief on Caltrans from compliance with the laws, regulations and requirements enforced by any local air district or the California Air Resources Board.

gg) Sampling and analysis is required to show the lead-contaminated soil meets the variance criteria. All sampling and analysis must be conducted in accordance with the appropriate methods specified in U.S. EPA SW-846.

hh) DTSC retains the right to require Caltrans or any future owner to remove, and properly dispose of, lead-contaminated soil in the event DTSC determines it is necessary for protection of public health, safety or the environment.

ii) DTSC finds that some projects involving lead-contaminated soil are joint projects between Caltrans and other government entities. In these joint projects, Caltrans may not be the lead agency implementing the project although Caltrans is still involved if the project occurs on its right-of-way.

Caltrans may invoke this variance for joint projects where Caltrans and local government entity are involved provided that 1) the project is within the Caltrans Right-of-Way; 2) Caltrans reviews/ oversees all phases of the project including design, contracting, environmental assessment, construction, operation, and maintenance; and 3) Caltrans oversees the project to verify all variance conditions are complied with. Caltrans will be fully responsible for the variance notification and implementation in these joint projects.

jj) All correspondence shall be directed to the following office:

Hazardous Waste Permitting
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

Attn: Caltrans Lead Variance Notification Unit

10. DISCLAIMER.

a) The issuance of this variance does not relieve Caltrans of the responsibility for compliance with Health and Safety Code, chapter 6.5, or the regulations adopted thereunder, and any other laws and regulations other than those specifically identified in Section 8 of this variance. Caltrans is subject to all terms and conditions herein. The granting of this variance confers no relief from compliance with any federal, State or local requirements other than those specifically provided herein.

b) The issuance of this variance does not release Caltrans from any liability associated with the handling of hazardous waste, except as specifically provided herein and subject to all terms and conditions of this variance.

11. VARIANCE MODIFICATION OR REVOCATION. This variance is subject to review at the discretion of DTSC and may be modified or revoked by DTSC upon change of ownership and at any other time pursuant to Health and Safety Code, section 25143.

12. CEQA DETERMINATION. DTSC adopted a Negative Declaration on June 30, 2009.

Approved:

6/30/09
Date

Beverly Rikala
Operating Facilities Team
Department of Toxic Substances Control

APPENDIX B

August 04, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119164

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on July 28, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119164

CASE NARRATIVE

Analytical Comments for Method 6010

Diltion was necessary for saamples 119164-078A, 119164-217A and 119164-235A, due to internal standard failure.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 119164-100AMSD, 119164-196AMS, 119164-201AMS and 119164-201AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 119164-011ADUP, 119164-026ADUP, 119164-048ADUP, 119164-050ADUP, 119164-099ADUP, 119164-099AMSD, 119164-100ADUP, 119164-100AMSD, 119164-112ADUP, 119164-145ADUP, 119164-196ADUP, 119164-196AMSD, 119164-201ADUP and 119164-212ADUP; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-001A	NBS 1-0	84	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-002A	NBS 1-1	13	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-003A	NBS 1-2	13	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-005A	NBS 2-1	120	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-006A	NBS 2-2	11	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-007A	NBS 3-0	85	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-008A	NBS 3-1	16	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-009A	NBS 3-2	6.5	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-010A	NBS 4-0	220	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-011A	NBS 4-1	23	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-014A	NBS 5-1	6.4	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-015A	NBS 5-2	11	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-016A	NBS 6-0	15	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-018A	NBS 6-2	ND	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-019A	NBS 7-0	140	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-020A	NBS 7-1	15	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-021A	NBS 7-2	11	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-022A	NBS 8-0	230	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-023A	NBS 8-1	11	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-026A	NBS 9-1	19	mg/Kg	74673	5.0	1	7/26/2011	8/2/2011
119164-027A	NBS 9-2	5.9	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-028A	NBS 10-0	7.0	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-029A	NBS 10-1	160	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-030A	NBS 10-2	6.7	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-031A	NBS 11-0	16	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-033A	NBS 11-2	100	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-034A	NBS 12-0	120	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-035A	NBS 12-1	380	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-037A	NBS 13-0	29	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-038A	NBS 13-1	34	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-039A	NBS 13-2	55	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-041A	NBS 14-1	6.4	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-042A	NBS 14-2	7.2	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-043A	NBS 15-0	58	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-044A	NBS 15-1	180	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-045A	NBS 15-2	180	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-046A	NBS 16-0	1200	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-047A	NBS 16-1	55	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-049A	NBS 17-0	530	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-050A	NBS 17-1	13	mg/Kg	74626	5.0	1	7/26/2011	8/1/2011
119164-051A	NBS 17-2	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-052A	NBS 18-0	74	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-054A	NBS 18-2	120	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-056A	NBS 19-1	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-057A	NBS 19-2	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-058A	NBS 20-0	60	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-059A	NBS 20-1	7.5	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-060A	NBS 20-2	5.1	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-062A	NBS 21-1	5.1	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-063A	NBS 21-2	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-064A	NBS 22-0	59	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-065A	NBS 22-1	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-067A	NBS 23-0	310	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-068A	NBS 23-1	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-069A	NBS 23-2	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-070A	NBS 24-0	35	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-071A	NBS 24-1	150	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-072A	NBS 24-2	24	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-073A	NBS 25-0	96	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-074A	NBS 25-1	ND	mg/Kg	74627	5.0	1	7/26/2011	8/1/2011
119164-075A	NBS 25-2	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-076A	NBS 26-0	100	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-077A	NBS 26-1	7.5	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-080A	NBS 27-1	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-081A	NBS 27-2	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-082A	NBS 28-0	130	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-084A	NBS 28-2	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-085A	NBS 29-0	270	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-086A	NBS 29-1	10	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-088A	NBS 30-0	200	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-089A	NBS 30-1	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-090A	NBS 30-2	5.9	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
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Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-091A	NBS 31-0	36	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-092A	NBS 31-1	5.8	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-093A	NBS 31-2	ND	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-094A	SBS 32-0	380	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-095A	SBS 32-1	24	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-097A	SBS 33-0	40	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-098A	SBS 33-1	86	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-099A	SBS 33-2	37	mg/Kg	74628	5.0	1	7/26/2011	8/1/2011
119164-101A	SBS 34-1	84	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-102A	SBS 34-2	5.6	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-103A	SBS 35-0	68	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-105A	SBS 35-2	ND	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-107A	SBS 36-1	100	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-108A	SBS 36-2	20	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-109A	SBS 37-0	120	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-110A	SBS 37-1	14	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-111A	SBS 37-2	ND	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-112A	SBS 38-0	64	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-113A	SBS 38-1	14	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-115A	SBS 39-0	210	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-116A	SBS 39-1	39	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-117A	SBS 39-2	9.5	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-119A	SBS 40-1	15	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-120A	SBS 40-2	5.1	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-121A	SBS 41-0	35	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-122A	SBS 41-1	ND	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-125A	SBS 42-1	ND	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-126A	SBS 42-2	ND	mg/Kg	74629	5.0	1	7/26/2011	8/1/2011
119164-127A	SBS 43-0	40	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-128A	SBS 43-1	5.5	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-129A	SBS 43-2	ND	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-130A	SBS 44-0	47	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-132A	SBS 44-2	ND	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-133A	SBS 45-0	170	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-134A	SBS 45-1	17	mg/Kg	74630	5.0	1	7/26/2011	8/1/2011
119164-136A	NBM 46-0	120	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-137A	NBM 46-1	11	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-138A	NBM 46-2	11	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-139A	NBM 47-0	220	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-140A	NBM 47-1	8.7	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-142A	NBM 48-0	37	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-143A	NBM 48-1	6.3	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-144A	NBM 48-2	ND	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-146A	NBM 49-1	8.2	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-147A	NBM 49-2	7.9	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-148A	NBM 50-0	170	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-149A	NBM 50-1	ND	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-150A	NBM 50-2	ND	mg/Kg	74630	5.0	1	7/27/2011	8/1/2011
119164-151A	NBM 51-0	160	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-153A	NBM 51-2	11	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-155A	NBM 52-1	240	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-156A	NBM 52-2	11	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-157A	NBM 53-0	220	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-158A	NBM 53-1	6.6	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-159A	NBM 53-2	ND	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-160A	NBM 54-0	390	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-161A	NBM 54-1	16	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-162A	NBM 54-2	7.6	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-164A	NBM 55-1	6.1	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-165A	NBM 55-2	ND	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-166A	NBM 56-0	190	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-167A	NBM 56-1	5.2	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-169A	NBM 57-0	1100	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-170A	NBM 57-1	6.2	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-171A	NBM 57-2	ND	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-172A	NBM 58-0	250	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-173A	NBM 58-1	ND	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-176A	NBM 59-1	ND	mg/Kg	74631	5.0	1	7/27/2011	8/1/2011
119164-177A	NBM 59-2	ND	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-178A	NBM 60-0	440	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-179A	NBM 60-1	ND	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-180A	NBM 60-2	15	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-181A	NBM 61-0	47	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-183A	NBM 61-2	9.9	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-184A	NBM 62-0	350	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-185A	NBM 62-1	25	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-187A	NBM 63-0	400	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-188A	NBM 63-1	5.7	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-189A	NBM 63-2	ND	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-190A	NBM 64-0	360	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-191A	NBM 64-1	7.0	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-193A	NBM 65-0	210	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-194A	NBM 65-1	340	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-195A	NBM 65-2	8.0	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-197A	NBM 66-1	ND	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-198A	NBM 66-2	ND	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-199A	NBM 67-0	360	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-200A	NBM 67-1	5.4	mg/Kg	74632	5.0	1	7/27/2011	8/1/2011
119164-202A	NBM 68-0	86	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-204A	NBM 68-2	ND	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-205A	NBM 69-0	150	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-206A	NBM 69-1	54	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-207A	NBM 69-2	ND	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-208A	SBS 70-0	45	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-209A	SBS 70-1	14	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-210A	SBS 70-2	12	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-211A	SBS 71-0	180	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-212A	SBS 71-1	8.8	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-214A	SBS 72-0	16	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-215A	SBS 72-1	5.5	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-216A	SBS 72-2	6.0	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-218A	SBS 73-1	ND	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-219A	SBS 73-2	8.9	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-220A	SBS 74-0	210	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-221A	SBS 74-1	6.7	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-222A	SBS 74-2	6.0	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-223A	SBS 75-0	240	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011
119164-224A	SBS 75-1	5.8	mg/Kg	74633	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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Advanced Technology Laboratories

Date: 8/4/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-226A	SBS 76-0	340	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-228A	SBS 76-2	7.6	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-229A	SBS 77-0	190	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-230A	SBS 77-1	7.6	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-231A	SBS 77-2	14	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-232A	SBS 78-0	170	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-233A	SBS 78-1	5.1	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-236A	SBS 79-1	9.5	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-237A	SBS 79-2	ND	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-238A	SBS 80-0	150	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-239A	SBS 80-1	33	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-240A	SBS 80-2	7.7	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-241A	SBS 81-0	500	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011
119164-243A	SBS 81-2	5.8	mg/Kg	74634	5.0	1	7/27/2011	8/1/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 2-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 01:31 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Barium	120	1.0		mg/Kg	1	8/2/2011 01:31 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Chromium	58	1.0		mg/Kg	1	8/2/2011 01:31 PM
Cobalt	14	1.0		mg/Kg	1	8/2/2011 01:31 PM
Copper	28	2.0		mg/Kg	1	8/2/2011 01:31 PM
Lead	22	1.0		mg/Kg	1	8/2/2011 01:31 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Nickel	89	1.0		mg/Kg	1	8/2/2011 01:31 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:31 PM
Vanadium	39	1.0		mg/Kg	1	8/2/2011 01:31 PM
Zinc	62	1.0		mg/Kg	1	8/2/2011 01:31 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	0.12	0.10		mg/Kg	1	8/2/2011 04:18 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 4-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 01:43 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Barium	340	1.0		mg/Kg	1	8/2/2011 01:43 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Chromium	27	1.0		mg/Kg	1	8/2/2011 01:43 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 01:43 PM
Copper	22	2.0		mg/Kg	1	8/2/2011 01:43 PM
Lead	7.8	1.0		mg/Kg	1	8/2/2011 01:43 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Nickel	47	1.0		mg/Kg	1	8/2/2011 01:43 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:43 PM
Vanadium	30	1.0		mg/Kg	1	8/2/2011 01:43 PM
Zinc	56	1.0		mg/Kg	1	8/2/2011 01:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:20 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 5-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 01:47 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Barium	63	1.0		mg/Kg	1	8/2/2011 01:47 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Chromium	45	1.0		mg/Kg	1	8/2/2011 01:47 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 01:47 PM
Copper	19	2.0		mg/Kg	1	8/2/2011 01:47 PM
Lead	21	1.0		mg/Kg	1	8/2/2011 01:47 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Nickel	56	1.0		mg/Kg	1	8/2/2011 01:47 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:47 PM
Vanadium	44	1.0		mg/Kg	1	8/2/2011 01:47 PM
Zinc	48	1.0		mg/Kg	1	8/2/2011 01:47 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 6-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-017A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	3.8	2.0		mg/Kg	1	8/2/2011 01:50 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Barium	5.9	1.0		mg/Kg	1	8/2/2011 01:50 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Chromium	270	1.0		mg/Kg	1	8/2/2011 01:50 PM
Cobalt	36	1.0		mg/Kg	1	8/2/2011 01:50 PM
Copper	41	2.0		mg/Kg	1	8/2/2011 01:50 PM
Lead	6.8	1.0		mg/Kg	1	8/2/2011 01:50 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Nickel	400	1.0		mg/Kg	1	8/2/2011 01:50 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:50 PM
Vanadium	73	1.0		mg/Kg	1	8/2/2011 01:50 PM
Zinc	69	1.0		mg/Kg	1	8/2/2011 01:50 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:24 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 8-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-024A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 01:54 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Barium	180	1.0		mg/Kg	1	8/2/2011 01:54 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Chromium	72	1.0		mg/Kg	1	8/2/2011 01:54 PM
Cobalt	16	1.0		mg/Kg	1	8/2/2011 01:54 PM
Copper	24	2.0		mg/Kg	1	8/2/2011 01:54 PM
Lead	7.6	1.0		mg/Kg	1	8/2/2011 01:54 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Nickel	98	1.0		mg/Kg	1	8/2/2011 01:54 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:54 PM
Vanadium	38	1.0		mg/Kg	1	8/2/2011 01:54 PM
Zinc	49	1.0		mg/Kg	1	8/2/2011 01:54 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:30 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 9-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-025A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 01:58 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Barium	81	1.0		mg/Kg	1	8/2/2011 01:58 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Chromium	51	1.0		mg/Kg	1	8/2/2011 01:58 PM
Cobalt	19	1.0		mg/Kg	1	8/2/2011 01:58 PM
Copper	28	2.0		mg/Kg	1	8/2/2011 01:58 PM
Lead	43	1.0		mg/Kg	1	8/2/2011 01:58 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Nickel	72	1.0		mg/Kg	1	8/2/2011 01:58 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 01:58 PM
Vanadium	49	1.0		mg/Kg	1	8/2/2011 01:58 PM
Zinc	46	1.0		mg/Kg	1	8/2/2011 01:58 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 11-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-032A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:01 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Barium	79	1.0		mg/Kg	1	8/2/2011 02:01 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Chromium	59	1.0		mg/Kg	1	8/2/2011 02:01 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 02:01 PM
Copper	20	2.0		mg/Kg	1	8/2/2011 02:01 PM
Lead	32	1.0		mg/Kg	1	8/2/2011 02:01 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Nickel	77	1.0		mg/Kg	1	8/2/2011 02:01 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:01 PM
Vanadium	44	1.0		mg/Kg	1	8/2/2011 02:01 PM
Zinc	47	1.0		mg/Kg	1	8/2/2011 02:01 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	0.20	0.10		mg/Kg	1	8/2/2011 04:34 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 12-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-036A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:05 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Barium	58	1.0		mg/Kg	1	8/2/2011 02:05 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Chromium	28	1.0		mg/Kg	1	8/2/2011 02:05 PM
Cobalt	13	1.0		mg/Kg	1	8/2/2011 02:05 PM
Copper	30	2.0		mg/Kg	1	8/2/2011 02:05 PM
Lead	2.7	1.0		mg/Kg	1	8/2/2011 02:05 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Nickel	13	1.0		mg/Kg	1	8/2/2011 02:05 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:05 PM
Vanadium	61	1.0		mg/Kg	1	8/2/2011 02:05 PM
Zinc	22	1.0		mg/Kg	1	8/2/2011 02:05 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:36 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 14-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-040A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:08 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Barium	95	1.0		mg/Kg	1	8/2/2011 02:08 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Chromium	41	1.0		mg/Kg	1	8/2/2011 02:08 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 02:08 PM
Copper	28	2.0		mg/Kg	1	8/2/2011 02:08 PM
Lead	120	1.0		mg/Kg	1	8/2/2011 02:08 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Nickel	48	1.0		mg/Kg	1	8/2/2011 02:08 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:08 PM
Vanadium	43	1.0		mg/Kg	1	8/2/2011 02:08 PM
Zinc	71	1.0		mg/Kg	1	8/2/2011 02:08 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	0.18	0.10		mg/Kg	1	8/2/2011 04:38 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 16-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-048A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802C	QC Batch: 74653			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:11 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Barium	66	1.0		mg/Kg	1	8/2/2011 02:11 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Chromium	32	1.0		mg/Kg	1	8/2/2011 02:11 PM
Cobalt	21	1.0		mg/Kg	1	8/2/2011 02:11 PM
Copper	26	2.0		mg/Kg	1	8/2/2011 02:11 PM
Lead	7.0	1.0		mg/Kg	1	8/2/2011 02:11 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Nickel	33	1.0		mg/Kg	1	8/2/2011 02:11 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:11 PM
Vanadium	47	1.0		mg/Kg	1	8/2/2011 02:11 PM
Zinc	46	1.0		mg/Kg	1	8/2/2011 02:11 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802E	QC Batch: 74658			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:13 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 18-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-053A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:38 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Barium	53	1.0		mg/Kg	1	8/2/2011 02:38 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Chromium	38	1.0		mg/Kg	1	8/2/2011 02:38 PM
Cobalt	19	1.0		mg/Kg	1	8/2/2011 02:38 PM
Copper	19	2.0		mg/Kg	1	8/2/2011 02:38 PM
Lead	34	1.0		mg/Kg	1	8/2/2011 02:38 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Nickel	43	1.0		mg/Kg	1	8/2/2011 02:38 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:38 PM
Vanadium	52	1.0		mg/Kg	1	8/2/2011 02:38 PM
Zinc	33	1.0		mg/Kg	1	8/2/2011 02:38 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:03 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 19-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-055A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:41 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Barium	86	1.0		mg/Kg	1	8/2/2011 02:41 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Chromium	41	1.0		mg/Kg	1	8/2/2011 02:41 PM
Cobalt	21	1.0		mg/Kg	1	8/2/2011 02:41 PM
Copper	32	2.0		mg/Kg	1	8/2/2011 02:41 PM
Lead	34	1.0		mg/Kg	1	8/2/2011 02:41 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Nickel	21	1.0		mg/Kg	1	8/2/2011 02:41 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:41 PM
Vanadium	79	1.0		mg/Kg	1	8/2/2011 02:41 PM
Zinc	35	1.0		mg/Kg	1	8/2/2011 02:41 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 21-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-061A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:45 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Barium	160	1.0		mg/Kg	1	8/2/2011 02:45 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Chromium	55	1.0		mg/Kg	1	8/2/2011 02:45 PM
Cobalt	29	1.0		mg/Kg	1	8/2/2011 02:45 PM
Copper	24	2.0		mg/Kg	1	8/2/2011 02:45 PM
Lead	4.9	1.0		mg/Kg	1	8/2/2011 02:45 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Nickel	60	1.0		mg/Kg	1	8/2/2011 02:45 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:45 PM
Vanadium	49	1.0		mg/Kg	1	8/2/2011 02:45 PM
Zinc	50	1.0		mg/Kg	1	8/2/2011 02:45 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 22-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-066A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:48 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Barium	180	1.0		mg/Kg	1	8/2/2011 02:48 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Chromium	51	1.0		mg/Kg	1	8/2/2011 02:48 PM
Cobalt	22	1.0		mg/Kg	1	8/2/2011 02:48 PM
Copper	32	2.0		mg/Kg	1	8/2/2011 02:48 PM
Lead	2.9	1.0		mg/Kg	1	8/2/2011 02:48 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Nickel	39	1.0		mg/Kg	1	8/2/2011 02:48 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:48 PM
Vanadium	34	1.0		mg/Kg	1	8/2/2011 02:48 PM
Zinc	53	1.0		mg/Kg	1	8/2/2011 02:48 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 26-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-078A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	10		mg/Kg	5	8/2/2011 03:33 PM
Arsenic	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Barium	78	5.0		mg/Kg	5	8/2/2011 03:33 PM
Beryllium	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Cadmium	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Chromium	47	5.0		mg/Kg	5	8/2/2011 03:33 PM
Cobalt	39	5.0		mg/Kg	5	8/2/2011 03:33 PM
Copper	20	10		mg/Kg	5	8/2/2011 03:33 PM
Lead	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Molybdenum	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Nickel	51	5.0		mg/Kg	5	8/2/2011 03:33 PM
Selenium	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Silver	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Thallium	ND	5.0		mg/Kg	5	8/2/2011 03:33 PM
Vanadium	50	5.0		mg/Kg	5	8/2/2011 03:33 PM
Zinc	51	5.0		mg/Kg	5	8/2/2011 03:33 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 27-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-079A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 02:59 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Barium	59	1.0		mg/Kg	1	8/2/2011 02:59 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Chromium	42	1.0		mg/Kg	1	8/2/2011 02:59 PM
Cobalt	22	1.0		mg/Kg	1	8/2/2011 02:59 PM
Copper	16	2.0		mg/Kg	1	8/2/2011 02:59 PM
Lead	9.5	1.0		mg/Kg	1	8/2/2011 02:59 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Nickel	42	1.0		mg/Kg	1	8/2/2011 02:59 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 02:59 PM
Vanadium	42	1.0		mg/Kg	1	8/2/2011 02:59 PM
Zinc	44	1.0		mg/Kg	1	8/2/2011 02:59 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 28-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-083A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:09 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Barium	110	1.0		mg/Kg	1	8/2/2011 03:09 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Chromium	110	1.0		mg/Kg	1	8/2/2011 03:09 PM
Cobalt	26	1.0		mg/Kg	1	8/2/2011 03:09 PM
Copper	22	2.0		mg/Kg	1	8/2/2011 03:09 PM
Lead	4.9	1.0		mg/Kg	1	8/2/2011 03:09 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Nickel	150	1.0		mg/Kg	1	8/2/2011 03:09 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:09 PM
Vanadium	51	1.0		mg/Kg	1	8/2/2011 03:09 PM
Zinc	37	1.0		mg/Kg	1	8/2/2011 03:09 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBS 29-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-087A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:13 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Barium	150	1.0		mg/Kg	1	8/2/2011 03:13 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Chromium	43	1.0		mg/Kg	1	8/2/2011 03:13 PM
Cobalt	17	1.0		mg/Kg	1	8/2/2011 03:13 PM
Copper	34	2.0		mg/Kg	1	8/2/2011 03:13 PM
Lead	8.7	1.0		mg/Kg	1	8/2/2011 03:13 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Nickel	45	1.0		mg/Kg	1	8/2/2011 03:13 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:13 PM
Vanadium	46	1.0		mg/Kg	1	8/2/2011 03:13 PM
Zinc	58	1.0		mg/Kg	1	8/2/2011 03:13 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 32-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-096A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:16 PM
Arsenic	1.4	1.0		mg/Kg	1	8/2/2011 03:16 PM
Barium	100	1.0		mg/Kg	1	8/2/2011 03:16 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Chromium	46	1.0		mg/Kg	1	8/2/2011 03:16 PM
Cobalt	25	1.0		mg/Kg	1	8/2/2011 03:16 PM
Copper	20	2.0		mg/Kg	1	8/2/2011 03:16 PM
Lead	8.3	1.0		mg/Kg	1	8/2/2011 03:16 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Nickel	31	1.0		mg/Kg	1	8/2/2011 03:16 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:16 PM
Vanadium	54	1.0		mg/Kg	1	8/2/2011 03:16 PM
Zinc	35	1.0		mg/Kg	1	8/2/2011 03:16 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:40 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 34-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-100A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802D	QC Batch: 74654			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:20 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Barium	81	1.0		mg/Kg	1	8/2/2011 03:20 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Chromium	45	1.0		mg/Kg	1	8/2/2011 03:20 PM
Cobalt	19	1.0		mg/Kg	1	8/2/2011 03:20 PM
Copper	26	2.0		mg/Kg	1	8/2/2011 03:20 PM
Lead	110	1.0		mg/Kg	1	8/2/2011 03:20 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Nickel	53	1.0		mg/Kg	1	8/2/2011 03:20 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:20 PM
Vanadium	37	1.0		mg/Kg	1	8/2/2011 03:20 PM
Zinc	60	1.0		mg/Kg	1	8/2/2011 03:20 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802B	QC Batch: 74659			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 04:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 35-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-104A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:52 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Barium	110	1.0		mg/Kg	1	8/2/2011 03:52 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Chromium	48	1.0		mg/Kg	1	8/2/2011 03:52 PM
Cobalt	37	1.0		mg/Kg	1	8/2/2011 03:52 PM
Copper	18	2.0		mg/Kg	1	8/2/2011 03:52 PM
Lead	3.7	1.0		mg/Kg	1	8/2/2011 03:52 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Nickel	45	1.0		mg/Kg	1	8/2/2011 03:52 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:52 PM
Vanadium	53	1.0		mg/Kg	1	8/2/2011 03:52 PM
Zinc	29	1.0		mg/Kg	1	8/2/2011 03:52 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 36-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-106A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:55 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Barium	80	1.0		mg/Kg	1	8/2/2011 03:55 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Chromium	53	1.0		mg/Kg	1	8/2/2011 03:55 PM
Cobalt	21	1.0		mg/Kg	1	8/2/2011 03:55 PM
Copper	18	2.0		mg/Kg	1	8/2/2011 03:55 PM
Lead	39	1.0		mg/Kg	1	8/2/2011 03:55 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Nickel	42	1.0		mg/Kg	1	8/2/2011 03:55 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:55 PM
Vanadium	45	1.0		mg/Kg	1	8/2/2011 03:55 PM
Zinc	47	1.0		mg/Kg	1	8/2/2011 03:55 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 38-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-114A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 03:58 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Barium	100	1.0		mg/Kg	1	8/2/2011 03:58 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Chromium	48	1.0		mg/Kg	1	8/2/2011 03:58 PM
Cobalt	20	1.0		mg/Kg	1	8/2/2011 03:58 PM
Copper	12	2.0		mg/Kg	1	8/2/2011 03:58 PM
Lead	4.2	1.0		mg/Kg	1	8/2/2011 03:58 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Nickel	34	1.0		mg/Kg	1	8/2/2011 03:58 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 03:58 PM
Vanadium	54	1.0		mg/Kg	1	8/2/2011 03:58 PM
Zinc	24	1.0		mg/Kg	1	8/2/2011 03:58 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 40-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-118A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:02 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Barium	120	1.0		mg/Kg	1	8/2/2011 04:02 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Chromium	18	1.0		mg/Kg	1	8/2/2011 04:02 PM
Cobalt	13	1.0		mg/Kg	1	8/2/2011 04:02 PM
Copper	13	2.0		mg/Kg	1	8/2/2011 04:02 PM
Lead	220	1.0		mg/Kg	1	8/2/2011 04:02 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Nickel	13	1.0		mg/Kg	1	8/2/2011 04:02 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:02 PM
Vanadium	28	1.0		mg/Kg	1	8/2/2011 04:02 PM
Zinc	42	1.0		mg/Kg	1	8/2/2011 04:02 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:07 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 41-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-123A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:05 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Barium	39	1.0		mg/Kg	1	8/2/2011 04:05 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Chromium	26	1.0		mg/Kg	1	8/2/2011 04:05 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 04:05 PM
Copper	13	2.0		mg/Kg	1	8/2/2011 04:05 PM
Lead	3.5	1.0		mg/Kg	1	8/2/2011 04:05 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Nickel	17	1.0		mg/Kg	1	8/2/2011 04:05 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:05 PM
Vanadium	46	1.0		mg/Kg	1	8/2/2011 04:05 PM
Zinc	23	1.0		mg/Kg	1	8/2/2011 04:05 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 42-0
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-124A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:08 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Barium	160	1.0		mg/Kg	1	8/2/2011 04:08 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Cadmium	1.1	1.0		mg/Kg	1	8/2/2011 04:08 PM
Chromium	35	1.0		mg/Kg	1	8/2/2011 04:08 PM
Cobalt	16	1.0		mg/Kg	1	8/2/2011 04:08 PM
Copper	39	2.0		mg/Kg	1	8/2/2011 04:08 PM
Lead	2800	1.0		mg/Kg	1	8/2/2011 04:08 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Nickel	41	1.0		mg/Kg	1	8/2/2011 04:08 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:08 PM
Vanadium	35	1.0		mg/Kg	1	8/2/2011 04:08 PM
Zinc	240	1.0		mg/Kg	1	8/2/2011 04:08 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 44-1
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-131A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:12 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Barium	73	1.0		mg/Kg	1	8/2/2011 04:12 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Chromium	27	1.0		mg/Kg	1	8/2/2011 04:12 PM
Cobalt	21	1.0		mg/Kg	1	8/2/2011 04:12 PM
Copper	26	2.0		mg/Kg	1	8/2/2011 04:12 PM
Lead	8.6	1.0		mg/Kg	1	8/2/2011 04:12 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Nickel	19	1.0		mg/Kg	1	8/2/2011 04:12 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:12 PM
Vanadium	64	1.0		mg/Kg	1	8/2/2011 04:12 PM
Zinc	39	1.0		mg/Kg	1	8/2/2011 04:12 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:15 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 45-2
Lab Order:	119164	**Collection Date:**	7/26/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-135A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:43 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Barium	77	1.0		mg/Kg	1	8/2/2011 04:43 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Chromium	38	1.0		mg/Kg	1	8/2/2011 04:43 PM
Cobalt	29	1.0		mg/Kg	1	8/2/2011 04:43 PM
Copper	35	2.0		mg/Kg	1	8/2/2011 04:43 PM
Lead	3.5	1.0		mg/Kg	1	8/2/2011 04:43 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Nickel	20	1.0		mg/Kg	1	8/2/2011 04:43 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:43 PM
Vanadium	92	1.0		mg/Kg	1	8/2/2011 04:43 PM
Zinc	30	1.0		mg/Kg	1	8/2/2011 04:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:17 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 47-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-141A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	2.1	2.0		mg/Kg	1	8/2/2011 04:19 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Barium	13	1.0		mg/Kg	1	8/2/2011 04:19 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Chromium	160	1.0		mg/Kg	1	8/2/2011 04:19 PM
Cobalt	23	1.0		mg/Kg	1	8/2/2011 04:19 PM
Copper	44	2.0		mg/Kg	1	8/2/2011 04:19 PM
Lead	4.8	1.0		mg/Kg	1	8/2/2011 04:19 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Nickel	250	1.0		mg/Kg	1	8/2/2011 04:19 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:19 PM
Vanadium	65	1.0		mg/Kg	1	8/2/2011 04:19 PM
Zinc	58	1.0		mg/Kg	1	8/2/2011 04:19 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 49-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-145A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802E	QC Batch: 74655			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:22 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Barium	57	1.0		mg/Kg	1	8/2/2011 04:22 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Chromium	30	1.0		mg/Kg	1	8/2/2011 04:22 PM
Cobalt	14	1.0		mg/Kg	1	8/2/2011 04:22 PM
Copper	17	2.0		mg/Kg	1	8/2/2011 04:22 PM
Lead	24	1.0		mg/Kg	1	8/2/2011 04:22 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Nickel	33	1.0		mg/Kg	1	8/2/2011 04:22 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:22 PM
Vanadium	41	1.0		mg/Kg	1	8/2/2011 04:22 PM
Zinc	37	1.0		mg/Kg	1	8/2/2011 04:22 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802C	QC Batch: 74660			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 05:52 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 51-1
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-152A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:53 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Barium	88	1.0		mg/Kg	1	8/2/2011 04:53 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Chromium	44	1.0		mg/Kg	1	8/2/2011 04:53 PM
Cobalt	25	1.0		mg/Kg	1	8/2/2011 04:53 PM
Copper	31	2.0		mg/Kg	1	8/2/2011 04:53 PM
Lead	4.1	1.0		mg/Kg	1	8/2/2011 04:53 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Nickel	54	1.0		mg/Kg	1	8/2/2011 04:53 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:53 PM
Vanadium	48	1.0		mg/Kg	1	8/2/2011 04:53 PM
Zinc	39	1.0		mg/Kg	1	8/2/2011 04:53 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 52-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-154A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 04:57 PM
Arsenic	1.7	1.0		mg/Kg	1	8/2/2011 04:57 PM
Barium	83	1.0		mg/Kg	1	8/2/2011 04:57 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Chromium	44	1.0		mg/Kg	1	8/2/2011 04:57 PM
Cobalt	11	1.0		mg/Kg	1	8/2/2011 04:57 PM
Copper	13	2.0		mg/Kg	1	8/2/2011 04:57 PM
Lead	5.3	1.0		mg/Kg	1	8/2/2011 04:57 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Nickel	48	1.0		mg/Kg	1	8/2/2011 04:57 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 04:57 PM
Vanadium	39	1.0		mg/Kg	1	8/2/2011 04:57 PM
Zinc	37	1.0		mg/Kg	1	8/2/2011 04:57 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	0.18	0.10		mg/Kg	1	8/2/2011 06:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 55-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-163A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:00 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Barium	87	1.0		mg/Kg	1	8/2/2011 05:00 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Chromium	34	1.0		mg/Kg	1	8/2/2011 05:00 PM
Cobalt	22	1.0		mg/Kg	1	8/2/2011 05:00 PM
Copper	25	2.0		mg/Kg	1	8/2/2011 05:00 PM
Lead	9.0	1.0		mg/Kg	1	8/2/2011 05:00 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Nickel	31	1.0		mg/Kg	1	8/2/2011 05:00 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:00 PM
Vanadium	56	1.0		mg/Kg	1	8/2/2011 05:00 PM
Zinc	37	1.0		mg/Kg	1	8/2/2011 05:00 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 56-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-168A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:10 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Barium	62	1.0		mg/Kg	1	8/2/2011 05:10 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Chromium	36	1.0		mg/Kg	1	8/2/2011 05:10 PM
Cobalt	20	1.0		mg/Kg	1	8/2/2011 05:10 PM
Copper	38	2.0		mg/Kg	1	8/2/2011 05:10 PM
Lead	1.6	1.0		mg/Kg	1	8/2/2011 05:10 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Nickel	17	1.0		mg/Kg	1	8/2/2011 05:10 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:10 PM
Vanadium	73	1.0		mg/Kg	1	8/2/2011 05:10 PM
Zinc	30	1.0		mg/Kg	1	8/2/2011 05:10 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 58-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-174A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:14 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Barium	80	1.0		mg/Kg	1	8/2/2011 05:14 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Chromium	51	1.0		mg/Kg	1	8/2/2011 05:14 PM
Cobalt	25	1.0		mg/Kg	1	8/2/2011 05:14 PM
Copper	27	2.0		mg/Kg	1	8/2/2011 05:14 PM
Lead	2.5	1.0		mg/Kg	1	8/2/2011 05:14 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Nickel	18	1.0		mg/Kg	1	8/2/2011 05:14 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:14 PM
Vanadium	77	1.0		mg/Kg	1	8/2/2011 05:14 PM
Zinc	26	1.0		mg/Kg	1	8/2/2011 05:14 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 59-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-175A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:17 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Barium	22	1.0		mg/Kg	1	8/2/2011 05:17 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Chromium	13	1.0		mg/Kg	1	8/2/2011 05:17 PM
Cobalt	6.1	1.0		mg/Kg	1	8/2/2011 05:17 PM
Copper	5.5	2.0		mg/Kg	1	8/2/2011 05:17 PM
Lead	11	1.0		mg/Kg	1	8/2/2011 05:17 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Nickel	15	1.0		mg/Kg	1	8/2/2011 05:17 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:17 PM
Vanadium	19	1.0		mg/Kg	1	8/2/2011 05:17 PM
Zinc	29	1.0		mg/Kg	1	8/2/2011 05:17 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 61-1
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-182A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:21 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Barium	46	1.0		mg/Kg	1	8/2/2011 05:21 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Chromium	68	1.0		mg/Kg	1	8/2/2011 05:21 PM
Cobalt	17	1.0		mg/Kg	1	8/2/2011 05:21 PM
Copper	19	2.0		mg/Kg	1	8/2/2011 05:21 PM
Lead	5.3	1.0		mg/Kg	1	8/2/2011 05:21 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Nickel	77	1.0		mg/Kg	1	8/2/2011 05:21 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:21 PM
Vanadium	38	1.0		mg/Kg	1	8/2/2011 05:21 PM
Zinc	39	1.0		mg/Kg	1	8/2/2011 05:21 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 07:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 62-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-186A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:24 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Barium	59	1.0		mg/Kg	1	8/2/2011 05:24 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Chromium	98	1.0		mg/Kg	1	8/2/2011 05:24 PM
Cobalt	16	1.0		mg/Kg	1	8/2/2011 05:24 PM
Copper	21	2.0		mg/Kg	1	8/2/2011 05:24 PM
Lead	5.5	1.0		mg/Kg	1	8/2/2011 05:24 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Nickel	49	1.0		mg/Kg	1	8/2/2011 05:24 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:24 PM
Vanadium	42	1.0		mg/Kg	1	8/2/2011 05:24 PM
Zinc	52	1.0		mg/Kg	1	8/2/2011 05:24 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 07:08 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 64-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-192A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:27 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Barium	110	1.0		mg/Kg	1	8/2/2011 05:27 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Cadmium	1.3	1.0		mg/Kg	1	8/2/2011 05:27 PM
Chromium	41	1.0		mg/Kg	1	8/2/2011 05:27 PM
Cobalt	46	1.0		mg/Kg	1	8/2/2011 05:27 PM
Copper	73	2.0		mg/Kg	1	8/2/2011 05:27 PM
Lead	4.2	1.0		mg/Kg	1	8/2/2011 05:27 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Nickel	29	1.0		mg/Kg	1	8/2/2011 05:27 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:27 PM
Vanadium	60	1.0		mg/Kg	1	8/2/2011 05:27 PM
Zinc	24	1.0		mg/Kg	1	8/2/2011 05:27 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 07:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 66-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-196A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802F	QC Batch: 74656			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 05:31 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Barium	64	1.0		mg/Kg	1	8/2/2011 05:31 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Chromium	33	1.0		mg/Kg	1	8/2/2011 05:31 PM
Cobalt	14	1.0		mg/Kg	1	8/2/2011 05:31 PM
Copper	15	2.0		mg/Kg	1	8/2/2011 05:31 PM
Lead	72	1.0		mg/Kg	1	8/2/2011 05:31 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Nickel	44	1.0		mg/Kg	1	8/2/2011 05:31 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 05:31 PM
Vanadium	41	1.0		mg/Kg	1	8/2/2011 05:31 PM
Zinc	42	1.0		mg/Kg	1	8/2/2011 05:31 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802D	QC Batch: 74661			PrepDate:	8/2/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 06:42 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 67-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-201A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 11:55 AM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Barium	97	1.0		mg/Kg	1	8/2/2011 11:55 AM
Beryllium	ND	2.0		mg/Kg	2	8/2/2011 01:04 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Chromium	16	1.0		mg/Kg	1	8/2/2011 11:55 AM
Cobalt	30	1.0		mg/Kg	1	8/2/2011 11:55 AM
Copper	23	2.0		mg/Kg	1	8/2/2011 11:55 AM
Lead	2.2	1.0		mg/Kg	1	8/2/2011 11:55 AM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Nickel	16	1.0		mg/Kg	1	8/2/2011 11:55 AM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Silver	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 11:55 AM
Vanadium	47	1.0		mg/Kg	1	8/2/2011 11:55 AM
Zinc	30	1.0		mg/Kg	1	8/2/2011 11:55 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 01:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	NBM 68-1
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-203A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:16 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Barium	76	1.0		mg/Kg	1	8/2/2011 12:16 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Chromium	37	1.0		mg/Kg	1	8/2/2011 12:16 PM
Cobalt	26	1.0		mg/Kg	1	8/2/2011 12:16 PM
Copper	19	2.0		mg/Kg	1	8/2/2011 12:16 PM
Lead	4.3	1.0		mg/Kg	1	8/2/2011 12:16 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Nickel	21	1.0		mg/Kg	1	8/2/2011 12:16 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:16 PM
Vanadium	65	1.0		mg/Kg	1	8/2/2011 12:16 PM
Zinc	27	1.0		mg/Kg	1	8/2/2011 12:16 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 01:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 71-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-213A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:19 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Barium	110	1.0		mg/Kg	1	8/2/2011 12:19 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Chromium	69	1.0		mg/Kg	1	8/2/2011 12:19 PM
Cobalt	15	1.0		mg/Kg	1	8/2/2011 12:19 PM
Copper	20	2.0		mg/Kg	1	8/2/2011 12:19 PM
Lead	2.2	1.0		mg/Kg	1	8/2/2011 12:19 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Nickel	57	1.0		mg/Kg	1	8/2/2011 12:19 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:19 PM
Vanadium	36	1.0		mg/Kg	1	8/2/2011 12:19 PM
Zinc	35	1.0		mg/Kg	1	8/2/2011 12:19 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 01:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 73-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-217A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	4.9	4.0		mg/Kg	2	8/2/2011 01:17 PM
Arsenic	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Barium	6.6	2.0		mg/Kg	2	8/2/2011 01:17 PM
Beryllium	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Cadmium	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Chromium	320	2.0		mg/Kg	2	8/2/2011 01:17 PM
Cobalt	42	2.0		mg/Kg	2	8/2/2011 01:17 PM
Copper	45	4.0		mg/Kg	2	8/2/2011 01:17 PM
Lead	8.3	2.0		mg/Kg	2	8/2/2011 01:17 PM
Molybdenum	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Nickel	470	2.0		mg/Kg	2	8/2/2011 01:17 PM
Selenium	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Silver	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Thallium	ND	2.0		mg/Kg	2	8/2/2011 01:17 PM
Vanadium	83	2.0		mg/Kg	2	8/2/2011 01:17 PM
Zinc	82	2.0		mg/Kg	2	8/2/2011 01:17 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	0.23	0.10		mg/Kg	1	8/2/2011 01:57 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 75-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-225A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:26 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Barium	67	1.0		mg/Kg	1	8/2/2011 12:26 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Chromium	150	1.0		mg/Kg	1	8/2/2011 12:26 PM
Cobalt	52	1.0		mg/Kg	1	8/2/2011 12:26 PM
Copper	51	2.0		mg/Kg	1	8/2/2011 12:26 PM
Lead	7.1	1.0		mg/Kg	1	8/2/2011 12:26 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Nickel	240	1.0		mg/Kg	1	8/2/2011 12:26 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:26 PM
Vanadium	48	1.0		mg/Kg	1	8/2/2011 12:26 PM
Zinc	63	1.0		mg/Kg	1	8/2/2011 12:26 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 02:03 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 76-1
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-227A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:31 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Barium	100	1.0		mg/Kg	1	8/2/2011 12:31 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Chromium	93	1.0		mg/Kg	1	8/2/2011 12:31 PM
Cobalt	21	1.0		mg/Kg	1	8/2/2011 12:31 PM
Copper	26	2.0		mg/Kg	1	8/2/2011 12:31 PM
Lead	10	1.0		mg/Kg	1	8/2/2011 12:31 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Nickel	140	1.0		mg/Kg	1	8/2/2011 12:31 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:31 PM
Vanadium	48	1.0		mg/Kg	1	8/2/2011 12:31 PM
Zinc	48	1.0		mg/Kg	1	8/2/2011 12:31 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 02:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 78-2
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-234A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	3.4	2.0		mg/Kg	1	8/2/2011 12:34 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Barium	150	1.0		mg/Kg	1	8/2/2011 12:34 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Chromium	220	1.0		mg/Kg	1	8/2/2011 12:34 PM
Cobalt	26	1.0		mg/Kg	1	8/2/2011 12:34 PM
Copper	23	2.0		mg/Kg	1	8/2/2011 12:34 PM
Lead	6.5	1.0		mg/Kg	1	8/2/2011 12:34 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Nickel	340	1.0		mg/Kg	1	8/2/2011 12:34 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:34 PM
Vanadium	58	1.0		mg/Kg	1	8/2/2011 12:34 PM
Zinc	50	1.0		mg/Kg	1	8/2/2011 12:34 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 02:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 79-0
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-235A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:39 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Barium	130	1.0		mg/Kg	1	8/2/2011 12:39 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Cadmium	1.3	1.0		mg/Kg	1	8/2/2011 12:39 PM
Chromium	46	1.0		mg/Kg	1	8/2/2011 12:39 PM
Cobalt	13	1.0		mg/Kg	1	8/2/2011 12:39 PM
Copper	36	2.0		mg/Kg	1	8/2/2011 12:39 PM
Lead	2300	2.0		mg/Kg	2	8/2/2011 01:21 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Nickel	55	1.0		mg/Kg	1	8/2/2011 12:39 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:39 PM
Vanadium	39	1.0		mg/Kg	1	8/2/2011 12:39 PM
Zinc	250	1.0		mg/Kg	1	8/2/2011 12:39 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 02:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *04-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SBS 81-1
Lab Order:	119164	**Collection Date:**	7/27/2011
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119164-242A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110802B	QC Batch: 74657			PrepDate:	8/1/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/2/2011 12:43 PM
Arsenic	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Barium	84	1.0		mg/Kg	1	8/2/2011 12:43 PM
Beryllium	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Cadmium	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Chromium	39	1.0		mg/Kg	1	8/2/2011 12:43 PM
Cobalt	19	1.0		mg/Kg	1	8/2/2011 12:43 PM
Copper	18	2.0		mg/Kg	1	8/2/2011 12:43 PM
Lead	9.9	1.0		mg/Kg	1	8/2/2011 12:43 PM
Molybdenum	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Nickel	43	1.0		mg/Kg	1	8/2/2011 12:43 PM
Selenium	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Silver	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Thallium	ND	1.0		mg/Kg	1	8/2/2011 12:43 PM
Vanadium	41	1.0		mg/Kg	1	8/2/2011 12:43 PM
Zinc	46	1.0		mg/Kg	1	8/2/2011 12:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110802A	QC Batch: 74662			PrepDate:	8/1/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/2/2011 02:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74653** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **PBS** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.196	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	0.150	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74653** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **LCSS** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219181**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.901	2.0	50.00	0.1964	95.4	80	120				
Arsenic	48.509	1.0	50.00	0	97.0	80	120				
Barium	50.095	1.0	50.00	0	100	80	120				
Beryllium	48.195	1.0	50.00	0	96.4	80	120				
Cadmium	48.498	1.0	50.00	0	97.0	80	120				
Chromium	46.003	1.0	50.00	0	92.0	80	120				
Cobalt	50.241	1.0	50.00	0	100	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74653** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **LCSS** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219181**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	49.214	2.0	50.00	0	98.4	80	120				
Lead	49.911	1.0	50.00	0.1503	99.5	80	120				
Molybdenum	52.191	1.0	50.00	0	104	80	120				
Nickel	49.090	1.0	50.00	0	98.2	80	120				
Selenium	46.319	1.0	50.00	0	92.6	80	120				
Silver	48.229	1.0	50.00	0	96.5	80	120				
Thallium	47.748	1.0	50.00	0	95.5	80	120				
Vanadium	49.323	1.0	50.00	0	98.6	80	120				
Zinc	49.253	1.0	50.00	0	98.5	80	120				

Sample ID: **119164-048A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **NBS 16-2** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219192**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	60.516	1.0						66.07	8.77	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.662	1.0						0.6927	0	20	
Chromium	34.358	1.0						32.44	5.75	20	
Cobalt	20.986	1.0						20.67	1.51	20	
Copper	25.958	2.0						26.37	1.57	20	
Lead	9.682	1.0						6.969	32.6	20	R
Molybdenum	ND	1.0						0	0	20	
Nickel	34.333	1.0						32.65	5.01	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	47.451	1.0						46.82	1.34	20	
Zinc	43.224	1.0						45.90	6.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-048A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **NBS 16-2** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219193**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	80.839	2.0	125.0	0	64.7	32	105				
Arsenic	72.792	1.0	125.0	0	58.2	49	106				
Barium	157.337	1.0	125.0	66.07	73.0	31	133				
Beryllium	89.873	1.0	125.0	0	71.9	56	106				
Cadmium	89.974	1.0	125.0	0.6927	71.4	51	103				
Chromium	132.918	1.0	125.0	32.44	80.4	45	114				
Cobalt	113.294	1.0	125.0	20.67	74.1	52	106				
Copper	134.410	2.0	125.0	26.37	86.4	54	125				
Lead	94.650	1.0	125.0	6.969	70.1	34	126				
Molybdenum	89.012	1.0	125.0	0	71.2	54	106				
Nickel	119.183	1.0	125.0	32.65	69.2	45	111				
Selenium	78.442	1.0	125.0	0	62.8	47	104				
Silver	97.446	1.0	125.0	0	78.0	56	112				
Thallium	66.152	1.0	125.0	0	52.9	46	101				
Vanadium	144.051	1.0	125.0	46.82	77.8	54	114				
Zinc	137.183	1.0	125.0	45.90	73.0	28	125				

Sample ID: **119164-048A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **NBS 16-2** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	86.427	2.0	125.0	0	69.1	32	105	80.84	6.68	20	
Arsenic	75.764	1.0	125.0	0	60.6	49	106	72.79	4.00	20	
Barium	173.615	1.0	125.0	66.07	86.0	31	133	157.3	9.84	20	
Beryllium	95.467	1.0	125.0	0	76.4	56	106	89.87	6.04	20	
Cadmium	95.567	1.0	125.0	0.6927	75.9	51	103	89.97	6.03	20	
Chromium	130.240	1.0	125.0	32.44	78.2	45	114	132.9	2.03	20	
Cobalt	126.582	1.0	125.0	20.67	84.7	52	106	113.3	11.1	20	
Copper	141.889	2.0	125.0	26.37	92.4	54	125	134.4	5.41	20	
Lead	104.587	1.0	125.0	6.969	78.1	34	126	94.65	9.98	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-048A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135521**
Client ID: **NBS 16-2** Batch ID: **74653** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	94.836	1.0	125.0	0	75.9	54	106	89.01	6.34	20	
Nickel	124.693	1.0	125.0	32.65	73.6	45	111	119.2	4.52	20	
Selenium	82.664	1.0	125.0	0	66.1	47	104	78.44	5.24	20	
Silver	104.412	1.0	125.0	0	83.5	56	112	97.45	6.90	20	
Thallium	67.683	1.0	125.0	0	54.1	46	101	66.15	2.29	20	
Vanadium	154.290	1.0	125.0	46.82	86.0	54	114	144.1	6.86	20	
Zinc	141.927	1.0	125.0	45.90	76.8	28	125	137.2	3.40	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74654** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **PBS** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219277**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.429	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	0.142	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74654** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **LCSS** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219278**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.710	2.0	50.00	0.4293	94.6	80	120				
Arsenic	48.014	1.0	50.00	0	96.0	80	120				
Barium	49.987	1.0	50.00	0	100	80	120				
Beryllium	48.326	1.0	50.00	0	96.7	80	120				
Cadmium	48.329	1.0	50.00	0	96.7	80	120				
Chromium	45.680	1.0	50.00	0	91.4	80	120				
Cobalt	49.775	1.0	50.00	0	99.6	80	120				
Copper	48.809	2.0	50.00	0	97.6	80	120				
Lead	49.080	1.0	50.00	0	98.2	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74654** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **LCSS** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219278**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	51.706	1.0	50.00	0	103	80	120				
Nickel	48.564	1.0	50.00	0	97.1	80	120				
Selenium	45.988	1.0	50.00	0	92.0	80	120				
Silver	47.985	1.0	50.00	0	96.0	80	120				
Thallium	47.057	1.0	50.00	0.1416	93.8	80	120				
Vanadium	48.361	1.0	50.00	0	96.7	80	120				
Zinc	49.147	1.0	50.00	0	98.3	80	120				

Sample ID: **119164-100A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **SBS 34-0** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219288**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.810	2.0						0.8847	0	20	
Arsenic	0.331	1.0						0.3920	0	20	
Barium	94.994	1.0						80.68	16.3	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.865	1.0						0.7336	0	20	
Chromium	48.497	1.0						45.12	7.21	20	
Cobalt	30.313	1.0						19.49	43.5	20	R
Copper	26.626	2.0						26.01	2.36	20	
Lead	103.207	1.0						107.1	3.74	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	59.914	1.0						53.41	11.5	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	44.442	1.0						37.19	17.8	20	
Zinc	66.253	1.0						59.68	10.4	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-100A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **SBS 34-0** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219289**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	88.948	2.0	125.0	0.8847	70.5	32	105				
Arsenic	93.344	1.0	125.0	0.3920	74.4	49	106				
Barium	177.530	1.0	125.0	80.68	77.5	31	133				
Beryllium	98.184	1.0	125.0	0	78.5	56	106				
Cadmium	97.381	1.0	125.0	0.7336	77.3	51	103				
Chromium	142.078	1.0	125.0	45.12	77.6	45	114				
Cobalt	120.735	1.0	125.0	19.49	81.0	52	106				
Copper	132.532	2.0	125.0	26.01	85.2	54	125				
Lead	209.011	1.0	125.0	107.1	81.5	34	126				
Molybdenum	98.027	1.0	125.0	0	78.4	54	106				
Nickel	139.909	1.0	125.0	53.41	69.2	45	111				
Selenium	89.622	1.0	125.0	0	71.7	47	104				
Silver	103.382	1.0	125.0	0	82.7	56	112				
Thallium	86.366	1.0	125.0	0	69.1	46	101				
Vanadium	143.310	1.0	125.0	37.19	84.9	54	114				
Zinc	156.729	1.0	125.0	59.68	77.6	28	125				

Sample ID: **119164-100A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **SBS 34-0** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219290**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	88.954	2.0	125.0	0.8847	70.5	32	105	88.95	0.00757	20	
Arsenic	93.652	1.0	125.0	0.3920	74.6	49	106	93.34	0.329	20	
Barium	187.726	1.0	125.0	80.68	85.6	31	133	177.5	5.58	20	
Beryllium	96.348	1.0	125.0	0	77.1	56	106	98.18	1.89	20	
Cadmium	96.807	1.0	125.0	0.7336	76.9	51	103	97.38	0.590	20	
Chromium	139.889	1.0	125.0	45.12	75.8	45	114	142.1	1.55	20	
Cobalt	121.308	1.0	125.0	19.49	81.5	52	106	120.7	0.473	20	
Copper	136.926	2.0	125.0	26.01	88.7	54	125	132.5	3.26	20	
Lead	288.697	1.0	125.0	107.1	145	34	126	209.0	32.0	20	SR

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-100A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135522**
Client ID: **SBS 34-0** Batch ID: **74654** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219290**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	98.820	1.0	125.0	0	79.1	54	106	98.03	0.805	20	
Nickel	146.109	1.0	125.0	53.41	74.2	45	111	139.9	4.34	20	
Selenium	89.650	1.0	125.0	0	71.7	47	104	89.62	0.0316	20	
Silver	104.022	1.0	125.0	0	83.2	56	112	103.4	0.617	20	
Thallium	86.095	1.0	125.0	0	68.9	46	101	86.37	0.315	20	
Vanadium	142.549	1.0	125.0	37.19	84.3	54	114	143.3	0.532	20	
Zinc	154.436	1.0	125.0	59.68	75.8	28	125	156.7	1.47	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74655** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **LCSS** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219392**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.423	2.0	50.00	0.4201	96.0	80	120				
Arsenic	48.284	1.0	50.00	0	96.6	80	120				
Barium	51.128	1.0	50.00	0	102	80	120				
Beryllium	49.398	1.0	50.00	0	98.8	80	120				
Cadmium	49.263	1.0	50.00	0	98.5	80	120				
Chromium	46.210	1.0	50.00	0	92.4	80	120				
Cobalt	50.843	1.0	50.00	0	102	80	120				
Copper	50.064	2.0	50.00	0	100	80	120				
Lead	49.048	1.0	50.00	0	98.1	80	120				
Molybdenum	51.929	1.0	50.00	0	104	80	120				
Nickel	48.859	1.0	50.00	0	97.7	80	120				
Selenium	46.020	1.0	50.00	0	92.0	80	120				
Silver	49.592	1.0	50.00	0	99.2	80	120				
Thallium	47.565	1.0	50.00	0	95.1	80	120				
Vanadium	49.352	1.0	50.00	0	98.7	80	120				
Zinc	50.273	1.0	50.00	0	101	80	120				

Sample ID: **MB-74655** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **PBS** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219393**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.420	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74655** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **PBS** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219393**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **119164-145A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **NBM 49-0** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219403**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.3957	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	50.788	1.0						57.11	11.7	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.444	1.0						0.4677	0	20	
Chromium	25.943	1.0						30.28	15.4	20	
Cobalt	10.831	1.0						13.54	22.2	20	R
Copper	14.570	2.0						17.46	18.1	20	
Lead	29.117	1.0						24.17	18.6	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	28.046	1.0						33.15	16.7	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	37.353	1.0						41.22	9.83	20	
Zinc	39.148	1.0						37.36	4.68	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-145A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **NBM 49-0** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219404**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	93.622	2.0	125.0	0.3957	74.6	32	105				
Arsenic	90.672	1.0	125.0	0	72.5	49	106				
Barium	159.857	1.0	125.0	57.11	82.2	31	133				
Beryllium	99.601	1.0	125.0	0	79.7	56	106				
Cadmium	100.620	1.0	125.0	0.4677	80.1	51	103				
Chromium	123.021	1.0	125.0	30.28	74.2	45	114				
Cobalt	115.042	1.0	125.0	13.54	81.2	52	106				
Copper	126.094	2.0	125.0	17.46	86.9	54	125				
Lead	118.213	1.0	125.0	24.17	75.2	34	126				
Molybdenum	101.160	1.0	125.0	0	80.9	54	106				
Nickel	124.618	1.0	125.0	33.15	73.2	45	111				
Selenium	93.672	1.0	125.0	0	74.9	47	104				
Silver	107.601	1.0	125.0	0	86.1	56	112				
Thallium	84.544	1.0	125.0	0	67.6	46	101				
Vanadium	140.965	1.0	125.0	41.22	79.8	54	114				
Zinc	134.124	1.0	125.0	37.36	77.4	28	125				

Sample ID: **119164-145A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **NBM 49-0** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219405**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	92.313	2.0	125.0	0.3957	73.5	32	105	93.62	1.41	20	
Arsenic	86.488	1.0	125.0	0	69.2	49	106	90.67	4.72	20	
Barium	159.275	1.0	125.0	57.11	81.7	31	133	159.9	0.365	20	
Beryllium	100.078	1.0	125.0	0	80.1	56	106	99.60	0.477	20	
Cadmium	99.066	1.0	125.0	0.4677	78.9	51	103	100.6	1.56	20	
Chromium	125.640	1.0	125.0	30.28	76.3	45	114	123.0	2.11	20	
Cobalt	114.435	1.0	125.0	13.54	80.7	52	106	115.0	0.529	20	
Copper	127.804	2.0	125.0	17.46	88.3	54	125	126.1	1.35	20	
Lead	121.057	1.0	125.0	24.17	77.5	34	126	118.2	2.38	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-145A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135528**
Client ID: **NBM 49-0** Batch ID: **74655** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219405**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	100.021	1.0	125.0	0	80.0	54	106	101.2	1.13	20	
Nickel	123.573	1.0	125.0	33.15	72.3	45	111	124.6	0.842	20	
Selenium	90.302	1.0	125.0	0	72.2	47	104	93.67	3.66	20	
Silver	106.412	1.0	125.0	0	85.1	56	112	107.6	1.11	20	
Thallium	81.882	1.0	125.0	0	65.5	46	101	84.54	3.20	20	
Vanadium	146.263	1.0	125.0	41.22	84.0	54	114	141.0	3.69	20	
Zinc	134.893	1.0	125.0	37.36	78.0	28	125	134.1	0.572	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74656** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **PBS** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74656** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **LCSS** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219598**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.573	2.0	50.00	0	97.1	80	120				
Arsenic	47.833	1.0	50.00	0	95.7	80	120				
Barium	49.806	1.0	50.00	0	99.6	80	120				
Beryllium	48.413	1.0	50.00	0	96.8	80	120				
Cadmium	48.096	1.0	50.00	0	96.2	80	120				
Chromium	45.473	1.0	50.00	0	90.9	80	120				
Cobalt	49.679	1.0	50.00	0	99.4	80	120				
Copper	48.830	2.0	50.00	0	97.7	80	120				
Lead	48.595	1.0	50.00	0	97.2	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74656** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **LCSS** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219598**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	50.586	1.0	50.00	0	101	80	120				
Nickel	47.438	1.0	50.00	0	94.9	80	120				
Selenium	45.530	1.0	50.00	0	91.1	80	120				
Silver	48.306	1.0	50.00	0	96.6	80	120				
Thallium	47.344	1.0	50.00	0	94.7	80	120				
Vanadium	48.531	1.0	50.00	0	97.1	80	120				
Zinc	48.895	1.0	50.00	0	97.8	80	120				

Sample ID: **119164-196A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **NBM 66-0** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.806	2.0						0.3694	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	92.176	1.0						63.91	36.2	20	R
Beryllium	ND	1.0						0	0	20	
Cadmium	0.821	1.0						0.5301	0	20	
Chromium	53.776	1.0						32.81	48.4	20	R
Cobalt	17.609	1.0						13.78	24.4	20	R
Copper	17.978	2.0						15.06	17.7	20	
Lead	88.443	1.0						72.27	20.1	20	R
Molybdenum	ND	1.0						0	0	20	
Nickel	88.512	1.0						44.30	66.6	20	R
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	52.934	1.0						40.97	25.5	20	R
Zinc	52.544	1.0						41.51	23.5	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-196A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **NBM 66-0** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219610**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	105.833	2.0	125.0	0.3694	84.4	32	105				
Arsenic	114.223	1.0	125.0	0	91.4	49	106				
Barium	205.305	1.0	125.0	63.91	113	31	133				
Beryllium	120.268	1.0	125.0	0	96.2	56	106				
Cadmium	119.842	1.0	125.0	0.5301	95.4	51	103				
Chromium	167.953	1.0	125.0	32.81	108	45	114				
Cobalt	142.295	1.0	125.0	13.78	103	52	106				
Copper	155.428	2.0	125.0	15.06	112	54	125				
Lead	200.438	1.0	125.0	72.27	103	34	126				
Molybdenum	122.268	1.0	125.0	0	97.8	54	106				
Nickel	179.150	1.0	125.0	44.30	108	45	111				
Selenium	113.557	1.0	125.0	0	90.8	47	104				
Silver	128.285	1.0	125.0	0	103	56	112				
Thallium	100.441	1.0	125.0	0	80.4	46	101				
Vanadium	188.271	1.0	125.0	40.97	118	54	114				S
Zinc	175.848	1.0	125.0	41.51	107	28	125				

Sample ID: **119164-196A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **NBM 66-0** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219611**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	82.229	2.0	125.0	0.3694	65.5	32	105	105.8	25.1	20	R
Arsenic	89.811	1.0	125.0	0	71.8	49	106	114.2	23.9	20	R
Barium	163.600	1.0	125.0	63.91	79.8	31	133	205.3	22.6	20	R
Beryllium	92.779	1.0	125.0	0	74.2	56	106	120.3	25.8	20	R
Cadmium	92.880	1.0	125.0	0.5301	73.9	51	103	119.8	25.3	20	R
Chromium	138.040	1.0	125.0	32.81	84.2	45	114	168.0	19.6	20	
Cobalt	110.700	1.0	125.0	13.78	77.5	52	106	142.3	25.0	20	R
Copper	119.824	2.0	125.0	15.06	83.8	54	125	155.4	25.9	20	R
Lead	164.154	1.0	125.0	72.27	73.5	34	126	200.4	19.9	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-196A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135531**
Client ID: **NBM 66-0** Batch ID: **74656** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219611**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	95.212	1.0	125.0	0	76.2	54	106	122.3	24.9	20	R
Nickel	146.809	1.0	125.0	44.30	82.0	45	111	179.2	19.8	20	
Selenium	88.454	1.0	125.0	0	70.8	47	104	113.6	24.9	20	R
Silver	100.473	1.0	125.0	0	80.4	56	112	128.3	24.3	20	R
Thallium	77.479	1.0	125.0	0	62.0	46	101	100.4	25.8	20	R
Vanadium	146.308	1.0	125.0	40.97	84.3	54	114	188.3	25.1	20	R
Zinc	134.943	1.0	125.0	41.51	74.7	28	125	175.8	26.3	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74657** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **PBS** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219034**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74657** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **LCSS** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219035**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.481	2.0	50.00	0	97.0	80	120				
Arsenic	48.310	1.0	50.00	0	96.6	80	120				
Barium	50.003	1.0	50.00	0	100	80	120				
Beryllium	49.074	1.0	50.00	0	98.1	80	120				
Cadmium	48.054	1.0	50.00	0	96.1	80	120				
Chromium	45.989	1.0	50.00	0	92.0	80	120				
Cobalt	50.013	1.0	50.00	0	100	80	120				
Copper	49.522	2.0	50.00	0	99.0	80	120				
Lead	49.509	1.0	50.00	0	99.0	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74657** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **LCSS** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219035**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	50.633	1.0	50.00	0	101	80	120				
Nickel	47.654	1.0	50.00	0	95.3	80	120				
Selenium	45.904	1.0	50.00	0	91.8	80	120				
Silver	48.234	1.0	50.00	0	96.5	80	120				
Thallium	48.045	1.0	50.00	0	96.1	80	120				
Vanadium	49.147	1.0	50.00	0	98.3	80	120				
Zinc	48.876	1.0	50.00	0	97.8	80	120				

Sample ID: **119164-201A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219037**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	102.226	1.0						96.61	5.65	20	
Cadmium	0.555	1.0						0.5544	0	20	
Chromium	8.849	1.0						15.67	55.6	20	R
Cobalt	27.223	1.0						29.69	8.66	20	
Copper	24.401	2.0						23.31	4.56	20	
Lead	1.250	1.0						2.229	56.3	20	R
Molybdenum	ND	1.0						0	0	20	
Nickel	13.954	1.0						15.87	12.8	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	41.514	1.0						46.59	11.5	20	
Zinc	31.039	1.0						30.01	3.36	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-201A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219038**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.427	2.0	125.0	0	60.3	32	105				
Arsenic	60.326	1.0	125.0	0	48.3	49	106				S
Barium	181.833	1.0	125.0	96.61	68.2	31	133				
Cadmium	85.596	1.0	125.0	0.5544	68.0	51	103				
Chromium	98.837	1.0	125.0	15.67	66.5	45	114				
Cobalt	112.275	1.0	125.0	29.69	66.1	52	106				
Copper	122.969	2.0	125.0	23.31	79.7	54	125				
Lead	87.492	1.0	125.0	2.229	68.2	34	126				
Molybdenum	83.957	1.0	125.0	0	67.2	54	106				
Nickel	99.182	1.0	125.0	15.87	66.7	45	111				
Selenium	72.842	1.0	125.0	0	58.3	47	104				
Silver	91.338	1.0	125.0	0	73.1	56	112				
Thallium	49.732	1.0	125.0	0	39.8	46	101				S
Vanadium	136.405	1.0	125.0	46.59	71.8	54	114				
Zinc	113.000	1.0	125.0	30.01	66.4	28	125				

Sample ID: **119164-201A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219039**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	77.824	2.0	125.0	0	62.3	32	105	75.43	3.13	20	
Arsenic	61.866	1.0	125.0	0	49.5	49	106	60.33	2.52	20	
Barium	173.818	1.0	125.0	96.61	61.8	31	133	181.8	4.51	20	
Cadmium	85.513	1.0	125.0	0.5544	68.0	51	103	85.60	0.0967	20	
Chromium	95.836	1.0	125.0	15.67	64.1	45	114	98.84	3.08	20	
Cobalt	113.087	1.0	125.0	29.69	66.7	52	106	112.3	0.721	20	
Copper	121.733	2.0	125.0	23.31	78.7	54	125	123.0	1.01	20	
Lead	88.434	1.0	125.0	2.229	69.0	34	126	87.49	1.07	20	
Molybdenum	86.404	1.0	125.0	0	69.1	54	106	83.96	2.87	20	
Nickel	97.099	1.0	125.0	15.87	65.0	45	111	99.18	2.12	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119164-201A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219039**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	75.087	1.0	125.0	0	60.1	47	104	72.84	3.04	20	
Silver	91.986	1.0	125.0	0	73.6	56	112	91.34	0.707	20	
Thallium	48.132	1.0	125.0	0	38.5	46	101	49.73	3.27	20	S
Vanadium	129.289	1.0	125.0	46.59	66.2	54	114	136.4	5.36	20	
Zinc	115.306	1.0	125.0	30.01	68.2	28	125	113.0	2.02	20	

Sample ID: **119164-201A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219050**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	ND	2.0						0	0	20	

Sample ID: **119164-201A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219051**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	105.517	2.0	125.0	0	84.4	56	106				

Sample ID: **119164-201A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135511**
Client ID: **NBM 67-2** Batch ID: **74657** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/2/2011** SeqNo: **2219052**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	117.810	2.0	125.0	0	94.2	56	106	105.5	11.0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 *Tel: 562. 989.4045* *Fax: 562.989.4040*

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74626A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **PBS** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74626** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **LCSS** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	221.698	5.0	250.0	0	88.7	80	120				

Sample ID: **119164-038A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **NBS 13-1** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	32.871	5.0						33.54	2.02	20	

Sample ID: **119164-038A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **NBS 13-1** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218104**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	238.300	5.0	250.0	33.54	81.9	34	126				

Sample ID: **MB-74626B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **PBS** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218105**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-050A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **NBS 17-1** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218116**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.831	5.0						13.40	64.9	20	R

Sample ID: **119164-050A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **NBS 17-1** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218117**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	196.108	5.0	250.0	13.40	73.1	34	126				

Sample ID: **119164-050A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135467**
Client ID: **NBS 17-1** Batch ID: **74626** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218118**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	196.146	5.0	250.0	13.40	73.1	34	126	196.1	0.0192	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74627A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **PBS** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218134**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.155	5.0									

Sample ID: **LCS-74627** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **LCSS** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218135**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	226.478	5.0	250.0	0.1555	90.5	80	120				

Sample ID: **119164-063A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **NBS 21-2** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218146**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.466	5.0						3.783	0	20	

Sample ID: **119164-063A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **NBS 21-2** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218147**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	196.889	5.0	250.0	3.783	77.2	34	126				

Sample ID: **MB-74627B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **PBS** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218148**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.140	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-074A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **NBS 25-1** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.177	5.0						4.791	7.75	20	

Sample ID: **119164-074A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **NBS 25-1** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218160**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	202.706	5.0	250.0	4.791	79.2	34	126				

Sample ID: **119164-074A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **7/29/2011** RunNo: **135469**
Client ID: **NBS 25-1** Batch ID: **74627** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	189.628	5.0	250.0	4.791	73.9	34	126	202.7	6.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74628A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **PBS** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74628** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **LCSS** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	238.703	5.0	250.0	0	95.5	80	120				

Sample ID: **119164-088A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **NBS 30-0** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	171.352	5.0						199.1	15.0	20	

Sample ID: **119164-088A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **NBS 30-0** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218181**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	380.396	5.0	250.0	199.1	72.5	34	126				

Sample ID: **MB-74628B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **PBS** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218182**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
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DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-099A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **SBS 33-2** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218193**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	52.871	5.0						36.78	35.9	20	R

Sample ID: **119164-099A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **SBS 33-2** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	251.021	5.0	250.0	36.78	85.7	34	126				

Sample ID: **119164-099A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135470**
Client ID: **SBS 33-2** Batch ID: **74628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218195**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	201.154	5.0	250.0	36.78	65.8	34	126	251.0	22.1	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74629A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **PBS** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74629** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **LCSS** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	216.295	5.0	250.0	0	86.5	80	120				

Sample ID: **119164-112A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **SBS 38-0** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218221**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	108.716	5.0						63.58	52.4	20	R

Sample ID: **119164-112A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **SBS 38-0** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	245.374	5.0	250.0	63.58	72.7	34	126				

Sample ID: **MB-74629B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **PBS** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-126A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **SBS 42-2** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218234**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.368	5.0						1.385	0	20	

Sample ID: **119164-126A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **SBS 42-2** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218235**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	170.630	5.0	250.0	1.385	67.7	34	126				

Sample ID: **119164-126A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135473**
Client ID: **SBS 42-2** Batch ID: **74629** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	168.432	5.0	250.0	1.385	66.8	34	126	170.6	1.30	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74630A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **PBS** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218299**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.153	5.0									

Sample ID: **LCS-74630** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **LCSS** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218300**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	219.621	5.0	250.0	0.1534	87.8	80	120				

Sample ID: **119164-138A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **NBM 46-2** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	9.603	5.0						10.58	9.69	20	

Sample ID: **119164-138A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **NBM 46-2** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218312**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	207.664	5.0	250.0	10.58	78.8	34	126				

Sample ID: **MB-74630B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **PBS** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218313**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-150A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **NBM 50-2** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218324**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.939	5.0						2.679	0	20	

Sample ID: **119164-150A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **NBM 50-2** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218325**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	193.338	5.0	250.0	2.679	76.3	34	126				

Sample ID: **119164-150A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135478**
Client ID: **NBM 50-2** Batch ID: **74630** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218326**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	189.042	5.0	250.0	2.679	74.5	34	126	193.3	2.25	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74631A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **PBS** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218327**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74631** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **LCSS** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218328**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	222.107	5.0	250.0	0	88.8	80	120				

Sample ID: **119164-162A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **NBM 54-2** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218339**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	7.047	5.0						7.615	7.74	20	

Sample ID: **119164-162A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **NBM 54-2** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	198.256	5.0	250.0	7.615	76.3	34	126				

Sample ID: **MB-74631B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **PBS** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
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DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
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Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-176A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **NBM 59-1** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218352**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.663	5.0						2.790	0	20	

Sample ID: **119164-176A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **NBM 59-1** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218353**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	206.808	5.0	250.0	2.790	81.6	34	126				

Sample ID: **119164-176A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135479**
Client ID: **NBM 59-1** Batch ID: **74631** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218354**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	203.367	5.0	250.0	2.790	80.2	34	126	206.8	1.68	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74632A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **PBS** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74632** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **LCSS** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	225.170	5.0	250.0	0	90.1	80	120				

Sample ID: **119164-188A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **NBM 63-1** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218375**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.299	5.0						5.734	7.88	20	

Sample ID: **119164-188A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **NBM 63-1** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218376**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	197.977	5.0	250.0	5.734	76.9	34	126				

Sample ID: **MB-74632B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **PBS** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218377**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-200A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **NBM 67-1** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218388**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.878	5.0						5.403	0	20	

Sample ID: **119164-200A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **NBM 67-1** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	164.665	5.0	250.0	5.403	63.7	34	126				

Sample ID: **119164-200A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135480**
Client ID: **NBM 67-1** Batch ID: **74632** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218390**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	194.645	5.0	250.0	5.403	75.7	34	126	164.7	16.7	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74633A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **PBS** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218450**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74633** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **LCSS** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218451**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	245.642	5.0	250.0	0	98.3	80	120				

Sample ID: **119164-212A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **SBS 71-1** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.250	5.0						8.842	51.0	20	R

Sample ID: **119164-212A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **SBS 71-1** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218463**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	202.705	5.0	250.0	8.842	77.5	34	126				

Sample ID: **MB-74633B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **PBS** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-224A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **SBS 75-1** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218475**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.368	5.0						5.781	7.41	20	

Sample ID: **119164-224A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **SBS 75-1** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218476**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	180.962	5.0	250.0	5.781	70.1	34	126				

Sample ID: **119164-224A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135482**
Client ID: **SBS 75-1** Batch ID: **74633** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218477**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	187.322	5.0	250.0	5.781	72.6	34	126	181.0	3.45	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74634A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **PBS** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218525**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-74634** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **LCSS** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218526**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	225.052	5.0	250.0	0	90.0	80	120				

Sample ID: **119164-238A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **SBS 80-0** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218537**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	146.453	5.0						149.2	1.88	20	

Sample ID: **119164-238A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **SBS 80-0** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218538**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	399.628	5.0	250.0	149.2	100	34	126				

Sample ID: **MB-74634B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **PBS** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218539**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 *Tel: 562. 989.4045* *Fax: 562.989.4040*

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-243A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **SBS 81-2** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218544**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.829	5.0						5.772	0.983	20	

Sample ID: **119164-243A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **SBS 81-2** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218545**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	189.527	5.0	250.0	5.772	73.5	34	126				

Sample ID: **119164-243A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135484**
Client ID: **SBS 81-2** Batch ID: **74634** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/1/2011** SeqNo: **2218546**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	176.979	5.0	250.0	5.772	68.5	34	126	189.5	6.85	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-74673A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **PBS** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219128**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.160	5.0									

Sample ID: **LCS-74673** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **LCSS** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	285.489	5.0	250.0	0.1601	114	80	120				

Sample ID: **119164-011A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **NBS 4-1** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	31.272	5.0						22.50	32.6	20	R

Sample ID: **119164-011A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **NBS 4-1** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	234.139	5.0	250.0	22.50	84.7	34	126				

Sample ID: **MB-74673B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **PBS** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **119164-026A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **NBS 9-1** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219153**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	13.414	5.0						19.18	35.4	20	R

Sample ID: **119164-026A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **NBS 9-1** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219154**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	224.537	5.0	250.0	19.18	82.1	34	126				

Sample ID: **119164-026A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135519**
Client ID: **NBS 9-1** Batch ID: **74673** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **8/2/2011** SeqNo: **2219155**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	222.791	5.0	250.0	19.18	81.4	34	126	224.5	0.781	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74658** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135547**
Client ID: **PBS** Batch ID: **74658** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219950**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74658** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135547**
Client ID: **LCSS** Batch ID: **74658** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.852	0.10	0.8300	0	103	80	120				

Sample ID: **119164-048A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135547**
Client ID: **NBS 16-2** Batch ID: **74658** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.862	0.10	0.8300	0.009479	103	70	130				

Sample ID: **119164-048A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135547**
Client ID: **NBS 16-2** Batch ID: **74658** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219953**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.746	0.10	0.8300	0.009479	88.8	70	130	0.8621	14.4	20	

Sample ID: **119164-048A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135547**
Client ID: **NBS 16-2** Batch ID: **74658** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219955**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0.009479	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
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DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74659** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135543**
Client ID: **PBS** Batch ID: **74659** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219858**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74659** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135543**
Client ID: **LCSS** Batch ID: **74659** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219859**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.741	0.10	0.8300	0	89.3	80	120				

Sample ID: **119164-100A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135543**
Client ID: **SBS 34-0** Batch ID: **74659** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219860**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.792	0.10	0.8300	0.02822	92.0	70	130				

Sample ID: **119164-100A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135543**
Client ID: **SBS 34-0** Batch ID: **74659** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219862**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.037	0.10						0.02822	0	20	

Sample ID: **119164-100A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135543**
Client ID: **SBS 34-0** Batch ID: **74659** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219864**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.764	0.10	0.8300	0.02822	88.7	70	130	0.7917	3.53	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74660** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135544**
Client ID: **PBS** Batch ID: **74660** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74660** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135544**
Client ID: **LCSS** Batch ID: **74660** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219889**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.807	0.10	0.8300	0	97.2	80	120				

Sample ID: **119164-145A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135544**
Client ID: **NBM 49-0** Batch ID: **74660** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219890**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.871	0.10	0.8300	0.07015	96.5	70	130				

Sample ID: **119164-145A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135544**
Client ID: **NBM 49-0** Batch ID: **74660** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219891**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.872	0.10	0.8300	0.07015	96.6	70	130	0.8710	0.0950	20	

Sample ID: **119164-145A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135544**
Client ID: **NBM 49-0** Batch ID: **74660** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.082	0.10						0.07015	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74661** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135545**
Client ID: **PBS** Batch ID: **74661** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219933**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74661** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135545**
Client ID: **LCSS** Batch ID: **74661** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219934**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.739	0.10	0.8300	0	89.1	80	120				

Sample ID: **119164-196A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135545**
Client ID: **NBM 66-0** Batch ID: **74661** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219935**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.780	0.10	0.8300	0.06171	86.6	70	130				

Sample ID: **119164-196A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135545**
Client ID: **NBM 66-0** Batch ID: **74661** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219936**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.799	0.10	0.8300	0.06171	88.8	70	130	0.7803	2.38	20	

Sample ID: **119164-196A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/2/2011** RunNo: **135545**
Client ID: **NBM 66-0** Batch ID: **74661** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.076	0.10						0.06171	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74662** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135514**
Client ID: **PBS** Batch ID: **74662** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74662** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135514**
Client ID: **LCSS** Batch ID: **74662** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.849	0.10	0.8300	0	102	80	120				

Sample ID: **119164-201A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135514**
Client ID: **NBM 67-2** Batch ID: **74662** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.827	0.10	0.8300	0.009792	98.4	70	130				

Sample ID: **119164-201A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135514**
Client ID: **NBM 67-2** Batch ID: **74662** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.856	0.10	0.8300	0.009792	102	70	130	0.8269	3.48	20	

Sample ID: **119164-201A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/1/2011** RunNo: **135514**
Client ID: **NBM 67-2** Batch ID: **74662** TestNo: **EPA 7471A** Analysis Date: **8/2/2011** SeqNo: **2219094**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0.009792	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O #:
Logged By: Date: 7/28/11

Method of Transport: Client ☐ ATL ☐ CA OverN ☑ FedEx ☐ Other:

Sample Condition Upon Receipt:
1. CHILLED Y ☑ N ☑ (28.4 4.6)
2. HEADSPACE (VOA) Y ☐ N ☐ (NA)
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☑
5. # OF SPLS MATCH COC Y ☑ N ☐
6. PRESERVED Y ☐ N ☑

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	On trac	7/27/11	1530
				7/28/11	8:14

I hereby authorize ATL to perform the work indicated below
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co:; Addr:; City: State: Zip:

Bill To: Attn: See Above; Co:; Addr:; City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com
Please run total Lead on 72 hr TAT

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample: $2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE CT ✓; SWRCB Logcode; OTHER

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	1191164-001	NBS1-0	7/26/11	900										X				X		D	1	Zip		
	2	-1		901																				
	3	-2		902																				
	4	NBS2-0		914									X							E		T	C	
	5	-1		915										X						D		Zip		
	6	-2		916																				
	7	NBS3-0		920																				
	8	-1		921																				
	9	-2		922																				
	10	NBS4-0		930																				

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. # _____

Logged By _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample: $2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	11516-4 11	NBS4-1	7/26/11	931									X			X				D	1	2.P		
	12	↓ -2	↓	932								X				↓				E		T	C	
	13	NBS5-0	↓	938								X				↓				E		T	C	
	14	-1	↓	939									X			↓				D		P		
	15	↓ -2	↓	940									↓			↓				↓		↓		
	16	NBS6-0	↓	946									↓			↓				↓		↓		
	17	↓ -1	↓	947								X				↓				E		T	C	
	18	↓ -2	↓	948									X			↓				D		2.P		
	19	NBS7-0	↓	955									↓			↓				↓		↓		
	20	↓ -1	↓	956									↓			↓				↓		↓		

- TAT starts 6AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co.; Addr.; City: State: Zip:

Bill To: Attn: See Above; Co.; Addr.; City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX; PRESERVATION; QA/QC: RTNE CT ✓; SWRCB Logcode_____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	119641- 21	NBS7-2	7/26/11	957										X		X				D	1	Zip		
	22	NBS8-0		1001																				
	23	-1		1002																				
	24	-2		1003									X							E		T	C	
	25	NBS9-0		1011									X							E		T	C	
	26	-1		1012										X						D		Zip		
	27	-2		1013																				
	28	NBS10-0		1021																				
	29	-1		1022																				
	30	-2		1023																				

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E6469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
			Marks	7/28/11	8:11

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn. See Above
Co:
Addr:
City State: Zip:

Bill To: Attn: See Above
Co.
Addr
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample: $2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	11G164-31	NBS11-0	7/26/11	1030										X		X				D	1	Zip		
	32	-1		1031								X								E		T	C	
	33	-2		1032										X						D		Zip		
	34	NBS12-0		1039																				
	35	-1		1040																				
	36	-2		1041								X								E		T	C	
	37	NBS13-0		1048										X						D		Zip		
	38	-1		1049																				
	39	-2		1050																				
	40	NBS14-0		1055								X								E		T	C	

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O #: _____

Logged By _____ Date _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	8:27

I hereby authorize ATL to perform the work indicated below
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co:; Addr:; City: State: Zip:

Bill To: Attn: See Above; Co:; Addr:; City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
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Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), Total Lead, pH

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	SOIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1159648 4'	NBS14-1	7/26/11	1056	X	D	1	2.P		
	5'	-2		1057						
	43	NBS15-0		1106						
	44	-1		1107						
	45	-2		1108						
	46	NBS16-0		1115						
	47	-1		1116						
	48	-2		1117		E		T	C	
	49	NBS17-0		1123		D		2.P		
	50	-1		1124						

* TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O #: _____
Logged By _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
			Mary	7/28/11	8:14

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co
Addr
City State Zip

Bill To: Attn: See Above
Co
Addr
City State Zip

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
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Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

QA/QC: RTNE CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	#	Type	PRESERVATION	REMARKS
	117164-51	NBS17-2	7/26/11	1125										X		X				D	1	Zip		
	52	NBS18-0	↓	1129										X		↓				↓	↓	↓		
	53	↓ -1		1130									X							E		T	C	
	54	↓ -2		1131										X						D		Zip		
	55	NBS19-0		1137									X							E		T	C	
	56	↓ -1		1138										X						D		Zip		
	57	↓ -2		1139																				
	58	NBS20-0		1147																				
	59	↓ -1		1148																				
	60	↓ -2	↓	1149										↓		↓				↓	↓	↓		

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
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Signal Hill, CA 90755
Tel: (562) 989-4045 ▪ Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By _____ Date _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
			Mark	7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-61	NBS21-0	7/28/11	1200								X				X				E	1	T	C	
	62	-1		1201										X						D		2		
	63	-2		1202																				
	64	NBS22-0		1206																				
	65	-1		1207																				
	66	-2		1209								X								E		T	C	
	67	NBS23-0		1214										X						D		2		
	68	-1		1215																				
	69	-2		1216																				
	70	NBS24-0		1220																				

▪ TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____

Logged By _____ Date _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E6469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	8/4

I hereby authorize ATL to perform the work indicated below.
Project Mgr./Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample: $2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), Total Lead, pH

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE ☐ CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1104-71	NBS24-1	7/26/11	1221									X			X				D	1	Zip		
	72	↓ -2	↓	1222									↓			↓				↓	↓	↓		
	73	NBS25-0		1228																				
	74	↓ -1		1229																				
	75	↓ -2		1230																				
	76	NBS26-0		1235																				
	77	↓ -1		1236									↓							↓		↓		
	78	↓ -2		1237								X								E		T	C	
	79	NBS27-0		1243								X								E		T	C	
	80	↓ -1	↓	1244									X			↓				D	↓	Zip		

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TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____

Logged By _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	On Trac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City State Zip:

Bill To: Attn: See Above
Co:
Addr:
City State Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

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- Records: $1 /ATL workorder /mo (after 1 year)

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SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE ☐ CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1109164-81	NBS27-2	7/26/11	1245										X				X			D	1	2.p		
	82	NBS28-0		1250																			2.p		
	83	-1		1251									X								E		T	C	
	84	-2		1252										X							D		2.p		
	85	NBS29-0		1257																					
	86	-1		1258																			X		
	87	-2		1259									X								E		T	C	
	88	NBS30-0		1302										X							D		2.p		
	89	-1		1303																					
	90	-2		1304																					

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
			Mike	7/28/11	8:14

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co:; Addr:; City: State: Zip:

Bill To: Attn: See Above; Co:; Addr:; City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

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SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A	8082	8260B	8270C	6010B	8015B (GRO) / 8020	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-91	NBS31-0	7/26/11	1308										X			X			D	1	Zip		
	92	-1		1309																				
	93	-2		1310																				
	94	SBS32-0		1325																				
	95	-1		1326																				
	96	-2		1327								X								E		T	C	
	97	SBS33-0		1337										X						D		Zip		
	98	-1		1338																				
	99	-2		1339																				
	100	SBS34-0		1341								X								E		T	C	

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____

Logged By: _____ Date _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
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Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
			Mike	7/28/11	514

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co.
Addr
City: State: Zip:

Bill To: Attn: See Above
Co.
Addr
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QA/QC: RTNE ☐ CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	117164-101	SB534-1	7/26/11	1342										X		X				D	1	2,D		
	102	-2		1343																				
	103	SB535-0		1351																				
	104	-1		1352								X								E		T	C	
	105	-2		1353										X						D		2,D		
	106	SB536-0		1357								X								E		T	C	
	107	-1		1358										X						D		2,D		
	108	-2		1359																				
	109	SB537-0		1404																				
	110	-1		1405																				

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CHAIN OF CUSTODY RECORD

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3275 Walnut Avenue
Signal Hill, CA 90755
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FOR LABORATORY USE ONLY

P.O #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other:

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Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	On trac	7/27/11	1530
				7/28/11	814

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Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co.; Addr; City State: Zip:

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	119164-111	SB537-2	7/26/11	1406										X		X				D	1	2 p		
	112	SB538-0		1412																				
	113	-1		1413																				
	114	-2		1414									X							E		T	C	
	115	SB539-0		1414										X						D		2 p		
	116	-1		1420																				
	117	-2		1421																				
	118	SB540-0		1425									X							E		T	C	
	119	-1		1426										X						D		2 p		
	120	-2		1427										X								2 p		

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Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	8:4

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City State Zip

Bill To: Attn: See Above
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	1197164-121	SB541-0	7/26/11	1433									X			X				D	1	2 P		
	122	-1		1434																				
	123	-2		1436								X								E		T	C	
	124	SB542-0		1442								X								E		T	C	
	125	-1		1443									X							D		2 P		
	126	-2		1444																				
	127	SB543-0		1449																				
	128	-1		1450																				
	129	-2		1451																				
	130	SB544 0		1456																				

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CHAIN OF CUSTODY RECORD

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FOR LABORATORY USE ONLY

P.O. #: _____
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Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
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Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
				7/28/11	814
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To:
Attn: See Above
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Addr:
City: State: Zip:

Bill To:
Attn: See Above
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Circle or Add Analysis(es) Requested

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-131	SB544-1	7/26/11	1457								X				X				D	1	T	C	
	132	↓ -2	↓	1458									X			↓				E	↓	2xp		
	133	SB545-0		1505									↓							↓		↓		
	134	↓ -1		1506																				
	135	↓ -2	↓	1507								X								D		T	C	
	136	NBM46-0	7/27/11	0743									X							E		2xp		
	137	↓ -1	↓	0744									↓							↓		↓		
	138	↓ -2		0745																				
	139	NBM47-0		0750																				
	140	↓ -1	↓	0751									↓			↓				↓	↓	↓		

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
			Marco	7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co.: ; Addr.: ; City: State: Zip:

Bill To: Attn: See Above; Co.: ; Addr.: ; City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	117164-141	NBM47-2	7/27/11	0752								X				X				E	1	T	C	
	142	NBM48-0		0757									X							D		Zip		
	143	-1		0758																				
	144	-2		0759																				
	145	NBM49-0		0803								X								E		T	C	
	146	-1		0804									X							D		Zip		
	147	-2		0805																				
	148	NBM50-0		0811																				
	149	-1		0812																				
	150	-2		0813																				

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16/25

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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Attention: R. Day
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Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
[signature]	7/27/11	1530	Ontrac	7/27/11	1530
			[signature]	7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
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Addr:
City: State: Zip:

Special Instructions/Comments:
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	1197640-151	NBM51-0	7/27/11	0820									X			X				D	1	2 zip		
	152	-1		0821								X								E		T	C	
	153	-2		0822									X							D		2 zip		
	154	NBM52-0		0829								X								E		T	C	
	155	-1		0830									X							D		2 zip		
	156	-2		0831																				
	157	NBM53-0		0837																				
	158	-1		0838																				
	159	-2		0839																				
	160	NBM54-0		0845																				

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17/25

CHAIN OF CUSTODY RECORD

Page 1 of 1

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Tel: 925.371.5900
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Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
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City: State: Zip:

Bill To: Attn: See Above
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Addr:
City: State: Zip:

Special Instructions/Comments:
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	119164-161	NBM54-1	7/27/11	0846										X		X				D	1	Zip		
	162	↓ -2		0847										X						↓		↓		
	163	NBM55-0		0852									X							E		T	C	
	164	↓ -1		0853										X						D		Zip		
	165	↓ -2		0854																				
	166	NBM56-0		0902																				
	167	↓ -1		0903																				
	168	↓ -2		0904									X							E		T	C	
	169	NBM57-0		0912										X						D		Zip		
	170	↓ -1		0913																				

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

18/25

CHAIN OF CUSTODY RECORD

Page Page of

Advanced Technology Laboratories

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Signal Hill, CA 90755
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Sample Condition Upon Receipt:
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6. PRESERVED Y ☐ N ☐

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Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

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Send Report To: Attn: See Above
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	11/9/644-171	NBM57-2	7/27/11	0914									X				X				D	1	2 P	
	172	NBM58-0		0919																				
	173	-1		0920																				
	174	-2		0921								X									E		T	C
	175	NBM59-0		0931								X									E		T	C
	176	-1		0932									X								D		2 P	
	177	-2		0933																				
	178	NBM60-0		0939																				
	179	-1		0940																				
	180	-2		0941																				

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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FOR LABORATORY USE ONLY

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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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Client: Geocon Inc.
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Address: 6671 Brisa St
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Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	On Trac	7/27/11	1530
			Mary	7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
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QA/QC: RTNE CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1151641-181	NBM61-0	7/27/11	947										X		X				D	1	2 P		
	182	-1		948									X							E		T	C	
	183	-2		949										X						D		2 P		
	184	NBM62-0		956																				
	185	-1		957																				
	186	-2		958									X							E		T	C	
	187	NBM63-0		1002										X						D		2 P		
	188	-1		1003																				
	189	-2		1004																				
	190	NBM64-0		1006																				

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Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	314

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co.:
Addr:
City: State: Zip:

Bill To: Attn: See Above
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Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), Total Lead, pH

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE ☐ CT ✓
SWRCB Logcode: _____
OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A	8082	8260B	8270C	6010B	8015B (GRO)	8015B (DRO)	8021	TITLE 22	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-191	NBM64-1	7/27/11	1009										X		X				D	1	zip		
	192	-2		1010									X							E		T	C	
	193	NBM65-0		1017										X						D		zip		
	194	-1		1018																				
	195	-2		1019																				
	196	NBM66-0		1023									X							E		T	C	
	197	-1		1024										X						D		zip		
	198	-2		1025																				
	199	NBM67-0		1033																				
	200	-1		1034																				

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Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below:
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Storage Fees (applies when storage is requested):
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- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ✓ SWRCB Logcode_____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-251	~~NBM68-2~~ NBM67-2	7/27/11	1035								X				X				E	1	T	C	
	252	NBM68-0		1041									X							D		Zip		
	253	-1		1042								X								E		T	C	
	254	-2		1043									X							D		Zip		
	255	NBM69-0		1044																				
	256	-1		1050																				
	257	-2		1051																				
	258	SBS20-0		1105																				
	259	-1		1106																				
	260	-2		1107																				

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By _____ Date _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	914

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), Total Lead, pH

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE CT ✓; SWRCB Logcode _____; OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	Total Lead	SOIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	11072-4-211	SB571-0	7/27/11	1113	X	X	D	1	Zip		
	212	-1		1114							
	213	-2		1115	X		E		T	C	
	214	SB572-0		1123	X		D		Zip		
	215	-1		1124							
	216	-2		1125							
	217	SB573-0		1129	X		E		T	C	
	218	-1		1130	X		D		Zip		
	219	-2		1131							
	220	SB574-0		1130							

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Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

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- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ✓ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	6021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-221	SB574-1	7/27/11	1139										X		X				D	1	2 P		
	222	↓ -2		1140										↓		↓				↓	↓	↓		
	223	SB575-0		1144																				
	224	↓ -1		1145										↓										
	225	↓ -2		1146								X								E		T	C	
	226	SB576-0		1155										X						D		2 P		
	227	↓ -1		1156								X								E		T	C	
	228	↓ -2		1157										X						D		2 P		
	229	SB577-0		1202																				
	230	↓ -1	↓	1203										↓		↓				↓	↓	↓		

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
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FOR LABORATORY USE ONLY

P.O. #: _____
Logged By _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
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Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
			Mayo	7/28/11	8:11

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co; Addr; City: State: Zip:

Bill To: Attn: See Above; Co; Addr; City: State: Zip:

Special Instructions/Comments: Please send EDF and EXCEL to cook@geoconinc.com

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ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1/9/64-231	SB577-2	7/27/11	1204									X			X				D	1	2,P		
	232	SB578-0		1212																				
	233	-1		1213																				
	234	-2		1214								X								E		T	C	
	235	SB579-0		1220								X								E		T	C	
	236	-1		1221									X							D		2,P		
	237	-2		1222																				
	238	SB580-0		1226																				
	239	-1		1227																				
	240	-2		1229																				

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
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FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above; Co: ; Addr: ; City: State: Zip:

Bill To: Attn: See Above; Co: ; Addr: ; City: State: Zip:

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	1191244-241	SB581-0	7/22/11	1233									X			X				D	1	Z,N		
	242	-1		1234								X								E		T	BC	
	243	-2		1235									X							D		Z,P		

QA/QC: RTNE ☐ CT ✓
SWRCB Logcode _____
OTHER _____

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Carmen Aguila

From: Rebecca Silva [silva@geoconinc.com]
Sent: Thursday, July 28, 2011 4:30 PM
To: Carmen Aguila
Subject: Marin-Sonoma Narrows
Attachments: 20110728163045936.pdf

Hi Margot -

The sample labeled NBS3-2 at 0916 should be NBS2-2 as shown on the COC.

The sample tube marked SBS40-2 with the ziploc labeled SBS41-2 at 1436 should be SBS41-2 as shown on the COC.

NBS31-0 should only be analyzed for total lead even though it is in a tube.

I have attached page 5 with the analyses added and page 14 with the TAT corrected.

Please call with additional questions.

Thanks,
Rebecca

-----Original Message-----
From: sacramento.geoconinc.com [mailto:sacramento.geoconinc.com]
Sent: Thursday, July 28, 2011 1:31 PM
To: Rebecca Silva
Subject:

This E-mail was sent from "RNPD69799" (MP C6000/LD260c).

Scan Date: 07.28.2011 16:30:45 (-0400)
Queries to: sacramento.geoconinc.com

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	7/27/11	1530	Ontrac	7/27/11	1530
				7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

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Circle or Add Analysis(es) Requested

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119164-41	NBS14-1	7/26/11	1056										X		X				D	1	2,P		
	42	-2		1057																				
	43	NBS15-0		1106																				
	44	-1		1107																				
	45	-2		1108																				
	46	NBS16-0		1115																				
	47	-1		1116																				
	48	-2		1117								X								E		T	C	
	49	NBS17-0		1123										X						D		2,P		
	50	-1		1124																				

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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
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6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02A
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
[signature]	7/27/11	1530	Ontrac	7/27/11	1530
			[signature]	7/28/11	814

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co: _____
Addr: _____
City: State: Zip:

Bill To: Attn: See Above
Co: _____
Addr: _____
City: State: Zip:

Special Instructions/Comments:
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QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	11G164-131	SB544-1	7/26/11	1457								X				X				~~D~~E	1	T	C	
	132	↓ -2	↓	1458									X			↓				~~D~~	2	P		
	133	SB545-0		1505									↓							↓	↓	↓		
	134	↓ -1		1506																				
	135	↓ -2	↓	1507								X								~~D~~E		T	C	
	136	NBM46-0	7/27/11	0743									X							~~D~~		P		
	137	↓ -1		0744									↓							↓		↓		
	138	↓ -2		0745																				
	139	NBM47-0		0750																				
	140	↓ -1	↓	0751									↓			↓				↓	↓	↓		

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Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

August 11, 2011

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119164

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on July 28, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119164

CASE NARRATIVE

Analytical Comments for Method 7420

Diltion was necessary for saamples 119164-022A, 119164-035A, 119164-046A, 119164-049A, 119164-067A, 119164-085A, 119164-088A, 119164-094A, 119164-115A, 119164-118A, 119164-124A, 119164-160A, 119164-166A, 119164-169A, 119164-172A, 119164-178A, 119164-184A, 119164-190A, 119164-199A, 119164-220A, 119164-223A, 119164-226A, 119164-235A, 119164-238A and 119164-241A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 119164-034AMS, 119164-199AMS, 119164-235AMS, 119164-235AMSD, 119164-241AMS and 119164-241AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/11/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-001A	NBS 1-0	2.4	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-005A	NBS 2-1	8.1	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-007A	NBS 3-0	5.6	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-010A	NBS 4-0	9.0	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-019A	NBS 7-0	5.5	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-022A	NBS 8-0	9.7	mg/L	74709	0.50	2	7/26/2011	8/8/2011
119164-026A	NBS 9-1	1.7	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-029A	NBS 10-1	6.9	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-033A	NBS 11-2	3.4	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-034A	NBS 12-0	8.6	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-035A	NBS 12-1	15	mg/L	74709	0.50	2	7/26/2011	8/8/2011
119164-039A	NBS 13-2	1.7	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-040A	NBS 14-0	3.8	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-043A	NBS 15-0	1.3	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-044A	NBS 15-1	5.8	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-045A	NBS 15-2	3.4	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-046A	NBS 16-0	42	mg/L	74709	1.2	5	7/26/2011	8/8/2011
119164-047A	NBS 16-1	0.54	mg/L	74709	0.25	1	7/26/2011	8/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/11/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-049A	NBS 17-0	45	mg/L	74709	2.5	10	7/26/2011	8/8/2011
119164-052A	NBS 18-0	2.7	mg/L	74709	0.25	1	7/26/2011	8/8/2011
119164-054A	NBS 18-2	1.5	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-058A	NBS 20-0	5.1	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-064A	NBS 22-0	7.2	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-067A	NBS 23-0	12	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-071A	NBS 24-1	2.5	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-073A	NBS 25-0	7.0	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-076A	NBS 26-0	7.0	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-082A	NBS 28-0	4.0	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-085A	NBS 29-0	12	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-088A	NBS 30-0	12	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-094A	SBS 32-0	16	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-098A	SBS 33-1	1.4	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-100A	SBS 34-0	1.9	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-101A	SBS 34-1	2.9	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-103A	SBS 35-0	1.1	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-107A	SBS 36-1	1.7	mg/L	74710	0.25	1	7/26/2011	8/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/11/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-109A	SBS 37-0	2.7	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-112A	SBS 38-0	1.5	mg/L	74710	0.25	1	7/26/2011	8/8/2011
119164-115A	SBS 39-0	10	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-118A	SBS 40-0	10	mg/L	74710	0.50	2	7/26/2011	8/8/2011
119164-124A	SBS 42-0	120	mg/L	74711	5.0	20	7/26/2011	8/8/2011
119164-133A	SBS 45-0	5.6	mg/L	74711	0.25	1	7/26/2011	8/8/2011
119164-136A	NBM 46-0	4.0	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-139A	NBM 47-0	7.7	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-148A	NBM 50-0	4.8	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-151A	NBM 51-0	5.1	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-155A	NBM 52-1	5.2	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-157A	NBM 53-0	8.5	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-160A	NBM 54-0	13	mg/L	74711	0.50	2	7/27/2011	8/8/2011
119164-166A	NBM 56-0	15	mg/L	74711	0.50	2	7/27/2011	8/8/2011
119164-169A	NBM 57-0	29	mg/L	74711	1.2	5	7/27/2011	8/8/2011
119164-172A	NBM 58-0	9.3	mg/L	74711	0.50	2	7/27/2011	8/8/2011
119164-178A	NBM 60-0	13	mg/L	74711	0.50	2	7/27/2011	8/8/2011
119164-184A	NBM 62-0	12	mg/L	74711	0.50	2	7/27/2011	8/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/11/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-187A	NBM 63-0	7.6	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-190A	NBM 64-0	20	mg/L	74711	1.0	4	7/27/2011	8/8/2011
119164-193A	NBM 65-0	5.0	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-194A	NBM 65-1	3.6	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-196A	NBM 66-0	2.4	mg/L	74711	0.25	1	7/27/2011	8/8/2011
119164-199A	NBM 67-0	9.5	mg/L	74711	0.50	2	7/27/2011	8/8/2011
119164-202A	NBM 68-0	2.8	mg/L	74712	0.25	1	7/27/2011	8/8/2011
119164-205A	NBM 69-0	4.6	mg/L	74712	0.25	1	7/27/2011	8/8/2011
119164-206A	NBM 69-1	0.55	mg/L	74712	0.25	1	7/27/2011	8/8/2011
119164-211A	SBS 71-0	5.0	mg/L	74712	0.25	1	7/27/2011	8/9/2011
119164-220A	SBS 74-0	10	mg/L	74712	0.50	2	7/27/2011	8/8/2011
119164-223A	SBS 75-0	10	mg/L	74712	0.50	2	7/27/2011	8/8/2011
119164-226A	SBS 76-0	17	mg/L	74712	0.50	2	7/27/2011	8/8/2011
119164-229A	SBS 77-0	8.7	mg/L	74712	0.25	1	7/27/2011	8/8/2011
119164-232A	SBS 78-0	4.8	mg/L	74712	0.25	1	7/27/2011	8/8/2011
119164-235A	SBS 79-0	130	mg/L	74712	5.0	20	7/27/2011	8/8/2011
119164-238A	SBS 80-0	9.6	mg/L	74712	0.50	2	7/27/2011	8/8/2011
119164-241A	SBS 81-0	16	mg/L	74712	0.50	2	7/27/2011	8/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-74709A** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **PBS** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222001**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74709** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **LCSS** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222002**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.246	0.25	5.000	0	105	80	120				

Sample ID: **119164-034A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **NBS 12-0** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222013**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	8.508	0.25						8.556	0.559	20	

Sample ID: **119164-034A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **NBS 12-0** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222014**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	10.847	0.50	5.000	8.556	45.8	80	120				S

Sample ID: **MB-74709** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **PBS** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222015**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **119164-052A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **NBS 18-0** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222026**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.664	0.25						2.728	2.40	20	

Sample ID: **119164-052A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **NBS 18-0** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222027**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.999	0.25	5.000	2.728	85.4	80	120				

Sample ID: **119164-052A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135669**
Client ID: **NBS 18-0** Batch ID: **74709** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222028**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.771	0.25	5.000	2.728	80.9	80	120	6.999	3.31	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-74710A** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **PBS** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222029**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74710** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **LCSS** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222030**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.693	0.25	5.000	0	93.9	80	120				

Sample ID: **119164-088A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **NBS 30-0** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222041**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	12.494	0.50						12.38	0.882	20	

Sample ID: **119164-088A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **NBS 30-0** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222042**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	17.269	0.50	5.000	12.38	97.7	80	120				

Sample ID: **MB-74710B** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **PBS** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222043**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Qualifiers:

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ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **119164-118A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **SBS 40-0** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222054**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	10.466	0.50						10.20	2.56	20	

Sample ID: **119164-118A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **SBS 40-0** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222055**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	14.973	0.50	5.000	10.20	95.4	80	120				

Sample ID: **119164-118A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135670**
Client ID: **SBS 40-0** Batch ID: **74710** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	15.131	0.50	5.000	10.20	98.6	80	120	14.97	1.05	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
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DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-74711A** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **PBS** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222057**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74711** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **LCSS** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222058**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.274	0.25	5.000	0	105	80	120				

Sample ID: **119164-166A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **NBM 56-0** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222069**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	14.063	0.50						14.56	3.47	20	

Sample ID: **119164-166A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **NBM 56-0** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222070**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	19.017	1.0	5.000	14.56	89.1	80	120				

Sample ID: **MB-74711B** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **PBS** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222071**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.214	0.25									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **119164-199A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **NBM 67-0** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222082**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	9.644	0.50						9.467	1.86	20	

Sample ID: **119164-199A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **NBM 67-0** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	13.454	0.50	5.000	9.467	79.7	80	120				S

Sample ID: **119164-199A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135671**
Client ID: **NBM 67-0** Batch ID: **74711** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222084**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	13.616	0.50	5.000	9.467	83.0	80	120	13.45	1.20	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-74712A** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **PBS** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222085**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74712** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **LCSS** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222086**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.668	0.25	5.000	0	93.4	80	120				

Sample ID: **119164-235A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **SBS 79-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222096**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	122.745	5.0						126.2	2.77	20	

Sample ID: **119164-235A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **SBS 79-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222097**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	135.141	5.0	5.000	126.2	179	80	120				S

Sample ID: **MB-74712B** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **PBS** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222098**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **119164-241A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **SBS 81-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222101**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	16.455	0.50						16.26	1.17	20	

Sample ID: **119164-241A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **SBS 81-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222102**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	18.953	1.0	5.000	16.26	53.8	80	120				S

Sample ID: **119164-241A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135672**
Client ID: **SBS 81-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/8/2011** SeqNo: **2222103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	18.794	1.0	5.000	16.26	50.6	80	120	18.95	0.843	20	S

Sample ID: **MB-74712B** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135688**
Client ID: **PBS** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/9/2011** SeqNo: **2222323**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74712** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135688**
Client ID: **LCSS** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/9/2011** SeqNo: **2222324**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.693	0.25	5.000	0	93.9	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **119164-235A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135688**
Client ID: **SBS 79-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/9/2011** SeqNo: **2222326**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	149.224	5.0						149.2	0.0279	20	

Sample ID: **119164-235A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135688**
Client ID: **SBS 79-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/9/2011** SeqNo: **2222327**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	151.335	5.0	5.000	149.2	43.1	80	120				S

Sample ID: **119164-235A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **8/6/2011** RunNo: **135688**
Client ID: **SBS 79-0** Batch ID: **74712** TestNo: **WET/ EPA 74 WET** Analysis Date: **8/9/2011** SeqNo: **2222328**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	151.965	5.0	5.000	149.2	55.7	80	120	151.3	0.415	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: Rick Day [day@geoconinc.com]
Sent: Tuesday, August 02, 2011 4:40 PM
To: Diane Galvan
Subject: RE: TTLC Results/EDD - Marin-Sonoma Narrows Segment B3 (119164)

Thanks Diane -

Please run WET lead on all samples >50 mg/kg.

This also applies to the samples which are currently being run for CAM17 (but don"t have results yet because they are 1-wk TAT).

1-wk TAT for the WETs please.

Thanks,
Rick.

Richard Day, PG, CEG, CHG | *Vice President*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900, ext. 201 Fax 925.371.5915 Cell 925.872.5860
www.geoconinc.com

August 18, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119164

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on July 28, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119164

CASE NARRATIVE

Analytical Comments for Method 7420

Diltion was necessary for sample 119164-235A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 119242-004AMS and 119242-004AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for sample 119164-241ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/18/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION
WET DI/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-005A	NBS 2-1	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-007A	NBS 3-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-010A	NBS 4-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-019A	NBS 7-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-022A	NBS 8-0	0.29	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-029A	NBS 10-1	0.30	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-034A	NBS 12-0	0.31	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-035A	NBS 12-1	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-044A	NBS 15-1	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-046A	NBS 16-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-049A	NBS 17-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-058A	NBS 20-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-067A	NBS 23-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-073A	NBS 25-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-076A	NBS 26-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-085A	NBS 29-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-088A	NBS 30-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-094A	SBS 32-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/18/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION
WET DI/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-115A	SBS 39-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-118A	SBS 40-0	ND	mg/L	74903	0.25	1	7/26/2011	8/17/2011
119164-124A	SBS 42-0	ND	mg/L	74904	0.25	1	7/26/2011	8/17/2011
119164-133A	SBS 45-0	ND	mg/L	74904	0.25	1	7/26/2011	8/17/2011
119164-139A	NBM 47-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-151A	NBM 51-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-155A	NBM 52-1	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-157A	NBM 53-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-160A	NBM 54-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-166A	NBM 56-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-169A	NBM 57-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-172A	NBM 58-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-178A	NBM 60-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-184A	NBM 62-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-187A	NBM 63-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-190A	NBM 64-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-193A	NBM 65-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-199A	NBM 67-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/18/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION
WET DI/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-211A	SBS 71-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-220A	SBS 74-0	ND	mg/L	74904	0.25	1	7/27/2011	8/18/2011
119164-223A	SBS 75-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-226A	SBS 76-0	ND	mg/L	74904	0.25	1	7/27/2011	8/17/2011
119164-229A	SBS 77-0	ND	mg/L	74905	0.25	1	7/27/2011	8/17/2011
119164-235A	SBS 79-0	ND	mg/L	74905	0.25	1	7/27/2011	8/17/2011
119164-238A	SBS 80-0	ND	mg/L	74905	0.25	1	7/27/2011	8/17/2011
119164-241A	SBS 81-0	ND	mg/L	74905	0.25	1	7/27/2011	8/17/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 8/18/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-046A	NBS 16-0	1.7	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-049A	NBS 17-0	2.3	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-067A	NBS 23-0	0.40	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-088A	NBS 30-0	0.48	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-094A	SBS 32-0	0.26	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-115A	SBS 39-0	0.45	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-118A	SBS 40-0	0.41	mg/L	74948	0.25	1	7/26/2011	8/17/2011
119164-124A	SBS 42-0	5.0	mg/L	74833	0.25	1	7/26/2011	8/11/2011
119164-169A	NBM 57-0	1.6	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-172A	NBM 58-0	0.88	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-178A	NBM 60-0	0.39	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-190A	NBM 64-0	0.73	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-199A	NBM 67-0	ND	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-220A	SBS 74-0	ND	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-223A	SBS 75-0	ND	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-226A	SBS 76-0	0.48	mg/L	74948	0.25	1	7/27/2011	8/17/2011
119164-235A	SBS 79-0	11	mg/L	74833	0.50	2	7/27/2011	8/11/2011
119164-241A	SBS 81-0	0.43	mg/L	74948	0.25	1	7/27/2011	8/17/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **MB-74903A** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **PBS** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226467**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74903** SampType: **LCS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **LCSS** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226468**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.120	0.25	5.000	0	102	80	120				

Sample ID: **119164-046A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **NBS 16-0** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226479**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-046A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **NBS 16-0** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226480**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.020	0.25	5.000	0	100	70	130				

Sample ID: **MB-74903B** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **PBS** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226481**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **119164-118A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **SBS 40-0** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226492**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-118A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **SBS 40-0** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226493**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.241	0.25	5.000	0	105	70	130				

Sample ID: **119164-118A-MSD** SampType: **MSD** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135892**
Client ID: **SBS 40-0** Batch ID: **74903** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226494**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.166	0.25	5.000	0	103	70	130	5.241	1.43	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **MB-74904A** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **PBS** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226495**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74904** SampType: **LCS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **LCSS** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226496**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.155	0.25	5.000	0	103	80	120				

Sample ID: **119164-172A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **NBM 58-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226507**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-172A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **NBM 58-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226508**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.290	0.25	5.000	0	106	70	130				

Sample ID: **MB-74904B** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **PBS** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226509**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **119164-226A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-226A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.056	0.25	5.000	0	101	70	130				

Sample ID: **119164-226A-MSD** SampType: **MSD** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135893**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.110	0.25	5.000	0	102	70	130	5.056	1.07	20	

Sample ID: **MB-74904B** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135906**
Client ID: **PBS** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/18/2011** SeqNo: **2226939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74904** SampType: **LCS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135906**
Client ID: **LCSS** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/18/2011** SeqNo: **2226940**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.701	0.25	5.000	0	94.0	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **119164-226A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135906**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/18/2011** SeqNo: **2226943**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-226A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135906**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/18/2011** SeqNo: **2226944**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.857	0.25	5.000	0	97.1	70	130				

Sample ID: **119164-226A-MSD** SampType: **MSD** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135906**
Client ID: **SBS 76-0** Batch ID: **74904** TestNo: **WET DI/ EPA WET** Analysis Date: **8/18/2011** SeqNo: **2226945**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.658	0.25	5.000	0	93.2	70	130	4.857	4.18	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI_GEOCON

Sample ID: **MB-74905A** SampType: **MBLK** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135894**
Client ID: **PBS** Batch ID: **74905** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226527**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74905** SampType: **LCS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135894**
Client ID: **LCSS** Batch ID: **74905** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226528**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.196	0.25	5.000	0	104	80	120				

Sample ID: **119164-241A-DUP** SampType: **DUP** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135894**
Client ID: **SBS 81-0** Batch ID: **74905** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226533**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **119164-241A-MS** SampType: **MS** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135894**
Client ID: **SBS 81-0** Batch ID: **74905** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226534**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.852	0.25	5.000	0	97.0	70	130				

Sample ID: **119164-241A-MSD** SampType: **MSD** TestCode: **7420_DI_GEO** Units: **mg/L** Prep Date: **8/15/2011** RunNo: **135894**
Client ID: **SBS 81-0** Batch ID: **74905** TestNo: **WET DI/ EPA WET** Analysis Date: **8/17/2011** SeqNo: **2226535**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.127	0.25	5.000	0	103	70	130	4.852	5.51	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-74833A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **PBS** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223654**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-74822A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **PBS** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223655**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74833** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **LCSS** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223656**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.872	0.25	1.000	0	87.2	80	120				

Sample ID: **119242-004A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **ZZZZZZ** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223665**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.875	0.25						0.8386	4.29	20	

Sample ID: **119242-004A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **ZZZZZZ** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223666**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.533	0.25	2.500	0.8386	67.8	70	130				S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **119242-004A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/10/2011** RunNo: **135757**
Client ID: **ZZZZZZ** Batch ID: **74833** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/11/2011** SeqNo: **2223667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.496	0.25	2.500	0.8386	66.3	70	130	2.533	1.47	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-74948A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **PBS** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226258**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-74926A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **PBS** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226259**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-74948** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **LCSS** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226260**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.865	0.25	1.000	0	86.5	80	120				

Sample ID: **119164-178A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **NBM 60-0** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226271**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.385	0.25						0.3903	1.27	20	

Sample ID: **119164-178A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **NBM 60-0** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226272**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.767	0.25	2.500	0.3903	95.1	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-74948B** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **PBS** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226273**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-74926B TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **PBS** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226274**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **119164-241A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **SBS 81-0** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.539	0.25						0.4316	22.2	20	R

Sample ID: **119164-241A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **SBS 81-0** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226282**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.202	0.25	2.500	0.4316	111	70	130				

Sample ID: **119164-241A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/16/2011** RunNo: **135881**
Client ID: **SBS 81-0** Batch ID: **74948** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/17/2011** SeqNo: **2226283**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.140	0.25	2.500	0.4316	108	70	130	3.202	1.95	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Rick Day [day@geoconinc.com]
Sent: Thursday, August 11, 2011 5:29 PM
To: Diane Galvan
Subject: RE: Additional Results/EDD - Marin-Sonoma Narrows Segment B3 (119164)
Attachments: 119164 DI-WET and TCLP Order.xls

Hi Diane -

Please see below and appended for DI-WET lead and TCLP lead request - standard TAT please.

	DI-WET	TCLP
NBS 2-1	X	---
NBS 3-0	X	---
NBS 4-0	X	---
NBS 7-0	X	---
NBS 8-0	X	---
NBS 10-1	X	---
NBS 12-0	X	---
NBS 12-1	X	---
NBS 15-1	X	---
NBS 16-0	X	X
NBS 17-0	X	X
NBS 20-0	X	---
NBS 23-0	X	X
NBS 25-0	X	---
NBS 26-0	X	---
NBS 29-0	X	---
NBS 30-0	X	X
SBS 32-0	X	X
SBS 39-0	X	X
SBS 40-0	X	X
SBS 42-0	X	X
SBS 45-0	X	---
NBM 47-0	X	---
NBM 51-0	X	---
NBM 52-1	X	---
NBM 53-0	X	---
NBM 54-0	X	---
NBM 56-0	X	---
NBM 57-0	X	X
NBM 58-0	X	X
NBM 60-0	X	X
NBM 62-0	X	---
NBM 63-0	X	---
NBM 64-0	X	X
NBM 65-0	X	---
NBM 67-0	X	X
SBS 71-0	X	---
SBS 74-0	X	X
SBS 75-0	X	X
SBS 76-0	X	X

SBS 77-0	X	---
SBS 79-0	X	X
SBS 80-0	X	---
SBS 81-0	X	X

Thanks,
Rick.

Richard Day, PG, CEG, CHG | *Vice President*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900, ext. 201 Fax 925.371.5915 Cell 925.872.5860
www.geoconinc.com

August 19, 2011

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119164

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on July 28, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: 8/19/2011

ANALYTICAL RESULTS

pH
EPA 9045C

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	pH	**Analyst:**	CBB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-005A	NBS 2-1	8.1	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-007A	NBS 3-0	8.1	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-010A	NBS 4-0	8.1	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-019A	NBS 7-0	8.0	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-022A	NBS 8-0	8.3	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-029A	NBS 10-1	8.3	pH Units	R135846	0.10	1	7/26/2011	8/16/2011
119164-034A	NBS 12-0	10	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-035A	NBS 12-1	7.7	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-044A	NBS 15-1	7.3	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-046A	NBS 16-0	7.4	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-049A	NBS 17-0	7.7	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-058A	NBS 20-0	7.6	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-067A	NBS 23-0	7.1	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-073A	NBS 25-0	7.4	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-076A	NBS 26-0	7.7	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-085A	NBS 29-0	7.8	pH Units	R135853	0.10	1	7/26/2011	8/16/2011
119164-088A	NBS 30-0	6.6	pH Units	R135855	0.10	1	7/26/2011	8/16/2011
119164-094A	SBS 32-0	6.7	pH Units	R135855	0.10	1	7/26/2011	8/16/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 8/19/2011

ANALYTICAL RESULTS

pH
EPA 9045C

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	pH	**Analyst:**	CBB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-115A	SBS 39-0	7.7	pH Units	R135855	0.10	1	7/26/2011	8/16/2011
119164-118A	SBS 40-0	7.4	pH Units	R135855	0.10	1	7/26/2011	8/16/2011
119164-124A	SBS 42-0	7.6	pH Units	R135855	0.10	1	7/26/2011	8/16/2011
119164-133A	SBS 45-0	7.8	pH Units	R135855	0.10	1	7/26/2011	8/16/2011
119164-139A	NBM 47-0	7.6	pH Units	R135855	0.10	1	7/27/2011	8/16/2011
119164-151A	NBM 51-0	7.9	pH Units	R135855	0.10	1	7/27/2011	8/16/2011
119164-155A	NBM 52-1	7.8	pH Units	R135855	0.10	1	7/27/2011	8/16/2011
119164-157A	NBM 53-0	7.7	pH Units	R135855	0.10	1	7/27/2011	8/16/2011
119164-160A	NBM 54-0	7.1	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-166A	NBM 56-0	7.9	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-169A	NBM 57-0	8.0	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-172A	NBM 58-0	8.2	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-178A	NBM 60-0	8.2	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-184A	NBM 62-0	8.2	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-187A	NBM 63-0	8.3	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-190A	NBM 64-0	8.4	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-193A	NBM 65-0	8.1	pH Units	R135856	0.10	1	7/27/2011	8/16/2011
119164-199A	NBM 67-0	8.0	pH Units	R135856	0.10	1	7/27/2011	8/16/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
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Advanced Technology Laboratories

Date: 8/19/2011

ANALYTICAL RESULTS

pH
EPA 9045C

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119164
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	7/28/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	pH	**Analyst:**	CBB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119164-211A	SBS 71-0	7.6	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-220A	SBS 74-0	7.2	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-223A	SBS 75-0	8.1	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-226A	SBS 76-0	8.3	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-229A	SBS 77-0	8.1	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-235A	SBS 79-0	7.9	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-238A	SBS 80-0	8.3	pH Units	R135857	0.10	1	7/27/2011	8/16/2011
119164-241A	SBS 81-0	8.3	pH Units	R135857	0.10	1	7/27/2011	8/16/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
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CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **119340-001ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **135846**
Client ID: **ZZZZZZ** Batch ID: **R135846** TestNo: **EPA 9045C** Analysis Date: **8/16/2011** SeqNo: **2225534**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.230	0.10						7.340	1.51	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **119164-085ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **135853**
Client ID: **NBS 29-0** Batch ID: **R135853** TestNo: **EPA 9045C** Analysis Date: **8/16/2011** SeqNo: **2225626**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.880	0.10						7.780	1.28	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **119164-133ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **135855**
Client ID: **SBS 45-0** Batch ID: **R135855** TestNo: **EPA 9045C** Analysis Date: **8/16/2011** SeqNo: **2225640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.670	0.10						7.790	1.55	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **119164-160ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **135856**
Client ID: **NBM 54-0** Batch ID: **R135856** TestNo: **EPA 9045C** Analysis Date: **8/16/2011** SeqNo: **2225646**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.210	0.10						7.090	1.68	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **119164-223ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **135857**
Client ID: **SBS 75-0** Batch ID: **R135857** TestNo: **EPA 9045C** Analysis Date: **8/16/2011** SeqNo: **2225659**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	8.100	0.10						8.060	0.495	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Rick Day [day@geoconinc.com]
Sent: Monday, August 15, 2011 2:13 PM
To: 'Rick Day'; Diane Galvan
Subject: RE: Additional Results/EDD - Marin-Sonoma Narrows Segment B3 (119164)

Hi Diane -

I forgot to order pH anlayses - please run pH on samples analyzed for DI-WET.

Thanks.

Richard Day, PG, CEG, CHG | *Vice President*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900, ext. 201 Fax 925.371.5915 Cell 925.872.5860
www.geoconinc.com

August 26, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119164

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on July 28, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119164

CASE NARRATIVE

Analytical Comments for Method 7420

Dilution was necessary for samples 119164-004A, 119164-017A, 119164-024A, 119164-025A, 119164-032A, 119164-061A, 119164-066A, 119164-083A, 119164-106A, 119164-141A, 119164-174A, 119164-182A, 119164-186A, 119164-213A, 119164-217A, 119164-225A, 119164-227A and 119164-234A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119164-004 **Collection Date:** 7/26/2011
Client Sample ID: NBS 2-0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:06 PM

Lab ID: 119164-017 **Collection Date:** 7/26/2011
Client Sample ID: NBS 6-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:09 PM
Nickel	ND	1.0		mg/L	20	8/25/2011 03:09 PM

Lab ID: 119164-024 **Collection Date:** 7/26/2011
Client Sample ID: NBS 8-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:12 PM

Lab ID: 119164-025 **Collection Date:** 7/26/2011
Client Sample ID: NBS 9-0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119164-032 **Collection Date:** 7/26/2011
Client Sample ID: NBS 11-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:20 PM

Lab ID: 119164-061 **Collection Date:** 7/26/2011
Client Sample ID: NBS 21-0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:23 PM

Lab ID: 119164-066 **Collection Date:** 7/26/2011
Client Sample ID: NBS 22-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:26 PM

Lab ID: 119164-083 **Collection Date:** 7/26/2011
Client Sample ID: NBS 28-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119164-106 **Collection Date:** 7/26/2011
Client Sample ID: SBS 36-0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:40 PM

Lab ID: 119164-141 **Collection Date:** 7/27/2011
Client Sample ID: NBM 47-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:43 PM
Nickel	ND	1.0		mg/L	20	8/25/2011 03:43 PM

Lab ID: 119164-174 **Collection Date:** 7/27/2011
Client Sample ID: NBM 58-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 03:59 PM

Lab ID: 119164-182 **Collection Date:** 7/27/2011
Client Sample ID: NBM 61-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:03 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119164-186 **Collection Date:** 7/27/2011
Client Sample ID: NBM 62-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:06 PM

Lab ID: 119164-213 **Collection Date:** 7/27/2011
Client Sample ID: SBS 71-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:16 PM

Lab ID: 119164-217 **Collection Date:** 7/27/2011
Client Sample ID: SBS 73-0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:19 PM
Nickel	ND	1.0		mg/L	20	8/25/2011 04:19 PM

Lab ID: 119164-225 **Collection Date:** 7/27/2011
Client Sample ID: SBS 75-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:23 PM
Nickel	ND	1.0		mg/L	20	8/25/2011 04:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *26-Aug-11*

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119164-227 **Collection Date:** 7/27/2011
Client Sample ID: SBS 76-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:26 PM

Lab ID: 119164-234 **Collection Date:** 7/27/2011
Client Sample ID: SBS 78-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110825D	QC Batch: R136090			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/25/2011 04:30 PM
Nickel	1.2	1.0		mg/L	20	8/25/2011 04:30 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-75043A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **PBS** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229875**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Nickel	ND	0.050									

Sample ID: **MB-75043A ST** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **PBS** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229876**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	1.0									
Nickel	0.028	1.0									

Sample ID: **LCS-75043** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **LCSS** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229877**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	1.796	1.0	2.000	0	89.8	85	115				
Nickel	2.011	1.0	2.000	0.02837	99.1	85	115				

Sample ID: **119164-141A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **NBM 47-2** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.073	1.0						0.07022	0	20	
Nickel	0.388	1.0						0.4765	0	20	

Sample ID: **119164-141A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **NBM 47-2** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229889**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **119164-141A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **NBM 47-2** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229889**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.374	1.0	2.500	0.07022	92.1	78	115				
Nickel	2.807	1.0	2.500	0.4765	93.2	78	120				

Sample ID: **MB-75043B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **PBS** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229890**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Nickel	ND	0.050									

Sample ID: **MB-75043B ST** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **PBS** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229891**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	1.0									
Nickel	0.035	1.0									

Sample ID: **119372-030A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **ZZZZZZ** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229901**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.250	1.0						0.2034	0	20	
Nickel	0.591	1.0						0.5594	0	20	

Sample ID: **119372-030A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **ZZZZZZ** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229902**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.545	1.0	2.500	0.2034	93.7	78	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119164
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **119372-030A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **ZZZZZZ** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229902**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nickel	3.017	1.0	2.500	0.5594	98.3	78	120				

Sample ID: **119372-030A-MSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **136090**
Client ID: **ZZZZZZ** Batch ID: **R136090** TestNo: **WET/ EPA 60** Analysis Date: **8/25/2011** SeqNo: **2229903**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.404	1.0	2.500	0.2034	88.0	78	115	2.545	5.72	20	
Nickel	2.839	1.0	2.500	0.5594	91.2	78	120	3.017	6.09	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Luann Beadle [beadle@geoconinc.com]
Sent: Friday, August 19, 2011 1:33 PM
To: Diane Galvan
Subject: E8469-06-02 Marin Sonoma

Hi Diane,

For Lab Workorder 119164:

1. Run WET chromium on samples with total chromium ≥50 mg/kg;
2. Run WET nickel on samples with total nickel ≥ 200 mg/kg.

Standard TAT.

Thank you!
Luann

Luann Beadle | *Senior Staff Scientist*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900 Fax 925.371.5915
www.geoconinc.com

August 10, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119244

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on August 03, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119244

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 119244-002A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 119224-001BMS, 119224-001BMSD and 119244-010AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Analytical Comments for Method 8015 (DRO/ORO)

RPD for Duplicate (DUP) is outside criteria for sample 119244-029ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8021

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 119244-022AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for sample 119244-022AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
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Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P1-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:05:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:41 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Barium	110	1.0		mg/Kg	1	8/8/2011 03:41 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Chromium	38	1.0		mg/Kg	1	8/8/2011 03:41 PM
Cobalt	27	1.0		mg/Kg	1	8/8/2011 03:41 PM
Copper	18	2.0		mg/Kg	1	8/8/2011 03:41 PM
Lead	8.2	1.0		mg/Kg	1	8/8/2011 03:41 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Nickel	23	1.0		mg/Kg	1	8/8/2011 03:41 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:41 PM
Vanadium	65	1.0		mg/Kg	1	8/8/2011 03:41 PM
Zinc	36	1.0		mg/Kg	1	8/8/2011 03:41 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	3.2	1.0		mg/Kg	1	8/5/2011 05:01 PM
ORO	18	1.0		mg/Kg	1	8/5/2011 05:01 PM
Surr: p-Terphenyl	43.7	30-128		%REC	1	8/5/2011 05:01 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 08:14 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P1-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:05:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 08:14 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 08:14 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 08:14 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 08:14 PM
Surr: Decachlorobiphenyl	57.3	31-107		%REC	1	8/8/2011 08:14 PM
Surr: Tetrachloro-m-xylene	51.7	35-108		%REC	1	8/8/2011 08:14 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:14 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P1-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:14:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 02:54 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Barium	120	1.0		mg/Kg	1	8/8/2011 02:54 PM
Beryllium	ND	2.0		mg/Kg	2	8/8/2011 03:55 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Chromium	35	1.0		mg/Kg	1	8/8/2011 02:54 PM
Cobalt	32	1.0		mg/Kg	1	8/8/2011 02:54 PM
Copper	21	2.0		mg/Kg	1	8/8/2011 02:54 PM
Lead	2.8	1.0		mg/Kg	1	8/8/2011 02:54 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Nickel	22	1.0		mg/Kg	1	8/8/2011 02:54 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 02:54 PM
Vanadium	69	1.0		mg/Kg	1	8/8/2011 02:54 PM
Zinc	31	1.0		mg/Kg	1	8/8/2011 02:54 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 11:54 AM
Surr: Bromofluorobenzene (FID)	97.4	62-153		%REC	1	8/4/2011 11:54 AM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 11:54 AM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 11:54 AM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 11:54 AM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 11:54 AM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 11:54 AM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 11:54 AM
Surr: Bromofluorobenzene (PID)	102	65-140		%REC	1	8/4/2011 11:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P1-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:14:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:17 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P2-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:25:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 02:57 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Barium	73	1.0		mg/Kg	1	8/8/2011 02:57 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Chromium	26	1.0		mg/Kg	1	8/8/2011 02:57 PM
Cobalt	24	1.0		mg/Kg	1	8/8/2011 02:57 PM
Copper	15	2.0		mg/Kg	1	8/8/2011 02:57 PM
Lead	9.8	1.0		mg/Kg	1	8/8/2011 02:57 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Nickel	9.4	1.0		mg/Kg	1	8/8/2011 02:57 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 02:57 PM
Vanadium	71	1.0		mg/Kg	1	8/8/2011 02:57 PM
Zinc	25	1.0		mg/Kg	1	8/8/2011 02:57 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	3.8	1.0		mg/Kg	1	8/5/2011 05:12 PM
ORO	18	1.0		mg/Kg	1	8/5/2011 05:12 PM
Surr: p-Terphenyl	53.4	30-128		%REC	1	8/5/2011 05:12 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:19 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P2-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:30:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110808C	QC Batch: 74757			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:01 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Barium	66	1.0		mg/Kg	1	8/8/2011 03:01 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Chromium	28	1.0		mg/Kg	1	8/8/2011 03:01 PM
Cobalt	26	1.0		mg/Kg	1	8/8/2011 03:01 PM
Copper	15	2.0		mg/Kg	1	8/8/2011 03:01 PM
Lead	2.2	1.0		mg/Kg	1	8/8/2011 03:01 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Nickel	9.4	1.0		mg/Kg	1	8/8/2011 03:01 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:01 PM
Vanadium	73	1.0		mg/Kg	1	8/8/2011 03:01 PM
Zinc	18	1.0		mg/Kg	1	8/8/2011 03:01 PM
GASOLINE RANGE ORGANICS BY GC/FID						
				EPA 8015B(M)		
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 12:08 PM
Surr: Bromofluorobenzene (FID)	93.9	62-153		%REC	1	8/4/2011 12:08 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
				EPA 8021B		
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 12:08 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 12:08 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 12:08 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 12:08 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 12:08 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 12:08 PM
Surr: Bromofluorobenzene (PID)	98.9	65-140		%REC	1	8/4/2011 12:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P2-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:30:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:21 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P3-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:45:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:04 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Barium	50	1.0		mg/Kg	1	8/8/2011 03:04 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Chromium	34	1.0		mg/Kg	1	8/8/2011 03:04 PM
Cobalt	17	1.0		mg/Kg	1	8/8/2011 03:04 PM
Copper	31	2.0		mg/Kg	1	8/8/2011 03:04 PM
Lead	12	1.0		mg/Kg	1	8/8/2011 03:04 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Nickel	11	1.0		mg/Kg	1	8/8/2011 03:04 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:04 PM
Vanadium	84	1.0		mg/Kg	1	8/8/2011 03:04 PM
Zinc	27	1.0		mg/Kg	1	8/8/2011 03:04 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	5.0	1.0		mg/Kg	1	8/5/2011 05:44 PM
ORO	32	1.0		mg/Kg	1	8/5/2011 05:44 PM
Surr: p-Terphenyl	49.9	30-128		%REC	1	8/5/2011 05:44 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 08:27 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P3-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:45:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 08:27 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 08:27 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 08:27 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 08:27 PM
Surr: Decachlorobiphenyl	59.2	31-107		%REC	1	8/8/2011 08:27 PM
Surr: Tetrachloro-m-xylene	54.8	35-108		%REC	1	8/8/2011 08:27 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:27 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P3-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:50:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:07 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Barium	45	1.0		mg/Kg	1	8/8/2011 03:07 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Chromium	32	1.0		mg/Kg	1	8/8/2011 03:07 PM
Cobalt	17	1.0		mg/Kg	1	8/8/2011 03:07 PM
Copper	33	2.0		mg/Kg	1	8/8/2011 03:07 PM
Lead	1.9	1.0		mg/Kg	1	8/8/2011 03:07 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Nickel	11	1.0		mg/Kg	1	8/8/2011 03:07 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:07 PM
Vanadium	83	1.0		mg/Kg	1	8/8/2011 03:07 PM
Zinc	22	1.0		mg/Kg	1	8/8/2011 03:07 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 12:24 PM
Surr: Bromofluorobenzene (FID)	100	62-153		%REC	1	8/4/2011 12:24 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 12:24 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 12:24 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 12:24 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 12:24 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 12:24 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 12:24 PM
Surr: Bromofluorobenzene (PID)	106	65-140		%REC	1	8/4/2011 12:24 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P3-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:50:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:29 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P4-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 12:52:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:11 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Barium	79	1.0		mg/Kg	1	8/8/2011 03:11 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Chromium	34	1.0		mg/Kg	1	8/8/2011 03:11 PM
Cobalt	18	1.0		mg/Kg	1	8/8/2011 03:11 PM
Copper	35	2.0		mg/Kg	1	8/8/2011 03:11 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 03:11 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Nickel	13	1.0		mg/Kg	1	8/8/2011 03:11 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:11 PM
Vanadium	75	1.0		mg/Kg	1	8/8/2011 03:11 PM
Zinc	59	1.0		mg/Kg	1	8/8/2011 03:11 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	4.4	1.0		mg/Kg	1	8/5/2011 05:22 PM
ORO	24	1.0		mg/Kg	1	8/5/2011 05:22 PM
Surr: p-Terphenyl	39.5	30-128		%REC	1	8/5/2011 05:22 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:31 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P4-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:55:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:21 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Barium	73	1.0		mg/Kg	1	8/8/2011 03:21 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Chromium	36	1.0		mg/Kg	1	8/8/2011 03:21 PM
Cobalt	18	1.0		mg/Kg	1	8/8/2011 03:21 PM
Copper	38	2.0		mg/Kg	1	8/8/2011 03:21 PM
Lead	1.5	1.0		mg/Kg	1	8/8/2011 03:21 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Nickel	14	1.0		mg/Kg	1	8/8/2011 03:21 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:21 PM
Vanadium	71	1.0		mg/Kg	1	8/8/2011 03:21 PM
Zinc	30	1.0		mg/Kg	1	8/8/2011 03:21 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 12:40 PM
Surr: Bromofluorobenzene (FID)	101	62-153		%REC	1	8/4/2011 12:40 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 12:40 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 12:40 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 12:40 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 12:40 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 12:40 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 12:40 PM
Surr: Bromofluorobenzene (PID)	106	65-140		%REC	1	8/4/2011 12:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P4-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 12:55:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:33 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P5-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 1:14:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:24 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Barium	91	1.0		mg/Kg	1	8/8/2011 03:24 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Chromium	35	1.0		mg/Kg	1	8/8/2011 03:24 PM
Cobalt	22	1.0		mg/Kg	1	8/8/2011 03:24 PM
Copper	47	2.0		mg/Kg	1	8/8/2011 03:24 PM
Lead	5.3	1.0		mg/Kg	1	8/8/2011 03:24 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Nickel	17	1.0		mg/Kg	1	8/8/2011 03:24 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:24 PM
Vanadium	69	1.0		mg/Kg	1	8/8/2011 03:24 PM
Zinc	42	1.0		mg/Kg	1	8/8/2011 03:24 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	3.1	1.0		mg/Kg	1	8/5/2011 04:40 PM
ORO	16	1.0		mg/Kg	1	8/5/2011 04:40 PM
Surr: p-Terphenyl	37.6	30-128		%REC	1	8/5/2011 04:40 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 08:40 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P5-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 1:14:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 08:40 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 08:40 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 08:40 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 08:40 PM
Surr: Decachlorobiphenyl	67.0	31-107		%REC	1	8/8/2011 08:40 PM
Surr: Tetrachloro-m-xylene	61.1	35-108		%REC	1	8/8/2011 08:40 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:35 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P5-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 1:18:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808C	QC Batch: 74757			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 03:28 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Barium	86	1.0		mg/Kg	1	8/8/2011 03:28 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Chromium	33	1.0		mg/Kg	1	8/8/2011 03:28 PM
Cobalt	26	1.0		mg/Kg	1	8/8/2011 03:28 PM
Copper	46	2.0		mg/Kg	1	8/8/2011 03:28 PM
Lead	1.1	1.0		mg/Kg	1	8/8/2011 03:28 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Nickel	18	1.0		mg/Kg	1	8/8/2011 03:28 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 03:28 PM
Vanadium	67	1.0		mg/Kg	1	8/8/2011 03:28 PM
Zinc	37	1.0		mg/Kg	1	8/8/2011 03:28 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 01:11 PM
Surr: Bromofluorobenzene (FID)	102	62-153		%REC	1	8/4/2011 01:11 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 01:11 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 01:11 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 01:11 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 01:11 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 01:11 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 01:11 PM
Surr: Bromofluorobenzene (PID)	108	65-140		%REC	1	8/4/2011 01:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P5-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 1:18:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA1_110809A	QC Batch: 74763			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:10 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P6-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 1:45:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-011A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:06 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Barium	77	1.0		mg/Kg	1	8/8/2011 05:06 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Chromium	58	1.0		mg/Kg	1	8/8/2011 05:06 PM
Cobalt	29	1.0		mg/Kg	1	8/8/2011 05:06 PM
Copper	31	2.0		mg/Kg	1	8/8/2011 05:06 PM
Lead	3.3	1.0		mg/Kg	1	8/8/2011 05:06 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Nickel	48	1.0		mg/Kg	1	8/8/2011 05:06 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:06 PM
Vanadium	59	1.0		mg/Kg	1	8/8/2011 05:06 PM
Zinc	49	1.0		mg/Kg	1	8/8/2011 05:06 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	1.8	1.0		mg/Kg	1	8/5/2011 04:29 PM
ORO	5.5	1.0		mg/Kg	1	8/5/2011 04:29 PM
Surr: p-Terphenyl	39.7	30-128		%REC	1	8/5/2011 04:29 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:56 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P6-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 1:49:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:09 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Barium	70	1.0		mg/Kg	1	8/8/2011 05:09 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Chromium	43	1.0		mg/Kg	1	8/8/2011 05:09 PM
Cobalt	24	1.0		mg/Kg	1	8/8/2011 05:09 PM
Copper	23	2.0		mg/Kg	1	8/8/2011 05:09 PM
Lead	1.9	1.0		mg/Kg	1	8/8/2011 05:09 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Nickel	39	1.0		mg/Kg	1	8/8/2011 05:09 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:09 PM
Vanadium	48	1.0		mg/Kg	1	8/8/2011 05:09 PM
Zinc	45	1.0		mg/Kg	1	8/8/2011 05:09 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 01:27 PM
Surr: Bromofluorobenzene (FID)	101	62-153		%REC	1	8/4/2011 01:27 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 01:27 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 01:27 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 01:27 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 01:27 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 01:27 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 01:27 PM
Surr: Bromofluorobenzene (PID)	106	65-140		%REC	1	8/4/2011 01:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P6-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 1:49:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:58 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P7-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 2:07:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:12 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Barium	72	1.0		mg/Kg	1	8/8/2011 05:12 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Chromium	58	1.0		mg/Kg	1	8/8/2011 05:12 PM
Cobalt	38	1.0		mg/Kg	1	8/8/2011 05:12 PM
Copper	26	2.0		mg/Kg	1	8/8/2011 05:12 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 05:12 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Nickel	61	1.0		mg/Kg	1	8/8/2011 05:12 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:12 PM
Vanadium	47	1.0		mg/Kg	1	8/8/2011 05:12 PM
Zinc	45	1.0		mg/Kg	1	8/8/2011 05:12 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	6.1	1.0		mg/Kg	1	8/5/2011 05:54 PM
ORO	31	1.0		mg/Kg	1	8/5/2011 05:54 PM
Surr: p-Terphenyl	52.8	30-128		%REC	1	8/5/2011 05:54 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 08:54 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P7-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 2:07:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 08:54 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 08:54 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 08:54 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 08:54 PM
Surr: Decachlorobiphenyl	63.5	31-107		%REC	1	8/8/2011 08:54 PM
Surr: Tetrachloro-m-xylene	58.5	35-108		%REC	1	8/8/2011 08:54 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P7-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:10:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-014A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:16 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Barium	61	1.0		mg/Kg	1	8/8/2011 05:16 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Chromium	58	1.0		mg/Kg	1	8/8/2011 05:16 PM
Cobalt	34	1.0		mg/Kg	1	8/8/2011 05:16 PM
Copper	28	2.0		mg/Kg	1	8/8/2011 05:16 PM
Lead	2.1	1.0		mg/Kg	1	8/8/2011 05:16 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Nickel	58	1.0		mg/Kg	1	8/8/2011 05:16 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:16 PM
Vanadium	49	1.0		mg/Kg	1	8/8/2011 05:16 PM
Zinc	37	1.0		mg/Kg	1	8/8/2011 05:16 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 01:43 PM
Surr: Bromofluorobenzene (FID)	102	62-153		%REC	1	8/4/2011 01:43 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 01:43 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 01:43 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 01:43 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 01:43 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 01:43 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 01:43 PM
Surr: Bromofluorobenzene (PID)	107	65-140		%REC	1	8/4/2011 01:43 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P7-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:10:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-014A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:02 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P8-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 2:20:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-015A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:19 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Barium	49	1.0		mg/Kg	1	8/8/2011 05:19 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Chromium	49	1.0		mg/Kg	1	8/8/2011 05:19 PM
Cobalt	29	1.0		mg/Kg	1	8/8/2011 05:19 PM
Copper	31	2.0		mg/Kg	1	8/8/2011 05:19 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 05:19 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Nickel	63	1.0		mg/Kg	1	8/8/2011 05:19 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:19 PM
Vanadium	34	1.0		mg/Kg	1	8/8/2011 05:19 PM
Zinc	46	1.0		mg/Kg	1	8/8/2011 05:19 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	3.8	1.0		mg/Kg	1	8/5/2011 05:33 PM
ORO	36	1.0		mg/Kg	1	8/5/2011 05:33 PM
Surr: p-Terphenyl	52.0	30-128		%REC	1	8/5/2011 05:33 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P8-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:25:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-016A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:22 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Barium	31	1.0		mg/Kg	1	8/8/2011 05:22 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Chromium	44	1.0		mg/Kg	1	8/8/2011 05:22 PM
Cobalt	25	1.0		mg/Kg	1	8/8/2011 05:22 PM
Copper	36	2.0		mg/Kg	1	8/8/2011 05:22 PM
Lead	1.4	1.0		mg/Kg	1	8/8/2011 05:22 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Nickel	58	1.0		mg/Kg	1	8/8/2011 05:22 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:22 PM
Vanadium	33	1.0		mg/Kg	1	8/8/2011 05:22 PM
Zinc	34	1.0		mg/Kg	1	8/8/2011 05:22 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 01:59 PM
Surr: Bromofluorobenzene (FID)	99.5	62-153		%REC	1	8/4/2011 01:59 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 01:59 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 01:59 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 01:59 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 01:59 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 01:59 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 01:59 PM
Surr: Bromofluorobenzene (PID)	105	65-140		%REC	1	8/4/2011 01:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P8-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:25:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-016A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:06 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P9-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 2:30:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-017A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:26 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Barium	94	1.0		mg/Kg	1	8/8/2011 05:26 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Chromium	46	1.0		mg/Kg	1	8/8/2011 05:26 PM
Cobalt	21	1.0		mg/Kg	1	8/8/2011 05:26 PM
Copper	28	2.0		mg/Kg	1	8/8/2011 05:26 PM
Lead	13	1.0		mg/Kg	1	8/8/2011 05:26 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Nickel	36	1.0		mg/Kg	1	8/8/2011 05:26 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:26 PM
Vanadium	53	1.0		mg/Kg	1	8/8/2011 05:26 PM
Zinc	40	1.0		mg/Kg	1	8/8/2011 05:26 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	2.4	1.0		mg/Kg	1	8/5/2011 04:50 PM
ORO	9.3	1.0		mg/Kg	1	8/5/2011 04:50 PM
Surr: p-Terphenyl	39.2	30-128		%REC	1	8/5/2011 04:50 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 09:07 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P9-0.0
Lab Order:	119244	**Collection Date:**	8/1/2011 2:30:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-017A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 09:07 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 09:07 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 09:07 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 09:07 PM
Surr: Decachlorobiphenyl	73.9	31-107		%REC	1	8/8/2011 09:07 PM
Surr: Tetrachloro-m-xylene	65.0	35-108		%REC	1	8/8/2011 09:07 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P9-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:35:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-018A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:29 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Barium	95	1.0		mg/Kg	1	8/8/2011 05:29 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Chromium	47	1.0		mg/Kg	1	8/8/2011 05:29 PM
Cobalt	30	1.0		mg/Kg	1	8/8/2011 05:29 PM
Copper	25	2.0		mg/Kg	1	8/8/2011 05:29 PM
Lead	2.1	1.0		mg/Kg	1	8/8/2011 05:29 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Nickel	41	1.0		mg/Kg	1	8/8/2011 05:29 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:29 PM
Vanadium	56	1.0		mg/Kg	1	8/8/2011 05:29 PM
Zinc	30	1.0		mg/Kg	1	8/8/2011 05:29 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 02:14 PM
Surr: Bromofluorobenzene (FID)	102	62-153		%REC	1	8/4/2011 02:14 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 02:14 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 02:14 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 02:14 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 02:14 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 02:14 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 02:14 PM
Surr: Bromofluorobenzene (PID)	107	65-140		%REC	1	8/4/2011 02:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P9-1.5
Lab Order:	119244	**Collection Date:**	8/1/2011 2:35:00 PM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-018A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:10 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P10-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 7:52:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-019A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:39 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Barium	100	1.0		mg/Kg	1	8/8/2011 05:39 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Chromium	58	1.0		mg/Kg	1	8/8/2011 05:39 PM
Cobalt	16	1.0		mg/Kg	1	8/8/2011 05:39 PM
Copper	27	2.0		mg/Kg	1	8/8/2011 05:39 PM
Lead	20	1.0		mg/Kg	1	8/8/2011 05:39 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Nickel	43	1.0		mg/Kg	1	8/8/2011 05:39 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:39 PM
Vanadium	46	1.0		mg/Kg	1	8/8/2011 05:39 PM
Zinc	45	1.0		mg/Kg	1	8/8/2011 05:39 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110805B	QC Batch: 74770			PrepDate:	8/5/2011	Analyst: **CBR**
DRO	13	1.0		mg/Kg	1	8/5/2011 06:15 PM
ORO	91	1.0		mg/Kg	1	8/5/2011 06:15 PM
Surr: p-Terphenyl	46.3	30-128		%REC	1	8/5/2011 06:15 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P10-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 7:56:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-020A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808E	QC Batch: 74758			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 05:42 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Barium	120	1.0		mg/Kg	1	8/8/2011 05:42 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Chromium	79	1.0		mg/Kg	1	8/8/2011 05:42 PM
Cobalt	25	1.0		mg/Kg	1	8/8/2011 05:42 PM
Copper	26	2.0		mg/Kg	1	8/8/2011 05:42 PM
Lead	3.2	1.0		mg/Kg	1	8/8/2011 05:42 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Nickel	58	1.0		mg/Kg	1	8/8/2011 05:42 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 05:42 PM
Vanadium	60	1.0		mg/Kg	1	8/8/2011 05:42 PM
Zinc	34	1.0		mg/Kg	1	8/8/2011 05:42 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/4/2011 02:30 PM
Surr: Bromofluorobenzene (FID)	105	62-153		%REC	1	8/4/2011 02:30 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110804A	QC Batch: E11VS288			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/4/2011 02:30 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/4/2011 02:30 PM
m,p-Xylene	ND	10		µg/Kg	1	8/4/2011 02:30 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/4/2011 02:30 PM
o-Xylene	ND	5.0		µg/Kg	1	8/4/2011 02:30 PM
Toluene	ND	5.0		µg/Kg	1	8/4/2011 02:30 PM
Surr: Bromofluorobenzene (PID)	111	65-140		%REC	1	8/4/2011 02:30 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P10-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 7:56:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-020A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA2_110809B	QC Batch: 74764			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:52 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT: Geocon Consultants, Inc.
Client Sample ID: P11-0.0
Lab Order: 119244
Collection Date: 8/2/2011 8:00:00 AM
Project: Marin-Sonoma Narrows Segment B3, E8469-
Matrix: SOIL
Lab ID: 119244-021A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:03 PM
Arsenic	1.4	1.0		mg/Kg	1	8/8/2011 06:03 PM
Barium	97	1.0		mg/Kg	1	8/8/2011 06:03 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Chromium	52	1.0		mg/Kg	1	8/8/2011 06:03 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 06:03 PM
Copper	15	2.0		mg/Kg	1	8/8/2011 06:03 PM
Lead	14	1.0		mg/Kg	1	8/8/2011 06:03 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Nickel	46	1.0		mg/Kg	1	8/8/2011 06:03 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:03 PM
Vanadium	37	1.0		mg/Kg	1	8/8/2011 06:03 PM
Zinc	29	1.0		mg/Kg	1	8/8/2011 06:03 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	4.4	1.0		mg/Kg	1	8/8/2011 05:02 PM
ORO	35	1.0		mg/Kg	1	8/8/2011 05:02 PM
Surr: p-Terphenyl	49.2	30-128		%REC	1	8/8/2011 05:02 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 09:20 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P11-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 8:00:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-021A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 09:20 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 09:20 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 09:20 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 09:20 PM
Surr: Decachlorobiphenyl	60.9	31-107		%REC	1	8/8/2011 09:20 PM
Surr: Tetrachloro-m-xylene	54.8	35-108		%REC	1	8/8/2011 09:20 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:20 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P11-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:04:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-022A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:06 PM
Arsenic	2.0	1.0		mg/Kg	1	8/8/2011 06:06 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 06:06 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Chromium	85	1.0		mg/Kg	1	8/8/2011 06:06 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 06:06 PM
Copper	17	2.0		mg/Kg	1	8/8/2011 06:06 PM
Lead	6.7	1.0		mg/Kg	1	8/8/2011 06:06 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Nickel	80	1.0		mg/Kg	1	8/8/2011 06:06 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:06 PM
Vanadium	51	1.0		mg/Kg	1	8/8/2011 06:06 PM
Zinc	25	1.0		mg/Kg	1	8/8/2011 06:06 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110805A	QC Batch: E11VS289			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/5/2011 11:10 AM
Surr: Bromofluorobenzene (FID)	104	62-153		%REC	1	8/5/2011 11:10 AM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110805A	QC Batch: E11VS289			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/5/2011 11:10 AM
Ethylbenzene	ND	5.0		µg/Kg	1	8/5/2011 11:10 AM
m,p-Xylene	ND	10		µg/Kg	1	8/5/2011 11:10 AM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/5/2011 11:10 AM
o-Xylene	ND	5.0		µg/Kg	1	8/5/2011 11:10 AM
Toluene	ND	5.0		µg/Kg	1	8/5/2011 11:10 AM
Surr: Bromofluorobenzene (PID)	109	65-140		%REC	1	8/5/2011 11:10 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P11-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:04:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-022A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:22 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P12-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 8:33:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-023A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.6	2.0		mg/Kg	1	8/8/2011 06:09 PM
Arsenic	2.1	1.0		mg/Kg	1	8/8/2011 06:09 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 06:09 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Chromium	130	1.0		mg/Kg	1	8/8/2011 06:09 PM
Cobalt	22	1.0		mg/Kg	1	8/8/2011 06:09 PM
Copper	34	2.0		mg/Kg	1	8/8/2011 06:09 PM
Lead	13	1.0		mg/Kg	1	8/8/2011 06:09 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Nickel	180	1.0		mg/Kg	1	8/8/2011 06:09 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:09 PM
Vanadium	46	1.0		mg/Kg	1	8/8/2011 06:09 PM
Zinc	60	1.0		mg/Kg	1	8/8/2011 06:09 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	5.5	1.0		mg/Kg	1	8/8/2011 04:31 PM
ORO	52	1.0		mg/Kg	1	8/8/2011 04:31 PM
Surr: p-Terphenyl	49.1	30-128		%REC	1	8/8/2011 04:31 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:24 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P12-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:37:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-024A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.8	2.0		mg/Kg	1	8/8/2011 06:20 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Barium	120	1.0		mg/Kg	1	8/8/2011 06:20 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Chromium	170	1.0		mg/Kg	1	8/8/2011 06:20 PM
Cobalt	24	1.0		mg/Kg	1	8/8/2011 06:20 PM
Copper	32	2.0		mg/Kg	1	8/8/2011 06:20 PM
Lead	7.0	1.0		mg/Kg	1	8/8/2011 06:20 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Nickel	270	1.0		mg/Kg	1	8/8/2011 06:20 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:20 PM
Vanadium	52	1.0		mg/Kg	1	8/8/2011 06:20 PM
Zinc	56	1.0		mg/Kg	1	8/8/2011 06:20 PM
GASOLINE RANGE ORGANICS BY GC/FID						
				EPA 8015B(M)		
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 08:51 PM
Surr: Bromofluorobenzene (FID)	106	62-153		%REC	1	8/3/2011 08:51 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
				EPA 8021B		
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 08:51 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 08:51 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 08:51 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 08:51 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 08:51 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 08:51 PM
Surr: Bromofluorobenzene (PID)	112	65-140		%REC	1	8/3/2011 08:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P12-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:37:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-024A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:26 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P13-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 8:48:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-025A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:24 PM
Arsenic	3.7	1.0		mg/Kg	1	8/8/2011 06:24 PM
Barium	160	1.0		mg/Kg	1	8/8/2011 06:24 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Chromium	63	1.0		mg/Kg	1	8/8/2011 06:24 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 06:24 PM
Copper	32	2.0		mg/Kg	1	8/8/2011 06:24 PM
Lead	16	1.0		mg/Kg	1	8/8/2011 06:24 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Nickel	95	1.0		mg/Kg	1	8/8/2011 06:24 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:24 PM
Vanadium	40	1.0		mg/Kg	1	8/8/2011 06:24 PM
Zinc	58	1.0		mg/Kg	1	8/8/2011 06:24 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	4.3	1.0		mg/Kg	1	8/8/2011 03:45 PM
ORO	34	1.0		mg/Kg	1	8/8/2011 03:45 PM
Surr: p-Terphenyl	42.6	30-128		%REC	1	8/8/2011 03:45 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 09:34 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P13-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 8:48:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-025A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 09:34 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 09:34 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 09:34 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 09:34 PM
Surr: Decachlorobiphenyl	67.0	31-107		%REC	1	8/8/2011 09:34 PM
Surr: Tetrachloro-m-xylene	60.3	35-108		%REC	1	8/8/2011 09:34 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:32 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P13-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:52:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-026A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:27 PM
Arsenic	5.6	1.0		mg/Kg	1	8/8/2011 06:27 PM
Barium	180	1.0		mg/Kg	1	8/8/2011 06:27 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Chromium	43	1.0		mg/Kg	1	8/8/2011 06:27 PM
Cobalt	14	1.0		mg/Kg	1	8/8/2011 06:27 PM
Copper	32	2.0		mg/Kg	1	8/8/2011 06:27 PM
Lead	9.3	1.0		mg/Kg	1	8/8/2011 06:27 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Nickel	60	1.0		mg/Kg	1	8/8/2011 06:27 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:27 PM
Vanadium	37	1.0		mg/Kg	1	8/8/2011 06:27 PM
Zinc	43	1.0		mg/Kg	1	8/8/2011 06:27 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 09:07 PM
Surr: Bromofluorobenzene (FID)	102	62-153		%REC	1	8/3/2011 09:07 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 09:07 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 09:07 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 09:07 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 09:07 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 09:07 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 09:07 PM
Surr: Bromofluorobenzene (PID)	108	65-140		%REC	1	8/3/2011 09:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P13-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 8:52:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-026A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:34 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P14-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 9:03:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-027A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:31 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 06:31 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Chromium	99	1.0		mg/Kg	1	8/8/2011 06:31 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 06:31 PM
Copper	25	2.0		mg/Kg	1	8/8/2011 06:31 PM
Lead	17	1.0		mg/Kg	1	8/8/2011 06:31 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Nickel	130	1.0		mg/Kg	1	8/8/2011 06:31 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:31 PM
Vanadium	46	1.0		mg/Kg	1	8/8/2011 06:31 PM
Zinc	50	1.0		mg/Kg	1	8/8/2011 06:31 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	6.0	1.0		mg/Kg	1	8/8/2011 04:41 PM
ORO	44	1.0		mg/Kg	1	8/8/2011 04:41 PM
Surr: p-Terphenyl	65.5	30-128		%REC	1	8/8/2011 04:41 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:36 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT: Geocon Consultants, Inc.
Client Sample ID: P14-1.5
Lab Order: 119244
Collection Date: 8/2/2011 9:10:00 AM
Project: Marin-Sonoma Narrows Segment B3, E8469-
Matrix: SOIL
Lab ID: 119244-028A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.1	2.0		mg/Kg	1	8/9/2011 09:51 AM
Arsenic	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Barium	160	1.0		mg/Kg	1	8/9/2011 09:51 AM
Beryllium	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Cadmium	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Chromium	120	1.0		mg/Kg	1	8/9/2011 09:51 AM
Cobalt	23	1.0		mg/Kg	1	8/9/2011 09:51 AM
Copper	23	2.0		mg/Kg	1	8/9/2011 09:51 AM
Lead	7.5	1.0		mg/Kg	1	8/9/2011 09:51 AM
Molybdenum	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Nickel	170	1.0		mg/Kg	1	8/9/2011 09:51 AM
Selenium	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Silver	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Thallium	ND	1.0		mg/Kg	1	8/9/2011 09:51 AM
Vanadium	55	1.0		mg/Kg	1	8/9/2011 09:51 AM
Zinc	39	1.0		mg/Kg	1	8/9/2011 09:51 AM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 09:23 PM
Surr: Bromofluorobenzene (FID)	103	62-153		%REC	1	8/3/2011 09:23 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 09:23 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 09:23 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 09:23 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 09:23 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 09:23 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 09:23 PM
Surr: Bromofluorobenzene (PID)	108	65-140		%REC	1	8/3/2011 09:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P14-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:10:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-028A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:38 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P15-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 9:19:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-029A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:37 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Barium	120	1.0		mg/Kg	1	8/8/2011 06:37 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Chromium	83	1.0		mg/Kg	1	8/8/2011 06:37 PM
Cobalt	24	1.0		mg/Kg	1	8/8/2011 06:37 PM
Copper	20	2.0		mg/Kg	1	8/8/2011 06:37 PM
Lead	8.9	1.0		mg/Kg	1	8/8/2011 06:37 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Nickel	100	1.0		mg/Kg	1	8/8/2011 06:37 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:37 PM
Vanadium	54	1.0		mg/Kg	1	8/8/2011 06:37 PM
Zinc	42	1.0		mg/Kg	1	8/8/2011 06:37 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	3.0	1.0		mg/Kg	1	8/8/2011 03:55 PM
ORO	18	1.0		mg/Kg	1	8/8/2011 03:55 PM
Surr: p-Terphenyl	37.5	30-128		%REC	1	8/8/2011 03:55 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 09:47 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P15-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 9:19:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-029A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 09:47 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 09:47 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 09:47 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 09:47 PM
Surr: Decachlorobiphenyl	66.3	31-107		%REC	1	8/8/2011 09:47 PM
Surr: Tetrachloro-m-xylene	60.6	35-108		%REC	1	8/8/2011 09:47 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P15-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:23:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-030A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808F	QC Batch: 74759			PrepDate: 8/8/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 06:40 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 06:40 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Chromium	96	1.0		mg/Kg	1	8/8/2011 06:40 PM
Cobalt	25	1.0		mg/Kg	1	8/8/2011 06:40 PM
Copper	21	2.0		mg/Kg	1	8/8/2011 06:40 PM
Lead	6.0	1.0		mg/Kg	1	8/8/2011 06:40 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Nickel	120	1.0		mg/Kg	1	8/8/2011 06:40 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 06:40 PM
Vanadium	55	1.0		mg/Kg	1	8/8/2011 06:40 PM
Zinc	35	1.0		mg/Kg	1	8/8/2011 06:40 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 09:39 PM
Surr: Bromofluorobenzene (FID)	97.8	62-153		%REC	1	8/3/2011 09:39 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 09:39 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 09:39 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 09:39 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 09:39 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 09:39 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 09:39 PM
Surr: Bromofluorobenzene (PID)	102	65-140		%REC	1	8/3/2011 09:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P15-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:23:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-030A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809A	QC Batch: 74765			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 11:15 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P16-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 9:27:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-031A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.1	2.0		mg/Kg	1	8/8/2011 07:07 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Barium	110	1.0		mg/Kg	1	8/8/2011 07:07 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Chromium	100	1.0		mg/Kg	1	8/8/2011 07:07 PM
Cobalt	25	1.0		mg/Kg	1	8/8/2011 07:07 PM
Copper	35	2.0		mg/Kg	1	8/8/2011 07:07 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 07:07 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Nickel	110	1.0		mg/Kg	1	8/8/2011 07:07 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:07 PM
Vanadium	55	1.0		mg/Kg	1	8/8/2011 07:07 PM
Zinc	47	1.0		mg/Kg	1	8/8/2011 07:07 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	3.5	1.0		mg/Kg	1	8/8/2011 04:52 PM
ORO	27	1.0		mg/Kg	1	8/8/2011 04:52 PM
Surr: p-Terphenyl	47.2	30-128		%REC	1	8/8/2011 04:52 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P16-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:31:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-032A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:10 PM
Arsenic	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Barium	69	1.0		mg/Kg	1	8/8/2011 07:10 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Chromium	50	1.0		mg/Kg	1	8/8/2011 07:10 PM
Cobalt	17	1.0		mg/Kg	1	8/8/2011 07:10 PM
Copper	39	2.0		mg/Kg	1	8/8/2011 07:10 PM
Lead	1.5	1.0		mg/Kg	1	8/8/2011 07:10 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Nickel	44	1.0		mg/Kg	1	8/8/2011 07:10 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:10 PM
Vanadium	65	1.0		mg/Kg	1	8/8/2011 07:10 PM
Zinc	25	1.0		mg/Kg	1	8/8/2011 07:10 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 09:55 PM
Surr: Bromofluorobenzene (FID)	102	62-153		%REC	1	8/3/2011 09:55 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 09:55 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 09:55 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 09:55 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 09:55 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 09:55 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 09:55 PM
Surr: Bromofluorobenzene (PID)	107	65-140		%REC	1	8/3/2011 09:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P16-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:31:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-032A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:06 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P17-0.0
Lab Order: 119244 **Collection Date:** 8/2/2011 9:51:00 AM
Project: Marin-Sonoma Narrows Segment B3, E8469- **Matrix:** SOIL
Lab ID: 119244-033A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.1	2.0		mg/Kg	1	8/8/2011 07:13 PM
Arsenic	3.2	1.0		mg/Kg	1	8/8/2011 07:13 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 07:13 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Chromium	76	1.0		mg/Kg	1	8/8/2011 07:13 PM
Cobalt	25	1.0		mg/Kg	1	8/8/2011 07:13 PM
Copper	17	2.0		mg/Kg	1	8/8/2011 07:13 PM
Lead	150	1.0		mg/Kg	1	8/8/2011 07:13 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Nickel	100	1.0		mg/Kg	1	8/8/2011 07:13 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:13 PM
Vanadium	46	1.0		mg/Kg	1	8/8/2011 07:13 PM
Zinc	32	1.0		mg/Kg	1	8/8/2011 07:13 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	3.4	1.0		mg/Kg	1	8/8/2011 04:19 PM
ORO	17	1.0		mg/Kg	1	8/8/2011 04:19 PM
Surr: p-Terphenyl	48.4	30-128		%REC	1	8/8/2011 04:19 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 10:00 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P17-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 9:51:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-033A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 10:00 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 10:00 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 10:00 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 10:00 PM
Surr: Decachlorobiphenyl	65.3	31-107		%REC	1	8/8/2011 10:00 PM
Surr: Tetrachloro-m-xylene	58.2	35-108		%REC	1	8/8/2011 10:00 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P17-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:57:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-034A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:17 PM
Arsenic	2.7	1.0		mg/Kg	1	8/8/2011 07:17 PM
Barium	150	1.0		mg/Kg	1	8/8/2011 07:17 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Chromium	95	1.0		mg/Kg	1	8/8/2011 07:17 PM
Cobalt	23	1.0		mg/Kg	1	8/8/2011 07:17 PM
Copper	15	2.0		mg/Kg	1	8/8/2011 07:17 PM
Lead	6.1	1.0		mg/Kg	1	8/8/2011 07:17 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Nickel	120	1.0		mg/Kg	1	8/8/2011 07:17 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:17 PM
Vanadium	53	1.0		mg/Kg	1	8/8/2011 07:17 PM
Zinc	21	1.0		mg/Kg	1	8/8/2011 07:17 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 10:10 PM
Surr: Bromofluorobenzene (FID)	107	62-153		%REC	1	8/3/2011 10:10 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 10:10 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 10:10 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 10:10 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 10:10 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 10:10 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 10:10 PM
Surr: Bromofluorobenzene (PID)	113	65-140		%REC	1	8/3/2011 10:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P17-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 9:57:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-034A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:09 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P18-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:01:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-035A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:20 PM
Arsenic	2.9	1.0		mg/Kg	1	8/8/2011 07:20 PM
Barium	170	1.0		mg/Kg	1	8/8/2011 07:20 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Chromium	75	1.0		mg/Kg	1	8/8/2011 07:20 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 07:20 PM
Copper	28	2.0		mg/Kg	1	8/8/2011 07:20 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 07:20 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Nickel	110	1.0		mg/Kg	1	8/8/2011 07:20 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:20 PM
Vanadium	43	1.0		mg/Kg	1	8/8/2011 07:20 PM
Zinc	53	1.0		mg/Kg	1	8/8/2011 07:20 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	4.7	1.0		mg/Kg	1	8/8/2011 01:52 PM
ORO	17	1.0		mg/Kg	1	8/8/2011 01:52 PM
Surr: p-Terphenyl	32.6	30-128		%REC	1	8/8/2011 01:52 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.25	0.10		mg/Kg	1	8/9/2011 12:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P18-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:05:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-036A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.2	2.0		mg/Kg	1	8/8/2011 07:23 PM
Arsenic	2.3	1.0		mg/Kg	1	8/8/2011 07:23 PM
Barium	180	1.0		mg/Kg	1	8/8/2011 07:23 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Chromium	110	1.0		mg/Kg	1	8/8/2011 07:23 PM
Cobalt	27	1.0		mg/Kg	1	8/8/2011 07:23 PM
Copper	20	2.0		mg/Kg	1	8/8/2011 07:23 PM
Lead	6.8	1.0		mg/Kg	1	8/8/2011 07:23 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Nickel	150	1.0		mg/Kg	1	8/8/2011 07:23 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:23 PM
Vanadium	53	1.0		mg/Kg	1	8/8/2011 07:23 PM
Zinc	31	1.0		mg/Kg	1	8/8/2011 07:23 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 10:26 PM
Surr: Bromofluorobenzene (FID)	103	62-153		%REC	1	8/3/2011 10:26 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 10:26 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 10:26 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 10:26 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 10:26 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 10:26 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 10:26 PM
Surr: Bromofluorobenzene (PID)	109	65-140		%REC	1	8/3/2011 10:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P18-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:05:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-036A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	8/9/2011 12:13 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

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ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P19-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:17:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-037A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	2.1	2.0		mg/Kg	1	8/8/2011 07:26 PM
Arsenic	3.1	1.0		mg/Kg	1	8/8/2011 07:26 PM
Barium	180	1.0		mg/Kg	1	8/8/2011 07:26 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Chromium	79	1.0		mg/Kg	1	8/8/2011 07:26 PM
Cobalt	19	1.0		mg/Kg	1	8/8/2011 07:26 PM
Copper	30	2.0		mg/Kg	1	8/8/2011 07:26 PM
Lead	8.7	1.0		mg/Kg	1	8/8/2011 07:26 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Nickel	120	1.0		mg/Kg	1	8/8/2011 07:26 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:26 PM
Vanadium	45	1.0		mg/Kg	1	8/8/2011 07:26 PM
Zinc	52	1.0		mg/Kg	1	8/8/2011 07:26 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	4.4	1.0		mg/Kg	1	8/8/2011 02:03 PM
ORO	20	1.0		mg/Kg	1	8/8/2011 02:03 PM
Surr: p-Terphenyl	57.2	30-128		%REC	1	8/8/2011 02:03 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 08:00 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P19-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:17:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-037A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808A	QC Batch: 74788			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 08:00 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 08:00 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 08:00 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 08:00 PM
Surr: Decachlorobiphenyl	61.9	31-107		%REC	1	8/8/2011 08:00 PM
Surr: Tetrachloro-m-xylene	55.9	35-108		%REC	1	8/8/2011 08:00 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.32	0.10		mg/Kg	1	8/9/2011 12:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P19-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:21:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-038A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:30 PM
Arsenic	3.7	1.0		mg/Kg	1	8/8/2011 07:30 PM
Barium	180	1.0		mg/Kg	1	8/8/2011 07:30 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Chromium	71	1.0		mg/Kg	1	8/8/2011 07:30 PM
Cobalt	15	1.0		mg/Kg	1	8/8/2011 07:30 PM
Copper	27	2.0		mg/Kg	1	8/8/2011 07:30 PM
Lead	11	1.0		mg/Kg	1	8/8/2011 07:30 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Nickel	100	1.0		mg/Kg	1	8/8/2011 07:30 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:30 PM
Vanadium	39	1.0		mg/Kg	1	8/8/2011 07:30 PM
Zinc	46	1.0		mg/Kg	1	8/8/2011 07:30 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 10:42 PM
Surr: Bromofluorobenzene (FID)	105	62-153		%REC	1	8/3/2011 10:42 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 10:42 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 10:42 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 10:42 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 10:42 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 10:42 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 10:42 PM
Surr: Bromofluorobenzene (PID)	110	65-140		%REC	1	8/3/2011 10:42 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P19-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:21:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-038A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.19	0.10		mg/Kg	1	8/9/2011 12:17 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P20-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:35:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-039A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:39 PM
Arsenic	3.0	1.0		mg/Kg	1	8/8/2011 07:39 PM
Barium	170	1.0		mg/Kg	1	8/8/2011 07:39 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Chromium	70	1.0		mg/Kg	1	8/8/2011 07:39 PM
Cobalt	17	1.0		mg/Kg	1	8/8/2011 07:39 PM
Copper	27	2.0		mg/Kg	1	8/8/2011 07:39 PM
Lead	7.5	1.0		mg/Kg	1	8/8/2011 07:39 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Nickel	110	1.0		mg/Kg	1	8/8/2011 07:39 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:39 PM
Vanadium	40	1.0		mg/Kg	1	8/8/2011 07:39 PM
Zinc	48	1.0		mg/Kg	1	8/8/2011 07:39 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808B	QC Batch: 74781			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	4.3	1.0		mg/Kg	1	8/8/2011 03:34 PM
ORO	19	1.0		mg/Kg	1	8/8/2011 03:34 PM
Surr: p-Terphenyl	52.4	30-128		%REC	1	8/8/2011 03:34 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.24	0.10		mg/Kg	1	8/9/2011 12:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P20-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:39:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-040A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808G	QC Batch: 74760			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 07:43 PM
Arsenic	2.9	1.0		mg/Kg	1	8/8/2011 07:43 PM
Barium	160	1.0		mg/Kg	1	8/8/2011 07:43 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Chromium	67	1.0		mg/Kg	1	8/8/2011 07:43 PM
Cobalt	15	1.0		mg/Kg	1	8/8/2011 07:43 PM
Copper	25	2.0		mg/Kg	1	8/8/2011 07:43 PM
Lead	10	1.0		mg/Kg	1	8/8/2011 07:43 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Nickel	100	1.0		mg/Kg	1	8/8/2011 07:43 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 07:43 PM
Vanadium	38	1.0		mg/Kg	1	8/8/2011 07:43 PM
Zinc	45	1.0		mg/Kg	1	8/8/2011 07:43 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 10:58 PM
Surr: Bromofluorobenzene (FID)	105	62-153		%REC	1	8/3/2011 10:58 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 10:58 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 10:58 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 10:58 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 10:58 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 10:58 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 10:58 PM
Surr: Bromofluorobenzene (PID)	110	65-140		%REC	1	8/3/2011 10:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P20-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:39:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-040A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809B	QC Batch: 74766			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.39	0.10		mg/Kg	1	8/9/2011 11:59 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P21-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:46:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-041A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808H	QC Batch: 74761			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 08:02 PM
Arsenic	2.1	1.0		mg/Kg	1	8/8/2011 08:02 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 08:02 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Chromium	56	1.0		mg/Kg	1	8/8/2011 08:02 PM
Cobalt	15	1.0		mg/Kg	1	8/8/2011 08:02 PM
Copper	19	2.0		mg/Kg	1	8/8/2011 08:02 PM
Lead	6.2	1.0		mg/Kg	1	8/8/2011 08:02 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Nickel	81	1.0		mg/Kg	1	8/8/2011 08:02 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 08:02 PM
Vanadium	34	1.0		mg/Kg	1	8/8/2011 08:02 PM
Zinc	38	1.0		mg/Kg	1	8/8/2011 08:02 PM
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3550B			**EPA 8015B(M)**			
RunID: GC16_110808C	QC Batch: 74786			PrepDate:	8/8/2011	Analyst: **CBR**
DRO	5.4	1.0		mg/Kg	1	8/8/2011 07:35 PM
ORO	20	1.0		mg/Kg	1	8/8/2011 07:35 PM
Surr: p-Terphenyl	44.2	30-128		%REC	1	8/8/2011 07:35 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B			**EPA 8081A**			
RunID: GC9_110808B	QC Batch: 74789			PrepDate:	8/8/2011	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
4,4´-DDE	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
4,4´-DDT	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Aldrin	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
alpha-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
beta-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
Chlordane	ND	8.5		µg/Kg	1	8/8/2011 10:54 PM
delta-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P21-0.0
Lab Order:	119244	**Collection Date:**	8/2/2011 10:46:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-041A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC9_110808B	QC Batch: 74789			PrepDate:	8/8/2011	Analyst: **HL**
Dieldrin	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Endosulfan I	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
Endosulfan II	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Endrin	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
Endrin ketone	ND	2.0		µg/Kg	1	8/8/2011 10:54 PM
gamma-BHC	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
Heptachlor	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	8/8/2011 10:54 PM
Methoxychlor	ND	5.0		µg/Kg	1	8/8/2011 10:54 PM
Toxaphene	ND	50		µg/Kg	1	8/8/2011 10:54 PM
Surr: Decachlorobiphenyl	67.0	31-107		%REC	1	8/8/2011 10:54 PM
Surr: Tetrachloro-m-xylene	60.2	35-108		%REC	1	8/8/2011 10:54 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_110809C	QC Batch: 74767			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.22	0.10		mg/Kg	1	8/9/2011 12:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS
Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P21-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:50:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-042A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_110808H	QC Batch: 74761			PrepDate:	8/8/2011	Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	8/8/2011 08:05 PM
Arsenic	2.3	1.0		mg/Kg	1	8/8/2011 08:05 PM
Barium	130	1.0		mg/Kg	1	8/8/2011 08:05 PM
Beryllium	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Cadmium	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Chromium	56	1.0		mg/Kg	1	8/8/2011 08:05 PM
Cobalt	15	1.0		mg/Kg	1	8/8/2011 08:05 PM
Copper	19	2.0		mg/Kg	1	8/8/2011 08:05 PM
Lead	7.7	1.0		mg/Kg	1	8/8/2011 08:05 PM
Molybdenum	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Nickel	84	1.0		mg/Kg	1	8/8/2011 08:05 PM
Selenium	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Silver	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Thallium	ND	1.0		mg/Kg	1	8/8/2011 08:05 PM
Vanadium	33	1.0		mg/Kg	1	8/8/2011 08:05 PM
Zinc	38	1.0		mg/Kg	1	8/8/2011 08:05 PM
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	8/3/2011 11:13 PM
Surr: Bromofluorobenzene (FID)	107	62-153		%REC	1	8/3/2011 11:13 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC2_110803B	QC Batch: E11VS287			PrepDate:		Analyst: **TP**
Benzene	ND	5.0		µg/Kg	1	8/3/2011 11:13 PM
Ethylbenzene	ND	5.0		µg/Kg	1	8/3/2011 11:13 PM
m,p-Xylene	ND	10		µg/Kg	1	8/3/2011 11:13 PM
Methyl tert-butyl ether	ND	5.0		µg/Kg	1	8/3/2011 11:13 PM
o-Xylene	ND	5.0		µg/Kg	1	8/3/2011 11:13 PM
Toluene	ND	5.0		µg/Kg	1	8/3/2011 11:13 PM
Surr: Bromofluorobenzene (PID)	112	65-140		%REC	1	8/3/2011 11:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P21-1.5
Lab Order:	119244	**Collection Date:**	8/2/2011 10:50:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	SOIL
Lab ID:	119244-042A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7471A			
RunID: AA5_110809C	QC Batch: 74767			PrepDate:	8/8/2011	Analyst: **VV**
Mercury	0.28	0.10		mg/Kg	1	8/9/2011 12:42 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

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3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

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ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PW1
Lab Order:	119244	**Collection Date:**	8/2/2011 11:15:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	WATER
Lab ID:	119244-043A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
			EPA 8015B(M)			
RunID: GC19_110803A QC Batch: M11VW153				PrepDate:		Analyst: **BB**
GRO	ND	0.050		mg/L	1	8/3/2011 02:45 PM
Surr: Bromofluorobenzene (FID)	89.9	70-130		%REC	1	8/3/2011 02:45 PM
VOLATILE ORGANIC COMPOUNDS BY GC/PID						
			EPA 8021B			
RunID: GC19_110803A QC Batch: M11VW153				PrepDate:		Analyst: **BB**
Benzene	ND	0.50		µg/L	1	8/3/2011 02:45 PM
Ethylbenzene	ND	0.50		µg/L	1	8/3/2011 02:45 PM
m,p-Xylene	ND	1.0		µg/L	1	8/3/2011 02:45 PM
Methyl tert-butyl ether	ND	0.50		µg/L	1	8/3/2011 02:45 PM
o-Xylene	ND	0.50		µg/L	1	8/3/2011 02:45 PM
Toluene	ND	0.50		µg/L	1	8/3/2011 02:45 PM
Surr: Bromofluorobenzene (PID)	87.9	70-130		%REC	1	8/3/2011 02:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PW1
Lab Order:	119244	**Collection Date:**	8/2/2011 11:15:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	WATER
Lab ID:	119244-043B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_110808A	QC Batch: 74776			PrepDate:	8/5/2011	Analyst: **IL**
Antimony	0.019	0.0050		mg/L	1	8/8/2011 10:11 AM
Arsenic	0.25	0.010		mg/L	1	8/8/2011 10:11 AM
Barium	3.7	0.0030		mg/L	1	8/8/2011 10:11 AM
Beryllium	ND	0.0030		mg/L	1	8/8/2011 10:11 AM
Cadmium	0.0082	0.0030		mg/L	1	8/8/2011 10:11 AM
Chromium	0.78	0.0030		mg/L	1	8/8/2011 10:11 AM
Cobalt	0.12	0.0030		mg/L	1	8/8/2011 10:11 AM
Copper	0.38	0.0050		mg/L	1	8/8/2011 10:11 AM
Lead	0.12	0.0050		mg/L	1	8/8/2011 10:11 AM
Molybdenum	0.014	0.0050		mg/L	1	8/8/2011 10:11 AM
Nickel	1.1	0.0050		mg/L	1	8/8/2011 10:11 AM
Selenium	ND	0.010		mg/L	1	8/8/2011 10:11 AM
Silver	ND	0.0030		mg/L	1	8/8/2011 10:11 AM
Thallium	ND	0.015		mg/L	1	8/8/2011 10:11 AM
Vanadium	0.37	0.0030		mg/L	1	8/8/2011 10:11 AM
Zinc	0.53	0.010		mg/L	1	8/8/2011 10:11 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_110805A	QC Batch: 74735			PrepDate:	8/4/2011	Analyst: **VV**
Mercury	1.3	0.20		µg/L	1	8/5/2011 11:33 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Aug-11*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PW1
Lab Order:	119244	**Collection Date:**	8/2/2011 11:15:00 AM
Project:	Marin-Sonoma Narrows Segment B3, E8469-	**Matrix:**	WATER
Lab ID:	119244-043C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DIESEL & MOTOR OIL RANGE ORGANICS BY GC/FID						
EPA 3510C			**EPA 8015B(M)**			
RunID: GC16_110804A	QC Batch: 74703			PrepDate:	8/3/2011	Analyst: **CBR**
DRO	0.094	0.050		mg/L	1	8/4/2011 03:50 PM
ORO	0.099	0.050		mg/L	1	8/4/2011 03:50 PM
Surr: p-Terphenyl	64.7	36-126		%REC	1	8/4/2011 03:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74757** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **PBS** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221944**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.234	2.0									
Arsenic	ND	1.0									
Barium	0.073	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	0.225	1.0									

Sample ID: **LCS-74757** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **LCSS** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221945**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	45.434	2.0	50.00	0.2344	90.4	80	120				
Arsenic	48.299	1.0	50.00	0	96.6	80	120				
Barium	50.169	1.0	50.00	0.07259	100	80	120				
Beryllium	49.227	1.0	50.00	0	98.5	80	120				
Cadmium	48.441	1.0	50.00	0	96.9	80	120				
Chromium	45.956	1.0	50.00	0	91.9	80	120				
Cobalt	50.167	1.0	50.00	0	100	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74757** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **LCSS** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221945**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	49.075	2.0	50.00	0	98.1	80	120				
Lead	50.103	1.0	50.00	0	100	80	120				
Molybdenum	52.213	1.0	50.00	0	104	80	120				
Nickel	49.223	1.0	50.00	0	98.4	80	120				
Selenium	45.815	1.0	50.00	0	91.6	80	120				
Silver	48.528	1.0	50.00	0	97.1	80	120				
Thallium	48.300	1.0	50.00	0	96.6	80	120				
Vanadium	49.500	1.0	50.00	0	99.0	80	120				
Zinc	49.381	1.0	50.00	0.2255	98.3	80	120				

Sample ID: **119244-010A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **P5-1.5** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221954**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.321	2.0						0.1617	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	86.776	1.0						85.74	1.20	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.854	1.0						0.8554	0	20	
Chromium	33.586	1.0						33.26	0.962	20	
Cobalt	24.703	1.0						26.06	5.34	20	
Copper	49.055	2.0						46.28	5.83	20	
Lead	1.063	1.0						1.104	3.76	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	18.132	1.0						17.67	2.57	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	66.828	1.0						67.24	0.618	20	
Zinc	38.075	1.0						36.70	3.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-010A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **P5-1.5** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221955**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	70.274	2.0	125.0	0.1617	56.1	32	105				
Arsenic	62.606	1.0	125.0	0	50.1	49	106				
Barium	187.398	1.0	125.0	85.74	81.3	31	133				
Beryllium	94.731	1.0	125.0	0	75.8	56	106				
Cadmium	93.220	1.0	125.0	0.8554	73.9	51	103				
Chromium	127.975	1.0	125.0	33.26	75.8	45	114				
Cobalt	120.548	1.0	125.0	26.06	75.6	52	106				
Copper	153.102	2.0	125.0	46.28	85.5	54	125				
Lead	98.370	1.0	125.0	1.104	77.8	34	126				
Molybdenum	80.182	1.0	125.0	0	64.1	54	106				
Nickel	111.536	1.0	125.0	17.67	75.1	45	111				
Selenium	70.540	1.0	125.0	0	56.4	47	104				
Silver	98.328	1.0	125.0	0	78.7	56	112				
Thallium	78.119	1.0	125.0	0	62.5	46	101				
Vanadium	163.526	1.0	125.0	67.24	77.0	54	114				
Zinc	131.153	1.0	125.0	36.70	75.6	28	125				

Sample ID: **119244-010A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **P5-1.5** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221956**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	65.976	2.0	125.0	0.1617	52.7	32	105	70.27	6.31	20	
Arsenic	55.368	1.0	125.0	0	44.3	49	106	62.61	12.3	20	S
Barium	179.096	1.0	125.0	85.74	74.7	31	133	187.4	4.53	20	
Beryllium	89.385	1.0	125.0	0	71.5	56	106	94.73	5.81	20	
Cadmium	87.770	1.0	125.0	0.8554	69.5	51	103	93.22	6.02	20	
Chromium	124.169	1.0	125.0	33.26	72.7	45	114	128.0	3.02	20	
Cobalt	115.368	1.0	125.0	26.06	71.4	52	106	120.5	4.39	20	
Copper	151.378	2.0	125.0	46.28	84.1	54	125	153.1	1.13	20	
Lead	92.304	1.0	125.0	1.104	73.0	34	126	98.37	6.36	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-010A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135654**
Client ID: **P5-1.5** Batch ID: **74757** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2221956**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	73.579	1.0	125.0	0	58.9	54	106	80.18	8.59	20	
Nickel	106.136	1.0	125.0	17.67	70.8	45	111	111.5	4.96	20	
Selenium	64.025	1.0	125.0	0	51.2	47	104	70.54	9.68	20	
Silver	92.161	1.0	125.0	0	73.7	56	112	98.33	6.47	20	
Thallium	71.948	1.0	125.0	0	57.6	46	101	78.12	8.23	20	
Vanadium	162.212	1.0	125.0	67.24	76.0	54	114	163.5	0.807	20	
Zinc	126.246	1.0	125.0	36.70	71.6	28	125	131.2	3.81	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74758** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **PBS** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222178**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.165	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	0.177	1.0									

Sample ID: **LCS-74758** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **LCSS** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	45.630	2.0	50.00	0.1654	90.9	80	120				
Arsenic	45.593	1.0	50.00	0	91.2	80	120				
Barium	48.563	1.0	50.00	0	97.1	80	120				
Beryllium	47.643	1.0	50.00	0	95.3	80	120				
Cadmium	45.423	1.0	50.00	0	90.8	80	120				
Chromium	45.004	1.0	50.00	0	90.0	80	120				
Cobalt	47.948	1.0	50.00	0	95.9	80	120				
Copper	49.283	2.0	50.00	0	98.6	80	120				
Lead	47.167	1.0	50.00	0	94.3	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74758** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **LCSS** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	49.611	1.0	50.00	0	99.2	80	120				
Nickel	46.092	1.0	50.00	0	92.2	80	120				
Selenium	42.983	1.0	50.00	0	86.0	80	120				
Silver	48.335	1.0	50.00	0	96.7	80	120				
Thallium	46.686	1.0	50.00	0	93.4	80	120				
Vanadium	48.138	1.0	50.00	0	96.3	80	120				
Zinc	45.799	1.0	50.00	0.1769	91.2	80	120				

Sample ID: **119244-020A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **P10-1.5** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222190**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.295	2.0						1.336	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	124.550	1.0						115.8	7.27	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.823	1.0						0.8007	0	20	
Chromium	79.216	1.0						78.51	0.900	20	
Cobalt	28.214	1.0						25.47	10.2	20	
Copper	26.591	2.0						25.84	2.88	20	
Lead	3.397	1.0						3.179	6.61	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	61.565	1.0						57.81	6.30	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	61.106	1.0						60.44	1.10	20	
Zinc	34.146	1.0						33.76	1.14	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-020A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **P10-1.5** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222191**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	69.672	2.0	125.0	1.336	54.7	32	105				
Arsenic	75.860	1.0	125.0	0	60.7	49	106				
Barium	216.492	1.0	125.0	115.8	80.5	31	133				
Beryllium	97.382	1.0	125.0	0	77.9	56	106				
Cadmium	89.477	1.0	125.0	0.8007	70.9	51	103				
Chromium	168.285	1.0	125.0	78.51	71.8	45	114				
Cobalt	123.923	1.0	125.0	25.47	78.8	52	106				
Copper	136.058	2.0	125.0	25.84	88.2	54	125				
Lead	95.882	1.0	125.0	3.179	74.2	34	126				
Molybdenum	86.048	1.0	125.0	0	68.8	54	106				
Nickel	155.675	1.0	125.0	57.81	78.3	45	111				
Selenium	77.451	1.0	125.0	0	62.0	47	104				
Silver	100.226	1.0	125.0	0	80.2	56	112				
Thallium	84.310	1.0	125.0	0	67.4	46	101				
Vanadium	157.703	1.0	125.0	60.44	77.8	54	114				
Zinc	126.166	1.0	125.0	33.76	73.9	28	125				

Sample ID: **119244-020A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **P10-1.5** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222192**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	76.021	2.0	125.0	1.336	59.7	32	105	69.67	8.72	20	
Arsenic	80.101	1.0	125.0	0	64.1	49	106	75.86	5.44	20	
Barium	225.541	1.0	125.0	115.8	87.8	31	133	216.5	4.09	20	
Beryllium	102.272	1.0	125.0	0	81.8	56	106	97.38	4.90	20	
Cadmium	94.372	1.0	125.0	0.8007	74.9	51	103	89.48	5.32	20	
Chromium	183.923	1.0	125.0	78.51	84.3	45	114	168.3	8.88	20	
Cobalt	128.681	1.0	125.0	25.47	82.6	52	106	123.9	3.77	20	
Copper	145.154	2.0	125.0	25.84	95.5	54	125	136.1	6.47	20	
Lead	100.696	1.0	125.0	3.179	78.0	34	126	95.88	4.90	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-020A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135676**
Client ID: **P10-1.5** Batch ID: **74758** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222192**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	91.182	1.0	125.0	0	72.9	54	106	86.05	5.79	20	
Nickel	160.059	1.0	125.0	57.81	81.8	45	111	155.7	2.78	20	
Selenium	80.957	1.0	125.0	0	64.8	47	104	77.45	4.43	20	
Silver	106.063	1.0	125.0	0	84.9	56	112	100.2	5.66	20	
Thallium	89.007	1.0	125.0	0	71.2	46	101	84.31	5.42	20	
Vanadium	170.363	1.0	125.0	60.44	87.9	54	114	157.7	7.72	20	
Zinc	135.226	1.0	125.0	33.76	81.2	28	125	126.2	6.93	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74759** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **PBS** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222193**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.374	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	0.224	1.0									
Vanadium	ND	1.0									
Zinc	0.137	1.0									

Sample ID: **LCS-74759** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **LCSS** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	45.162	2.0	50.00	0.3742	89.6	80	120				
Arsenic	44.764	1.0	50.00	0	89.5	80	120				
Barium	47.851	1.0	50.00	0	95.7	80	120				
Beryllium	47.303	1.0	50.00	0	94.6	80	120				
Cadmium	45.059	1.0	50.00	0	90.1	80	120				
Chromium	44.039	1.0	50.00	0	88.1	80	120				
Cobalt	47.211	1.0	50.00	0	94.4	80	120				
Copper	48.197	2.0	50.00	0	96.4	80	120				
Lead	45.906	1.0	50.00	0	91.8	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74759** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **LCSS** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	48.812	1.0	50.00	0	97.6	80	120				
Nickel	45.284	1.0	50.00	0	90.6	80	120				
Selenium	42.436	1.0	50.00	0	84.9	80	120				
Silver	47.604	1.0	50.00	0	95.2	80	120				
Thallium	45.760	1.0	50.00	0.2239	91.1	80	120				
Vanadium	47.042	1.0	50.00	0	94.1	80	120				
Zinc	45.461	1.0	50.00	0.1373	90.6	80	120				

Sample ID: **119244-030A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **P15-1.5** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222204**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.521	2.0						1.734	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	118.260	1.0						128.0	7.92	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.653	1.0						0.6859	0	20	
Chromium	86.714	1.0						95.53	9.68	20	
Cobalt	22.948	1.0						25.23	9.46	20	
Copper	19.421	2.0						20.68	6.26	20	
Lead	5.956	1.0						5.952	0.0720	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	114.092	1.0						120.4	5.37	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	50.499	1.0						55.45	9.34	20	
Zinc	31.843	1.0						34.95	9.29	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-030A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **P15-1.5** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222205**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.559	2.0	125.0	1.734	59.1	32	105				
Arsenic	92.014	1.0	125.0	0	73.6	49	106				
Barium	233.215	1.0	125.0	128.0	84.2	31	133				
Beryllium	103.377	1.0	125.0	0	82.7	56	106				
Cadmium	95.129	1.0	125.0	0.6859	75.6	51	103				
Chromium	198.038	1.0	125.0	95.53	82.0	45	114				
Cobalt	128.270	1.0	125.0	25.23	82.4	52	106				
Copper	138.847	2.0	125.0	20.68	94.5	54	125				
Lead	102.844	1.0	125.0	5.952	77.5	34	126				
Molybdenum	99.161	1.0	125.0	0	79.3	54	106				
Nickel	218.991	1.0	125.0	120.4	78.9	45	111				
Selenium	90.819	1.0	125.0	0	72.7	47	104				
Silver	109.717	1.0	125.0	0	87.8	56	112				
Thallium	85.614	1.0	125.0	0	68.5	46	101				
Vanadium	162.415	1.0	125.0	55.45	85.6	54	114				
Zinc	132.317	1.0	125.0	34.95	77.9	28	125				

Sample ID: **119244-030A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **P15-1.5** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222206**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.339	2.0	125.0	1.734	58.9	32	105	75.56	0.292	20	
Arsenic	89.384	1.0	125.0	0	71.5	49	106	92.01	2.90	20	
Barium	224.059	1.0	125.0	128.0	76.8	31	133	233.2	4.00	20	
Beryllium	100.797	1.0	125.0	0	80.6	56	106	103.4	2.53	20	
Cadmium	92.706	1.0	125.0	0.6859	73.6	51	103	95.13	2.58	20	
Chromium	186.944	1.0	125.0	95.53	73.1	45	114	198.0	5.76	20	
Cobalt	123.878	1.0	125.0	25.23	78.9	52	106	128.3	3.48	20	
Copper	134.077	2.0	125.0	20.68	90.7	54	125	138.8	3.50	20	
Lead	99.987	1.0	125.0	5.952	75.2	34	126	102.8	2.82	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-030A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135677**
Client ID: **P15-1.5** Batch ID: **74759** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222206**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	97.201	1.0	125.0	0	77.8	54	106	99.16	2.00	20	
Nickel	210.512	1.0	125.0	120.4	72.1	45	111	219.0	3.95	20	
Selenium	87.746	1.0	125.0	0	70.2	47	104	90.82	3.44	20	
Silver	106.485	1.0	125.0	0	85.2	56	112	109.7	2.99	20	
Thallium	83.023	1.0	125.0	0	66.4	46	101	85.61	3.07	20	
Vanadium	156.733	1.0	125.0	55.45	81.0	54	114	162.4	3.56	20	
Zinc	129.530	1.0	125.0	34.95	75.7	28	125	132.3	2.13	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 *Tel: 562. 989.4045* *Fax: 562.989.4040*

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74760** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **PBS** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222207**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.164	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74760** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **LCSS** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.217	2.0	50.00	0.1637	94.1	80	120				
Arsenic	45.795	1.0	50.00	0	91.6	80	120				
Barium	49.330	1.0	50.00	0	98.7	80	120				
Beryllium	48.666	1.0	50.00	0	97.3	80	120				
Cadmium	46.146	1.0	50.00	0	92.3	80	120				
Chromium	44.872	1.0	50.00	0	89.7	80	120				
Cobalt	48.150	1.0	50.00	0	96.3	80	120				
Copper	49.536	2.0	50.00	0	99.1	80	120				
Lead	46.523	1.0	50.00	0	93.0	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74760** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **LCSS** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	49.636	1.0	50.00	0	99.3	80	120				
Nickel	45.945	1.0	50.00	0	91.9	80	120				
Selenium	43.823	1.0	50.00	0	87.6	80	120				
Silver	48.530	1.0	50.00	0	97.1	80	120				
Thallium	46.402	1.0	50.00	0	92.8	80	120				
Vanadium	47.540	1.0	50.00	0	95.1	80	120				
Zinc	46.671	1.0	50.00	0	93.3	80	120				

Sample ID: **119244-040A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **P20-1.5** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222219**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.695	2.0						1.556	0	20	
Arsenic	3.375	1.0						2.926	14.2	20	
Barium	172.353	1.0						162.8	5.68	20	
Beryllium	0.065	1.0						0	0	20	
Cadmium	0.677	1.0						0.6448	0	20	
Chromium	68.522	1.0						66.66	2.75	20	
Cobalt	17.855	1.0						15.35	15.1	20	
Copper	25.765	2.0						25.37	1.54	20	
Lead	10.656	1.0						10.20	4.40	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	107.907	1.0						99.92	7.68	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	39.015	1.0						38.18	2.15	20	
Zinc	46.120	1.0						44.96	2.55	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-040A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **P20-1.5** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222220**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	65.609	2.0	125.0	1.556	51.2	32	105				
Arsenic	100.006	1.0	125.0	2.926	77.7	49	106				
Barium	269.369	1.0	125.0	162.8	85.2	31	133				
Beryllium	103.941	1.0	125.0	0	83.2	56	106				
Cadmium	94.927	1.0	125.0	0.6448	75.4	51	103				
Chromium	168.776	1.0	125.0	66.66	81.7	45	114				
Cobalt	118.460	1.0	125.0	15.35	82.5	52	106				
Copper	142.305	2.0	125.0	25.37	93.5	54	125				
Lead	105.750	1.0	125.0	10.20	76.4	34	126				
Molybdenum	101.935	1.0	125.0	0	81.5	54	106				
Nickel	200.097	1.0	125.0	99.92	80.1	45	111				
Selenium	93.414	1.0	125.0	0	74.7	47	104				
Silver	109.994	1.0	125.0	0	88.0	56	112				
Thallium	92.669	1.0	125.0	0	74.1	46	101				
Vanadium	143.629	1.0	125.0	38.18	84.4	54	114				
Zinc	144.476	1.0	125.0	44.96	79.6	28	125				

Sample ID: **119244-040A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **P20-1.5** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222221**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	62.319	2.0	125.0	1.556	48.6	32	105	65.61	5.14	20	
Arsenic	95.696	1.0	125.0	2.926	74.2	49	106	100.0	4.40	20	
Barium	264.441	1.0	125.0	162.8	81.3	31	133	269.4	1.85	20	
Beryllium	98.253	1.0	125.0	0	78.6	56	106	103.9	5.63	20	
Cadmium	91.874	1.0	125.0	0.6448	73.0	51	103	94.93	3.27	20	
Chromium	164.885	1.0	125.0	66.66	78.6	45	114	168.8	2.33	20	
Cobalt	114.863	1.0	125.0	15.35	79.6	52	106	118.5	3.08	20	
Copper	138.170	2.0	125.0	25.37	90.2	54	125	142.3	2.95	20	
Lead	101.328	1.0	125.0	10.20	72.9	34	126	105.7	4.27	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-040A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135678**
Client ID: **P20-1.5** Batch ID: **74760** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222221**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	97.337	1.0	125.0	0	77.9	54	106	101.9	4.62	20	
Nickel	195.916	1.0	125.0	99.92	76.8	45	111	200.1	2.11	20	
Selenium	90.233	1.0	125.0	0	72.2	47	104	93.41	3.46	20	
Silver	106.473	1.0	125.0	0	85.2	56	112	110.0	3.25	20	
Thallium	89.506	1.0	125.0	0	71.6	46	101	92.67	3.47	20	
Vanadium	139.483	1.0	125.0	38.18	81.0	54	114	143.6	2.93	20	
Zinc	140.246	1.0	125.0	44.96	76.2	28	125	144.5	2.97	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74761** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **PBS** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.320	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	0.217	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-74761** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **LCSS** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	46.141	2.0	50.00	0.3197	91.6	80	120				
Arsenic	44.373	1.0	50.00	0	88.7	80	120				
Barium	48.462	1.0	50.00	0	96.9	80	120				
Beryllium	47.308	1.0	50.00	0	94.6	80	120				
Cadmium	44.957	1.0	50.00	0	89.9	80	120				
Chromium	43.740	1.0	50.00	0	87.5	80	120				
Cobalt	46.973	1.0	50.00	0	93.9	80	120				
Copper	48.629	2.0	50.00	0	97.3	80	120				
Lead	44.891	1.0	50.00	0	89.8	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-74761** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **LCSS** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	48.368	1.0	50.00	0	96.7	80	120				
Nickel	44.610	1.0	50.00	0	89.2	80	120				
Selenium	42.630	1.0	50.00	0	85.3	80	120				
Silver	47.780	1.0	50.00	0	95.6	80	120				
Thallium	44.935	1.0	50.00	0.2171	89.4	80	120				
Vanadium	46.035	1.0	50.00	0	92.1	80	120				
Zinc	45.491	1.0	50.00	0	91.0	80	120				

Sample ID: **119244-042A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **P21-1.5** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222226**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.358	2.0						1.587	0	20	
Arsenic	2.632	1.0						2.261	15.2	20	
Barium	131.170	1.0						130.9	0.202	20	
Beryllium	0.049	1.0						0	0	20	
Cadmium	0.550	1.0						0.5518	0	20	
Chromium	56.512	1.0						55.72	1.41	20	
Cobalt	15.215	1.0						14.72	3.32	20	
Copper	19.298	2.0						19.00	1.56	20	
Lead	7.903	1.0						7.699	2.61	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	85.039	1.0						84.00	1.23	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	32.303	1.0						32.76	1.42	20	
Zinc	38.266	1.0						37.57	1.83	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-042A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **P21-1.5** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222227**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	66.446	2.0	125.0	1.587	51.9	32	105				
Arsenic	98.650	1.0	125.0	2.261	77.1	49	106				
Barium	232.466	1.0	125.0	130.9	81.2	31	133				
Beryllium	102.215	1.0	125.0	0	81.8	56	106				
Cadmium	94.125	1.0	125.0	0.5518	74.9	51	103				
Chromium	155.510	1.0	125.0	55.72	79.8	45	114				
Cobalt	115.364	1.0	125.0	14.72	80.5	52	106				
Copper	131.772	2.0	125.0	19.00	90.2	54	125				
Lead	102.073	1.0	125.0	7.699	75.5	34	126				
Molybdenum	100.012	1.0	125.0	0	80.0	54	106				
Nickel	181.519	1.0	125.0	84.00	78.0	45	111				
Selenium	92.806	1.0	125.0	0	74.2	47	104				
Silver	107.145	1.0	125.0	0	85.7	56	112				
Thallium	92.301	1.0	125.0	0	73.8	46	101				
Vanadium	135.028	1.0	125.0	32.76	81.8	54	114				
Zinc	135.519	1.0	125.0	37.57	78.4	28	125				

Sample ID: **119244-042A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **P21-1.5** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222228**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	63.848	2.0	125.0	1.587	49.8	32	105	66.45	3.99	20	
Arsenic	94.184	1.0	125.0	2.261	73.5	49	106	98.65	4.63	20	
Barium	222.580	1.0	125.0	130.9	73.3	31	133	232.5	4.35	20	
Beryllium	98.975	1.0	125.0	0	79.2	56	106	102.2	3.22	20	
Cadmium	91.653	1.0	125.0	0.5518	72.9	51	103	94.13	2.66	20	
Chromium	150.863	1.0	125.0	55.72	76.1	45	114	155.5	3.03	20	
Cobalt	112.232	1.0	125.0	14.72	78.0	52	106	115.4	2.75	20	
Copper	128.614	2.0	125.0	19.00	87.7	54	125	131.8	2.43	20	
Lead	97.753	1.0	125.0	7.699	72.0	34	126	102.1	4.32	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **119244-042A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135679**
Client ID: **P21-1.5** Batch ID: **74761** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/8/2011** SeqNo: **2222228**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	96.527	1.0	125.0	0	77.2	54	106	100.0	3.55	20	
Nickel	173.727	1.0	125.0	84.00	71.8	45	111	181.5	4.39	20	
Selenium	89.038	1.0	125.0	0	71.2	47	104	92.81	4.14	20	
Silver	104.936	1.0	125.0	0	83.9	56	112	107.1	2.08	20	
Thallium	90.062	1.0	125.0	0	72.0	46	101	92.30	2.46	20	
Vanadium	130.486	1.0	125.0	32.76	78.2	54	114	135.0	3.42	20	
Zinc	130.188	1.0	125.0	37.57	74.1	28	125	135.5	4.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-74776** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **8/5/2011** RunNo: **135649**
Client ID: **PBW** Batch ID: **74776** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **8/8/2011** SeqNo: **2221647**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.002	0.0050									
Arsenic	ND	0.010									
Barium	0.000464	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	0.004	0.010									

Sample ID: **LCS-74776** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **8/5/2011** RunNo: **135649**
Client ID: **LCSW** Batch ID: **74776** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **8/8/2011** SeqNo: **2221648**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.972	0.0050	1.000	0.002351	97.0	85	115				
Arsenic	0.951	0.010	1.000	0	95.1	85	115				
Barium	0.960	0.0030	1.000	0.0004642	96.0	85	115				
Beryllium	0.958	0.0030	1.000	0	95.8	85	115				
Cadmium	0.940	0.0030	1.000	0	94.0	85	115				
Chromium	0.875	0.0030	1.000	0	87.5	85	115				
Cobalt	0.968	0.0030	1.000	0	96.8	85	115				
Copper	0.951	0.0050	1.000	0	95.1	85	115				
Lead	0.965	0.0050	1.000	0	96.5	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-74776** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **8/5/2011** RunNo: **135649**
Client ID: **LCSW** Batch ID: **74776** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **8/8/2011** SeqNo: **2221648**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	0.962	0.0050	1.000	0	96.2	85	115				
Nickel	0.927	0.0050	1.000	0	92.7	85	115				
Selenium	0.924	0.010	1.000	0	92.4	85	115				
Silver	0.959	0.0030	1.000	0	95.9	85	115				
Thallium	0.940	0.015	1.000	0	94.0	85	115				
Vanadium	0.937	0.0030	1.000	0	93.7	85	115				
Zinc	0.958	0.010	1.000	0.003778	95.4	85	115				

Sample ID: **119224-001B-MS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **8/5/2011** RunNo: **135649**
Client ID: **ZZZZZZ** Batch ID: **74776** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **8/8/2011** SeqNo: **2221650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.582	0.0050	2.500	0.009613	103	73	128				
Arsenic	2.751	0.010	2.500	0.01348	109	79	121				
Barium	2.603	0.0030	2.500	0.03828	103	82	118				
Beryllium	2.688	0.0030	2.500	0	108	84	119				
Cadmium	2.609	0.0030	2.500	0	104	79	117				
Chromium	2.462	0.0030	2.500	0.007321	98.2	78	115				
Cobalt	2.693	0.0030	2.500	0	108	80	118				
Copper	2.718	0.0050	2.500	0.06206	106	81	127				
Lead	2.552	0.0050	2.500	0.004051	102	80	118				
Molybdenum	2.665	0.0050	2.500	0.0005159	107	81	118				
Nickel	2.525	0.0050	2.500	0.002039	101	78	120				
Selenium	3.065	0.010	2.500	0.02265	122	78	120				S
Silver	2.560	0.0030	2.500	0	102	79	125				
Thallium	2.517	0.015	2.500	0.006674	100	74	115				
Vanadium	2.646	0.0030	2.500	0.003329	106	84	119				
Zinc	2.797	0.010	2.500	0.1199	107	75	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **119224-001B-MSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **8/5/2011** RunNo: **135649**
Client ID: **ZZZZZZ** Batch ID: **74776** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **8/8/2011** SeqNo: **2221651**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.664	0.0050	2.500	0.009613	106	73	128	2.582	3.15	20	
Arsenic	2.827	0.010	2.500	0.01348	113	79	121	2.751	2.73	20	
Barium	2.649	0.0030	2.500	0.03828	104	82	118	2.603	1.75	20	
Beryllium	2.709	0.0030	2.500	0	108	84	119	2.688	0.770	20	
Cadmium	2.649	0.0030	2.500	0	106	79	117	2.609	1.51	20	
Chromium	2.512	0.0030	2.500	0.007321	100	78	115	2.462	1.98	20	
Cobalt	2.733	0.0030	2.500	0	109	80	118	2.693	1.48	20	
Copper	2.764	0.0050	2.500	0.06206	108	81	127	2.718	1.67	20	
Lead	2.616	0.0050	2.500	0.004051	104	80	118	2.552	2.46	20	
Molybdenum	2.703	0.0050	2.500	0.0005159	108	81	118	2.665	1.41	20	
Nickel	2.569	0.0050	2.500	0.002039	103	78	120	2.525	1.74	20	
Selenium	3.121	0.010	2.500	0.02265	124	78	120	3.065	1.83	20	S
Silver	2.604	0.0030	2.500	0	104	79	125	2.560	1.69	20	
Thallium	2.585	0.015	2.500	0.006674	103	74	115	2.517	2.65	20	
Vanadium	2.678	0.0030	2.500	0.003329	107	84	119	2.646	1.21	20	
Zinc	2.832	0.010	2.500	0.1199	108	75	122	2.797	1.26	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-74735** SampType: **MBLK** TestCode: **7470_W** Units: **µg/L** Prep Date: **8/4/2011** RunNo: **135619**
Client ID: **PBW** Batch ID: **74735** TestNo: **EPA 7470A** Analysis Date: **8/5/2011** SeqNo: **2221152**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-74735** SampType: **LCS** TestCode: **7470_W** Units: **µg/L** Prep Date: **8/4/2011** RunNo: **135619**
Client ID: **LCSW** Batch ID: **74735** TestNo: **EPA 7470A** Analysis Date: **8/5/2011** SeqNo: **2221153**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.985	0.20	10.00	0	99.9	85	115				

Sample ID: **119224-001B-MS** SampType: **MS** TestCode: **7470_W** Units: **µg/L** Prep Date: **8/4/2011** RunNo: **135619**
Client ID: **ZZZZZZ** Batch ID: **74735** TestNo: **EPA 7470A** Analysis Date: **8/5/2011** SeqNo: **2221154**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	8.068	0.20	10.00	0	80.7	70	130				

Sample ID: **119224-001B-MSD** SampType: **MSD** TestCode: **7470_W** Units: **µg/L** Prep Date: **8/4/2011** RunNo: **135619**
Client ID: **ZZZZZZ** Batch ID: **74735** TestNo: **EPA 7470A** Analysis Date: **8/5/2011** SeqNo: **2221156**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	7.970	0.20	10.00	0	79.7	70	130	8.068	1.22	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74763** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135690**
Client ID: **PBS** Batch ID: **74763** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222337**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74763** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135690**
Client ID: **LCSS** Batch ID: **74763** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222338**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.832	0.10	0.8300	0	100	80	120				

Sample ID: **119244-010A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135690**
Client ID: **P5-1.5** Batch ID: **74763** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.872	0.10	0.8300	0.01148	104	70	130				

Sample ID: **119244-010A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135690**
Client ID: **P5-1.5** Batch ID: **74763** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.872	0.10	0.8300	0.01148	104	70	130	0.8721	0.0284	20	

Sample ID: **119244-010A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135690**
Client ID: **P5-1.5** Batch ID: **74763** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222343**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.008	0.10						0.01148	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74764** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135691**
Client ID: **PBS** Batch ID: **74764** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222353**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74764** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135691**
Client ID: **LCSS** Batch ID: **74764** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222354**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.901	0.10	0.8300	0	109	80	120				

Sample ID: **119244-020A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135691**
Client ID: **P10-1.5** Batch ID: **74764** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222355**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.905	0.10	0.8300	0.01262	108	70	130				

Sample ID: **119244-020A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135691**
Client ID: **P10-1.5** Batch ID: **74764** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222356**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.919	0.10	0.8300	0.01262	109	70	130	0.9054	1.51	20	

Sample ID: **119244-020A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135691**
Client ID: **P10-1.5** Batch ID: **74764** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222358**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.010	0.10						0.01262	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74765** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135692**
Client ID: **PBS** Batch ID: **74765** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222368**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74765** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135692**
Client ID: **LCSS** Batch ID: **74765** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222369**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.816	0.10	0.8300	0	98.3	80	120				

Sample ID: **119244-030A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135692**
Client ID: **P15-1.5** Batch ID: **74765** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222370**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.868	0.10	0.8300	0.01473	103	70	130				

Sample ID: **119244-030A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135692**
Client ID: **P15-1.5** Batch ID: **74765** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222371**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.911	0.10	0.8300	0.01473	108	70	130	0.8684	4.82	20	

Sample ID: **119244-030A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135692**
Client ID: **P15-1.5** Batch ID: **74765** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222373**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.012	0.10						0.01473	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74766** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135693**
Client ID: **PBS** Batch ID: **74766** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222383**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74766** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135693**
Client ID: **LCSS** Batch ID: **74766** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222384**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	80	120				

Sample ID: **119244-040A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135693**
Client ID: **P20-1.5** Batch ID: **74766** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222385**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.166	0.10	0.8300	0.3920	93.2	70	130				

Sample ID: **119244-040A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135693**
Client ID: **P20-1.5** Batch ID: **74766** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222386**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.168	0.10	0.8300	0.3920	93.5	70	130	1.166	0.211	20	

Sample ID: **119244-040A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135693**
Client ID: **P20-1.5** Batch ID: **74766** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222388**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.343	0.10						0.3920	13.3	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-74767** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135694**
Client ID: **PBS** Batch ID: **74767** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222398**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-74767** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135694**
Client ID: **LCSS** Batch ID: **74767** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222399**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.877	0.10	0.8300	0	106	80	120				

Sample ID: **119244-041A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135694**
Client ID: **P21-0.0** Batch ID: **74767** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222400**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.175	0.10	0.8300	0.2211	115	70	130				

Sample ID: **119244-041A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135694**
Client ID: **P21-0.0** Batch ID: **74767** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222401**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.138	0.10	0.8300	0.2211	111	70	130	1.175	3.19	20	

Sample ID: **119244-041A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135694**
Client ID: **P21-0.0** Batch ID: **74767** TestNo: **EPA 7471A** Analysis Date: **8/9/2011** SeqNo: **2222402**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.222	0.10						0.2211	0.332	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **MB-74770** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **PBS** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221399**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.566		2.670		58.6	30	128				

Sample ID: **LCS-74770** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **LCSS** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221400**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.676	1.0	33.00	0	53.6	35	118				
Surr: p-Terphenyl	1.483		2.670		55.5	30	128				

Sample ID: **119255-005AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **ZZZZZZ** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221405**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	15.313	1.0	33.00	2.436	39.0	25	129				
Surr: p-Terphenyl	1.017		2.670		38.1	30	128				

Sample ID: **119255-005AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **ZZZZZZ** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221406**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	13.553	1.0	33.00	2.436	33.7	25	129	15.31	12.2	20	
Surr: p-Terphenyl	0.888		2.670		33.3	30	128		0	0	

Sample ID: **119244-013ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **P7-0.0** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221550**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **119244-013ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/5/2011** RunNo: **135639**
Client ID: **P7-0.0** Batch ID: **74770** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/5/2011** SeqNo: **2221550**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	5.939	1.0						6.131	3.18	20	
ORO	34.633	1.0						30.84	11.6	20	
Surr: p-Terphenyl	1.020		2.670		38.2	30	128		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **MB-74781** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135680**
Client ID: **PBS** Batch ID: **74781** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222230**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.206		2.670		45.2	30	128				

Sample ID: **LCS-74781** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135680**
Client ID: **LCSS** Batch ID: **74781** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222231**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	15.892	1.0	33.00	0	48.2	35	118				
Surr: p-Terphenyl	1.266		2.670		47.4	30	128				

Sample ID: **119244-029ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135680**
Client ID: **P15-0.0** Batch ID: **74781** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	2.044	1.0						3.022	38.6	20	R
ORO	13.424	1.0						18.20	30.2	20	R
Surr: p-Terphenyl	0.964		2.670		36.1	30	128		0	0	

Sample ID: **119244-021AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135680**
Client ID: **P11-0.0** Batch ID: **74781** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222243**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.832	1.0	33.00	4.361	40.8	25	129				
Surr: p-Terphenyl	1.066		2.670		39.9	30	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
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ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **119244-021AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135680**
Client ID: **P11-0.0** Batch ID: **74781** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222244**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	14.958	1.0	33.00	4.361	32.1	25	129	17.83	17.5	20	
Surr: p-Terphenyl	0.897		2.670		33.6	30	128		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **MB-74786** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **PBS** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222245**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.133		2.670		42.4	30	128				

Sample ID: **LCS-74786** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **LCSS** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222246**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	13.220	1.0	33.00	0	40.1	35	118				
Surr: p-Terphenyl	1.019		2.670		38.2	30	128				

Sample ID: **119278-007AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **ZZZZZZ** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222251**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.684	1.0	33.00	3.949	38.6	25	129				
Surr: p-Terphenyl	1.140		2.670		42.7	30	128				

Sample ID: **119278-007AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **ZZZZZZ** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222252**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.539	1.0	33.00	3.949	44.2	25	129	16.68	10.5	20	
Surr: p-Terphenyl	1.223		2.670		45.8	30	128		0	0	

Sample ID: **119244-041ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **P21-0.0** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222255**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LL

Sample ID: **119244-041ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **8/8/2011** RunNo: **135681**
Client ID: **P21-0.0** Batch ID: **74786** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222255**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	4.800	1.0						5.406	11.9	20	
ORO	19.656	1.0						20.29	3.19	20	
Surr: p-Terphenyl	1.136		2.670		42.5	30	128		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **E110803LC3** SampType: **LCS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **LCSS** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.966	1.0	5.000	0	99.3	70	130				
Surr: Bromofluorobenzene (FID)	110.411		100.0		110	62	153				

Sample ID: **E110803MB2MS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **ZZZZZZ** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.754	1.0	5.000	0	95.1	49	131				
Surr: Bromofluorobenzene (FID)	125.801		100.0		126	62	153				

Sample ID: **E110803MB2MSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **ZZZZZZ** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222145**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.579	1.0	5.000	0	91.6	49	131	4.754	3.75	20	
Surr: Bromofluorobenzene (FID)	118.923		100.0		119	62	153		0	0	

Sample ID: **E110803MB2** SampType: **MBLK** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **PBS** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222146**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0									
Surr: Bromofluorobenzene (FID)	88.567		100.0		88.6	62	153				

Sample ID: **119244-042ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **P21-1.5** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **119244-042ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **P21-1.5** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	101.678		100.0		102	62	153		0	0	

Sample ID: **119244-024AMS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **P12-1.5** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2222158**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.147	1.0	5.000	0	82.9	49	131				
Surr: Bromofluorobenzene (FID)	122.811		100.0		123	62	153				

Sample ID: **119244-024AMSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135675**
Client ID: **P12-1.5** Batch ID: **E11VS287** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2222159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	3.901	1.0	5.000	0	78.0	49	131	4.147	6.11	20	
Surr: Bromofluorobenzene (FID)	125.083		100.0		125	62	153		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **E110804LC1** SampType: **LCS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **LCSS** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.783	1.0	5.000	0	95.7	70	130				
Surr: Bromofluorobenzene (FID)	129.476		100.0		129	62	153				

Sample ID: **E110804MB1MS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **ZZZZZZ** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.618	1.0	5.000	0	92.4	49	131				
Surr: Bromofluorobenzene (FID)	121.218		100.0		121	62	153				

Sample ID: **E110804MB1MSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **ZZZZZZ** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.835	1.0	5.000	0	96.7	49	131	4.618	4.59	20	
Surr: Bromofluorobenzene (FID)	120.570		100.0		121	62	153		0	0	

Sample ID: **E110804MB1** SampType: **MBLK** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **PBS** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0									
Surr: Bromofluorobenzene (FID)	89.988		100.0		90.0	62	153				

Sample ID: **119244-008ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221676**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **119244-008ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221676**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	99.499		100.0		99.5	62	153		0	0	

Sample ID: **119244-008AMS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	3.953	1.0	5.000	0	79.1	49	131				
Surr: Bromofluorobenzene (FID)	117.926		100.0		118	62	153				

Sample ID: **119244-008AMSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8015B(M** Analysis Date: **8/4/2011** SeqNo: **2221684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.058	1.0	5.000	0	81.2	49	131	3.953	2.62	20	
Surr: Bromofluorobenzene (FID)	118.603		100.0		119	62	153		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **E110805LC1** SampType: **LCS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **LCSS** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.210	1.0	5.000	0	104	70	130				
Surr: Bromofluorobenzene (FID)	111.924		100.0		112	62	153				

Sample ID: **E110805MB1MS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **ZZZZZZ** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221720**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.853	1.0	5.000	0	97.1	49	131				
Surr: Bromofluorobenzene (FID)	128.510		100.0		129	62	153				

Sample ID: **E110805MB1MSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **ZZZZZZ** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221721**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.913	1.0	5.000	0	98.3	49	131	4.853	1.23	20	
Surr: Bromofluorobenzene (FID)	129.844		100.0		130	62	153		0	0	

Sample ID: **E110805MB1** SampType: **MBLK** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **PBS** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221722**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0									
Surr: Bromofluorobenzene (FID)	95.850		100.0		95.8	62	153				

Sample ID: **119244-022ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID: **119244-022ADUP** SampType: **DUP** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	106.095		100.0		106	62	153		0	0	

Sample ID: **119244-022AMS** SampType: **MS** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221725**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.198	1.0	5.000	0	104	49	131				
Surr: Bromofluorobenzene (FID)	123.794		100.0		124	62	153				

Sample ID: **119244-022AMSD** SampType: **MSD** TestCode: **8015_S_GAS** Units: **mg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8015B(M** Analysis Date: **8/5/2011** SeqNo: **2221726**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.036	1.0	5.000	0	101	49	131	5.198	3.17	20	
Surr: Bromofluorobenzene (FID)	124.622		100.0		125	62	153		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
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Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LL

Sample ID: **MB-74703** SampType: **MBLK** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **8/3/2011** RunNo: **135599**
Client ID: **PBW** Batch ID: **74703** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **8/4/2011** SeqNo: **2220826**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.037		0.08000		46.5	36	126				

Sample ID: **LCS-74703** SampType: **LCS** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **8/3/2011** RunNo: **135599**
Client ID: **LCSW** Batch ID: **74703** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **8/4/2011** SeqNo: **2220827**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.461	0.050	0.5000	0	92.1	52	128				
Surr: p-Terphenyl	0.039		0.08000		48.3	36	126				

Sample ID: **MB-74703MS** SampType: **MS** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **8/3/2011** RunNo: **135599**
Client ID: **ZZZZZZ** Batch ID: **74703** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **8/4/2011** SeqNo: **2220828**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.532	0.050	0.5000	0	106	52	128				
Surr: p-Terphenyl	0.048		0.08000		59.7	36	126				

Sample ID: **MB-74703MSD** SampType: **MSD** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **8/3/2011** RunNo: **135599**
Client ID: **ZZZZZZ** Batch ID: **74703** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **8/4/2011** SeqNo: **2220829**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.481	0.050	0.5000	0	96.2	52	128	0.5317	9.99	20	
Surr: p-Terphenyl	0.038		0.08000		48.1	36	126		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **M110803LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **LCSW** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220418**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.073	0.050	1.000	0	107	70	130				
Surr: Bromofluorobenzene (FID)	90.043		100.0		90.0	70	130				

Sample ID: **M110803MB1MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **ZZZZZZ** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220420**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.103	0.050	1.000	0	110	70	130				
Surr: Bromofluorobenzene (FID)	92.032		100.0		92.0	70	130				

Sample ID: **M110803MB1MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **ZZZZZZ** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220421**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.136	0.050	1.000	0	114	70	130	1.103	2.95	20	
Surr: Bromofluorobenzene (FID)	90.685		100.0		90.7	70	130		0	0	

Sample ID: **M110803MB1** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **PBW** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220422**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	89.499		100.0		89.5	70	130				

Sample ID: **119244-043ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **PW1** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220424**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **119244-043ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **135574**
Client ID: **PW1** Batch ID: **M11VW153** TestNo: **EPA 8015B(M** Analysis Date: **8/3/2011** SeqNo: **2220424**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	88.949		100.0		88.9	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110803LC4** SampType: **LCS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **LCSS** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222160**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	98.797	5.0	100.0	0	98.8	70	130				
Ethylbenzene	107.204	5.0	100.0	0	107	70	130				
m,p-Xylene	218.259	10	200.0	0	109	70	130				
Methyl tert-butyl ether	94.915	5.0	100.0	0	94.9	70	130				
o-Xylene	111.364	5.0	100.0	0	111	70	130				
Toluene	104.084	5.0	100.0	0	104	70	130				
Surr: Bromofluorobenzene (PID)	99.179		100.0		99.2	65	140				

Sample ID: **E110803LC4** SampType: **LCSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **LCSS02** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	101.949	5.0	100.0	0	102	70	130	98.80	3.14	20	
Ethylbenzene	109.187	5.0	100.0	0	109	70	130	107.2	1.83	20	
m,p-Xylene	221.593	10	200.0	0	111	70	130	218.3	1.52	20	
Methyl tert-butyl ether	96.510	5.0	100.0	0	96.5	70	130	94.92	1.67	20	
o-Xylene	113.296	5.0	100.0	0	113	70	130	111.4	1.72	20	
Toluene	106.646	5.0	100.0	0	107	70	130	104.1	2.43	20	
Surr: Bromofluorobenzene (PID)	100.658		100.0		101	65	140		0	0	

Sample ID: **E110803MB2MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **ZZZZZZ** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222162**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.484	5.0	22.15	0	169	69	264				
Ethylbenzene	61.186	5.0	42.30	0	145	37	161				
m,p-Xylene	210.201	10	180.2	0	117	30	149				
Methyl tert-butyl ether	431.650	5.0	578.9	0	74.6	39	121				
o-Xylene	79.567	5.0	64.80	0	123	31	166				
Toluene	191.599	5.0	172.6	0	111	44	150				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110803MB2MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **ZZZZZZ** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222162**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (PID)	105.558		100.0		106	65	140				

Sample ID: **E110803MB2MSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **ZZZZZZ** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222163**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	35.905	5.0	22.15	0	162	69	264	37.48	4.30	20	
Ethylbenzene	58.142	5.0	42.30	0	137	37	161	61.19	5.10	20	
m,p-Xylene	198.727	10	180.2	0	110	30	149	210.2	5.61	20	
Methyl tert-butyl ether	405.252	5.0	578.9	0	70.0	39	121	431.6	6.31	20	
o-Xylene	74.867	5.0	64.80	0	116	31	166	79.57	6.09	20	
Toluene	181.750	5.0	172.6	0	105	44	150	191.6	5.28	20	
Surr: Bromofluorobenzene (PID)	100.088		100.0		100	65	140		0	20	

Sample ID: **E110803MB2** SampType: **MBLK** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **PBS** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222164**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methyl tert-butyl ether	ND	5.0									
o-Xylene	ND	5.0									
Toluene	ND	5.0									
Surr: Bromofluorobenzene (PID)	93.392		100.0		93.4	65	140				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-042ADUP** SampType: **DUP** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **P21-1.5** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222175**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0						0	0	20	
Ethylbenzene	ND	5.0						0	0	20	
m,p-Xylene	ND	10						0	0	20	
Methyl tert-butyl ether	ND	5.0						0	0	20	
o-Xylene	ND	5.0						0	0	20	
Toluene	ND	5.0						0	0	20	
Surr: Bromofluorobenzene (PID)	106.334		100.0		106	65	140		0	0	

Sample ID: **119244-024AMS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **P12-1.5** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2222176**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	33.001	5.0	22.15	0	149	69	264				
Ethylbenzene	51.332	5.0	42.30	0	121	37	161				
m,p-Xylene	176.758	10	180.2	0	98.1	30	149				
Methyl tert-butyl ether	369.604	5.0	578.9	0	63.8	39	121				
o-Xylene	66.293	5.0	64.80	0	102	31	166				
Toluene	163.404	5.0	172.6	0	94.6	44	150				
Xylenes, Total	243.051	15	245.0	0	99.2	30	149				
Surr: Bromofluorobenzene (PID)	117.448		100.0		117	65	140				

Sample ID: **119244-024AMSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **P12-1.5** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2222177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	32.721	5.0	22.15	0	148	69	264	33.00	0.852	20	
Ethylbenzene	49.725	5.0	42.30	0	118	37	161	51.33	3.18	20	
m,p-Xylene	173.317	10	180.2	0	96.2	30	149	176.8	1.97	20	
Methyl tert-butyl ether	378.344	5.0	578.9	0	65.4	39	121	369.6	2.34	20	
o-Xylene	66.221	5.0	64.80	0	102	31	166	66.29	0.109	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-024AMSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135675**
Client ID: **P12-1.5** Batch ID: **E11VS287** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2222177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	161.884	5.0	172.6	0	93.8	44	150	163.4	0.935	20	
Xylenes, Total	239.538	15	245.0	0	97.8	30	149	243.1	1.46	20	
Surr: Bromofluorobenzene (PID)	120.384		100.0		120	65	140		0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110804LC2** SampType: **LCS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **LCSS** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	98.589	5.0	100.0	0	98.6	70	130				
Ethylbenzene	108.033	5.0	100.0	0	108	70	130				
m,p-Xylene	220.397	10	200.0	0	110	70	130				
Methyl tert-butyl ether	94.046	5.0	100.0	0	94.0	70	130				
o-Xylene	112.223	5.0	100.0	0	112	70	130				
Toluene	104.857	5.0	100.0	0	105	70	130				
Surr: Bromofluorobenzene (PID)	101.688		100.0		102	65	140				

Sample ID: **E110804LC2** SampType: **LCSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **LCSS02** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	101.472	5.0	100.0	0	101	70	130	98.59	2.88	20	
Ethylbenzene	110.772	5.0	100.0	0	111	70	130	108.0	2.50	20	
m,p-Xylene	225.689	10	200.0	0	113	70	130	220.4	2.37	20	
Methyl tert-butyl ether	96.275	5.0	100.0	0	96.3	70	130	94.05	2.34	20	
o-Xylene	114.974	5.0	100.0	0	115	70	130	112.2	2.42	20	
Toluene	107.302	5.0	100.0	0	107	70	130	104.9	2.30	20	
Surr: Bromofluorobenzene (PID)	103.117		100.0		103	65	140		0	0	

Sample ID: **E110804MB1MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **ZZZZZZ** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	36.352	5.0	22.15	0	164	69	264				
Ethylbenzene	59.761	5.0	42.30	0	141	37	161				
m,p-Xylene	204.524	10	180.2	0	113	30	149				
Methyl tert-butyl ether	416.436	5.0	578.9	0	71.9	39	121				
o-Xylene	76.728	5.0	64.80	0	118	31	166				
Toluene	185.468	5.0	172.6	0	107	44	150				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110804MB1MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **ZZZZZZ** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (PID)	101.696		100.0		102	65	140				

Sample ID: **E110804MB1MSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **ZZZZZZ** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221688**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.797	5.0	22.15	0	171	69	264	36.35	3.90	20	
Ethylbenzene	61.658	5.0	42.30	0	146	37	161	59.76	3.12	20	
m,p-Xylene	211.225	10	180.2	0	117	30	149	204.5	3.22	20	
Methyl tert-butyl ether	416.916	5.0	578.9	0	72.0	39	121	416.4	0.115	20	
o-Xylene	79.321	5.0	64.80	0	122	31	166	76.73	3.32	20	
Toluene	192.617	5.0	172.6	0	112	44	150	185.5	3.78	20	
Surr: Bromofluorobenzene (PID)	101.596		100.0		102	65	140		0	20	

Sample ID: **E110804MB1** SampType: **MBLK** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **PBS** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221689**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methyl tert-butyl ether	ND	5.0									
o-Xylene	ND	5.0									
Toluene	ND	5.0									
Surr: Bromofluorobenzene (PID)	95.129		100.0		95.1	65	140				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-008ADUP** SampType: **DUP** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0						0	0	20	
Ethylbenzene	ND	5.0						0	0	20	
m,p-Xylene	ND	10						0	0	20	
Methyl tert-butyl ether	ND	5.0						0	0	20	
o-Xylene	ND	5.0						0	0	20	
Toluene	ND	5.0						0	0	20	
Surr: Bromofluorobenzene (PID)	105.006		100.0		105	65	140		0	0	

Sample ID: **119244-008AMS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221701**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	32.907	5.0	22.15	0	149	69	264				
Ethylbenzene	52.223	5.0	42.30	0	123	37	161				
m,p-Xylene	181.135	10	180.2	0	101	30	149				
Methyl tert-butyl ether	284.595	5.0	578.9	0	49.2	39	121				
o-Xylene	68.985	5.0	64.80	0	106	31	166				
Toluene	167.458	5.0	172.6	0	97.0	44	150				
Xylenes, Total	250.120	15	245.0	0	102	30	149				
Surr: Bromofluorobenzene (PID)	113.598		100.0		114	65	140				

Sample ID: **119244-008AMSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	33.652	5.0	22.15	0	152	69	264	32.91	2.24	20	
Ethylbenzene	52.997	5.0	42.30	0	125	37	161	52.22	1.47	20	
m,p-Xylene	183.405	10	180.2	0	102	30	149	181.1	1.25	20	
Methyl tert-butyl ether	380.279	5.0	578.9	0	65.7	39	121	284.6	28.8	20	R
o-Xylene	69.443	5.0	64.80	0	107	31	166	68.98	0.662	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-008AMSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135653**
Client ID: **P4-1.5** Batch ID: **E11VS288** TestNo: **EPA 8021B** Analysis Date: **8/4/2011** SeqNo: **2221702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	170.785	5.0	172.6	0	98.9	44	150	167.5	1.97	20	
Xylenes, Total	252.848	15	245.0	0	103	30	149	250.1	1.08	20	
Surr: Bromofluorobenzene (PID)	114.197		100.0		114	65	140		0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110805LC2** SampType: **LCS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **LCSS** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221629**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	103.359	5.0	100.0	0	103	70	130				
Ethylbenzene	113.414	5.0	100.0	0	113	70	130				
m,p-Xylene	230.976	10	200.0	0	115	70	130				
Methyl tert-butyl ether	95.646	5.0	100.0	0	95.6	70	130				
o-Xylene	117.364	5.0	100.0	0	117	70	130				
Toluene	109.785	5.0	100.0	0	110	70	130				
Surr: Bromofluorobenzene (PID)	106.110		100.0		106	65	140				

Sample ID: **E110805LC2** SampType: **LCSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **LCSS02** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221630**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	102.580	5.0	100.0	0	103	70	130	103.4	0.757	20	
Ethylbenzene	112.954	5.0	100.0	0	113	70	130	113.4	0.406	20	
m,p-Xylene	230.752	10	200.0	0	115	70	130	231.0	0.0970	20	
Methyl tert-butyl ether	97.177	5.0	100.0	0	97.2	70	130	95.65	1.59	20	
o-Xylene	117.716	5.0	100.0	0	118	70	130	117.4	0.299	20	
Toluene	108.817	5.0	100.0	0	109	70	130	109.8	0.886	20	
Surr: Bromofluorobenzene (PID)	105.461		100.0		105	65	140		0	0	

Sample ID: **E110805MB1MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **ZZZZZZ** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	38.068	5.0	22.15	0	172	69	264				
Ethylbenzene	61.822	5.0	42.30	0	146	37	161				
m,p-Xylene	213.173	10	180.2	0	118	30	149				
Methyl tert-butyl ether	437.002	5.0	578.9	0	75.5	39	121				
o-Xylene	80.780	5.0	64.80	0	125	31	166				
Toluene	193.820	5.0	172.6	0	112	44	150				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **E110805MB1MS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **ZZZZZZ** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (PID)	107.109		100.0		107	65	140				

Sample ID: **E110805MB1MSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **ZZZZZZ** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	38.397	5.0	22.15	0	173	69	264	38.07	0.861	20	
Ethylbenzene	63.284	5.0	42.30	0	150	37	161	61.82	2.34	20	
m,p-Xylene	218.204	10	180.2	0	121	30	149	213.2	2.33	20	
Methyl tert-butyl ether	445.226	5.0	578.9	0	76.9	39	121	437.0	1.86	20	
o-Xylene	82.599	5.0	64.80	0	127	31	166	80.78	2.23	20	
Toluene	197.227	5.0	172.6	0	114	44	150	193.8	1.74	20	
Surr: Bromofluorobenzene (PID)	108.356		100.0		108	65	140		0	20	

Sample ID: **E110805MB1** SampType: **MBLK** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **PBS** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221633**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methyl tert-butyl ether	ND	5.0									
o-Xylene	ND	5.0									
Toluene	ND	5.0									
Surr: Bromofluorobenzene (PID)	100.116		100.0		100	65	140				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-022AMS** SampType: **MS** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221635**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	42.621	5.0	22.15	0	192	69	264				
Ethylbenzene	68.240	5.0	42.30	0	161	37	161				S
m,p-Xylene	237.295	10	180.2	0	132	30	149				
Methyl tert-butyl ether	500.697	5.0	578.9	0	86.5	39	121				
o-Xylene	90.678	5.0	64.80	0	140	31	166				
Toluene	217.845	5.0	172.6	0	126	44	150				
Xylenes, Total	327.973	15	245.0	0	134	30	149				
Surr: Bromofluorobenzene (PID)	122.370		100.0		122	65	140				

Sample ID: **119244-022AMSD** SampType: **MSD** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221636**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	41.546	5.0	22.15	0	188	69	264	42.62	2.55	20	
Ethylbenzene	66.699	5.0	42.30	0	158	37	161	68.24	2.28	20	
m,p-Xylene	233.586	10	180.2	0	130	30	149	237.3	1.58	20	
Methyl tert-butyl ether	481.377	5.0	578.9	0	83.2	39	121	500.7	3.93	20	
o-Xylene	88.815	5.0	64.80	0	137	31	166	90.68	2.08	20	
Toluene	212.929	5.0	172.6	0	123	44	150	217.8	2.28	20	
Xylenes, Total	322.401	15	245.0	0	132	30	149	328.0	1.71	20	
Surr: Bromofluorobenzene (PID)	122.025		100.0		122	65	140		0	20	

Sample ID: **119244-022ADUP** SampType: **DUP** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221727**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	5.0						0	0	20	
Ethylbenzene	ND	5.0						0	0	20	
m,p-Xylene	ND	10						0	0	20	
Methyl tert-butyl ether	ND	5.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_S_BTEX

Sample ID: **119244-022ADUP** SampType: **DUP** TestCode: **8021_S_BTE** Units: **µg/Kg** Prep Date: RunNo: **135648**
Client ID: **P11-1.5** Batch ID: **E11VS289** TestNo: **EPA 8021B** Analysis Date: **8/5/2011** SeqNo: **2221727**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	5.0						0	0	20	
Toluene	ND	5.0						0	0	20	
Surr: Bromofluorobenzene (PID)	110.340		100.0		110	65	140		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_WP_BTEX

Sample ID: **M110803LCS1** SampType: **LCS** TestCode: **8021_WP_BT** Units: **µg/L** Prep Date: RunNo: **135574**
Client ID: **LCSW** Batch ID: **M11VW153** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2220405**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	102.433	0.50	100.0	0	102	70	130				
Toluene	103.925	0.50	100.0	0	104	70	130				
Ethylbenzene	102.500	0.50	100.0	0	103	70	130				
m,p-Xylene	206.461	1.0	200.0	0	103	70	130				
o-Xylene	102.545	0.50	100.0	0	103	70	130				
Methyl tert-butyl ether	104.967	0.50	100.0	0	105	70	130				
Surr: Bromofluorobenzene (PID)	87.543		100.0		87.5	70	130				

Sample ID: **M110803LCS1D** SampType: **LCSD** TestCode: **8021_WP_BT** Units: **µg/L** Prep Date: RunNo: **135574**
Client ID: **LCSS02** Batch ID: **M11VW153** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2220407**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	101.956	0.50	100.0	0	102	70	130	102.4	0.467	20	
Toluene	104.559	0.50	100.0	0	105	70	130	103.9	0.608	20	
Ethylbenzene	102.719	0.50	100.0	0	103	70	130	102.5	0.213	20	
m,p-Xylene	206.884	1.0	200.0	0	103	70	130	206.5	0.205	20	
o-Xylene	103.180	0.50	100.0	0	103	70	130	102.5	0.617	20	
Methyl tert-butyl ether	103.589	0.50	100.0	0	104	70	130	105.0	1.32	20	
Surr: Bromofluorobenzene (PID)	88.661		100.0		88.7	70	130		0	0	

Sample ID: **M110803MB1** SampType: **MBLK** TestCode: **8021_WP_BT** Units: **µg/L** Prep Date: RunNo: **135574**
Client ID: **PBW** Batch ID: **M11VW153** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2220410**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50									
Toluene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
o-Xylene	ND	0.50									
Methyl tert-butyl ether	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8021_WP_BTEX

Sample ID: **M110803MB1** SampType: **MBLK** TestCode: **8021_WP_BT** Units: **µg/L** Prep Date: RunNo: **135574**
Client ID: **PBW** Batch ID: **M11VW153** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2220410**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (PID)	87.330		100.0		87.3	70	130				

Sample ID: **119244-043ADUP** SampType: **DUP** TestCode: **8021_WP_BT** Units: **µg/L** Prep Date: RunNo: **135574**
Client ID: **PW1** Batch ID: **M11VW153** TestNo: **EPA 8021B** Analysis Date: **8/3/2011** SeqNo: **2220415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
o-Xylene	ND	0.50						0	0	20	
Methyl tert-butyl ether	ND	0.50						0	0	20	
Surr: Bromofluorobenzene (PID)	86.203		100.0		86.2	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-74788** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **PBS** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222261**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	12.712		16.67		76.3	35	108				
Surr: Decachlorobiphenyl	13.251		16.67		79.5	31	107				

Sample ID: **LCS-74788** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **LCSS** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222262**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	12.609	1.0	16.67	0	75.6	59	105				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **LCS-74788** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **LCSS** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222262**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dieldrin	13.503	2.0	16.67	0	81.0	56	112				
Endrin	13.540	2.0	16.67	0	81.2	53	116				
gamma-BHC	13.252	1.0	16.67	0	79.5	59	110				
Heptachlor	12.634	1.0	16.67	0	75.8	53	118				
Surr: Tetrachloro-m-xylene	12.476		16.67		74.8	35	108				
Surr: Decachlorobiphenyl	12.707		16.67		76.2	31	107				

Sample ID: **119244-037AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **P19-0.0** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222263**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	11.856	2.0	16.67	0	71.1	38	130				
Aldrin	10.193	1.0	16.67	0	61.1	35	122				
Dieldrin	11.395	2.0	16.67	0	68.4	31	138				
Endrin	11.688	2.0	16.67	0	70.1	39	132				
gamma-BHC	10.526	1.0	16.67	0	63.1	36	126				
Heptachlor	10.455	1.0	16.67	0	62.7	34	131				
Surr: Tetrachloro-m-xylene	9.557		16.67		57.3	35	108				
Surr: Decachlorobiphenyl	10.955		16.67		65.7	31	107				

Sample ID: **119244-037AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **P19-0.0** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222264**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	11.993	2.0	16.67	0	71.9	38	130	11.86	1.15	20	
Aldrin	10.521	1.0	16.67	0	63.1	35	122	10.19	3.16	20	
Dieldrin	11.673	2.0	16.67	0	70.0	31	138	11.39	2.41	20	
Endrin	11.913	2.0	16.67	0	71.5	39	132	11.69	1.91	20	
gamma-BHC	11.070	1.0	16.67	0	66.4	36	126	10.53	5.03	20	
Heptachlor	11.306	1.0	16.67	0	67.8	34	131	10.46	7.82	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **119244-037AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **P19-0.0** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222264**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	9.702		16.67		58.2	35	108		0	0	
Surr: Decachlorobiphenyl	10.914		16.67		65.5	31	107		0	0	

Sample ID: **119244-033ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **P17-0.0** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222275**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0						0	0	20	
4,4´-DDE	ND	2.0						0	0	20	
4,4´-DDT	ND	2.0						0	0	20	
Aldrin	ND	1.0						0	0	20	
alpha-BHC	ND	1.0						0	0	20	
alpha-Chlordane	ND	1.0						0	0	20	
beta-BHC	ND	1.0						0	0	20	
Chlordane	ND	8.5						0	0	20	
delta-BHC	ND	1.0						0	0	20	
Dieldrin	ND	2.0						0	0	20	
Endosulfan I	ND	1.0						0	0	20	
Endosulfan II	ND	2.0						0	0	20	
Endosulfan sulfate	ND	2.0						0	0	20	
Endrin	ND	2.0						0	0	20	
Endrin aldehyde	ND	2.0						0	0	20	
Endrin ketone	ND	2.0						0	0	20	
gamma-BHC	ND	1.0						0	0	20	
gamma-Chlordane	ND	1.0						0	0	20	
Heptachlor	ND	1.0						0	0	20	
Heptachlor epoxide	ND	1.0						0	0	20	
Methoxychlor	ND	5.0						0	0	20	
Toxaphene	ND	50						0	0	20	
Surr: Tetrachloro-m-xylene	10.749		16.67		64.5	35	108		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
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Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **119244-033ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135682**
Client ID: **P17-0.0** Batch ID: **74788** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222275**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	11.760		16.67		70.5	31	107		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-74789** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **PBS** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222276**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	12.271		16.67		73.6	35	108				
Surr: Decachlorobiphenyl	13.231		16.67		79.4	31	107				

Sample ID: **LCS-74789** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **LCSS** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222277**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	12.212	1.0	16.67	0	73.3	59	105				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **LCS-74789** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **LCSS** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222277**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dieldrin	13.082	2.0	16.67	0	78.5	56	112				
Endrin	13.060	2.0	16.67	0	78.3	53	116				
gamma-BHC	12.848	1.0	16.67	0	77.1	59	110				
Heptachlor	12.321	1.0	16.67	0	73.9	53	118				
Surr: Tetrachloro-m-xylene	12.333		16.67		74.0	35	108				
Surr: Decachlorobiphenyl	12.672		16.67		76.0	31	107				

Sample ID: **119244-041AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **P21-0.0** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222278**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	11.498	2.0	16.67	0	69.0	38	130				
Aldrin	9.452	1.0	16.67	0	56.7	35	122				
Dieldrin	10.434	2.0	16.67	0	62.6	31	138				
Endrin	10.913	2.0	16.67	0	65.5	39	132				
gamma-BHC	9.772	1.0	16.67	0	58.6	36	126				
Heptachlor	10.939	1.0	16.67	0	65.6	34	131				
Surr: Tetrachloro-m-xylene	8.431		16.67		50.6	35	108				
Surr: Decachlorobiphenyl	9.737		16.67		58.4	31	107				

Sample ID: **119244-041AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **P21-0.0** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222279**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	11.728	2.0	16.67	0	70.4	38	130	11.50	1.98	20	
Aldrin	9.497	1.0	16.67	0	57.0	35	122	9.452	0.471	20	
Dieldrin	10.730	2.0	16.67	0	64.4	31	138	10.43	2.79	20	
Endrin	11.210	2.0	16.67	0	67.2	39	132	10.91	2.68	20	
gamma-BHC	9.900	1.0	16.67	0	59.4	36	126	9.772	1.30	20	
Heptachlor	11.126	1.0	16.67	0	66.7	34	131	10.94	1.70	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 *Tel: 562. 989.4045* *Fax: 562.989.4040*

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **119244-041AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **P21-0.0** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222279**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	8.525		16.67		51.1	35	108		0	0	
Surr: Decachlorobiphenyl	9.975		16.67		59.8	31	107		0	0	

Sample ID: **119244-041ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **P21-0.0** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0						0	0	20	
4,4´-DDE	ND	2.0						0	0	20	
4,4´-DDT	ND	2.0						0	0	20	
Aldrin	ND	1.0						0	0	20	
alpha-BHC	ND	1.0						0	0	20	
alpha-Chlordane	ND	1.0						0	0	20	
beta-BHC	ND	1.0						0	0	20	
Chlordane	ND	8.5						0	0	20	
delta-BHC	ND	1.0						0	0	20	
Dieldrin	ND	2.0						0	0	20	
Endosulfan I	ND	1.0						0	0	20	
Endosulfan II	ND	2.0						0	0	20	
Endosulfan sulfate	ND	2.0						0	0	20	
Endrin	ND	2.0						0	0	20	
Endrin aldehyde	ND	2.0						0	0	20	
Endrin ketone	ND	2.0						0	0	20	
gamma-BHC	ND	1.0						0	0	20	
gamma-Chlordane	ND	1.0						0	0	20	
Heptachlor	ND	1.0						0	0	20	
Heptachlor epoxide	ND	1.0						0	0	20	
Methoxychlor	ND	5.0						0	0	20	
Toxaphene	ND	50						0	0	20	
Surr: Tetrachloro-m-xylene	10.753		16.67		64.5	35	108		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **119244-041ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **8/8/2011** RunNo: **135683**
Client ID: **P21-0.0** Batch ID: **74789** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **8/8/2011** SeqNo: **2222281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	12.022		16.67		72.1	31	107		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 *Tel: 562. 989.4045* *Fax: 562.989.4040*

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: 8/3/11

Method of Transport: Client ☐ ATL ☐ CA OverN ☑ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED 5.2 Y ☑ N ☐
2. HEADSPACE (VOA) Y ☑ N ☐
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☑
5. # OF SPLS MATCH COC Y ☑ N ☐
6. PRESERVED Y ☑ N ☑

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02B
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	8/2/11	1530	OnTrac	8/2/11	1530
			Marju	8/3/11	8:05

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To:
Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To:
Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☑ SWRCB Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX) / MTBE	8015B (DRO) / TPH-mo	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	119244-001	P1-0.0	8/1/11	1205	X					X			X				X				E	1	M T	C	
	2	P1-1.5		1214					X																
	3	P2-0.0		1225						X															
	4	P2-1.5		1230					X																
	5	P3-0.0		1245	X					X															
	6	P3-1.5		1250					X																
	7	P4-0.0		1252						X															
	8	P4-1.5		1255					X																
	9	P5-0.0		1314	X					X															
	10	P5-1.5		1318					X																

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02B
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
[signature]	8/2/11	1530	OnTrac	8/3/11	1530
			[signature]	8/3/11	805

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co: _____
Addr: _____
City: State: Zip:

Bill To: Attn: See Above
Co: _____
Addr: _____
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX) / MTBE	8015B (DRO) TPH m3	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1192244-11	P6-0.0	8/1/11	1345						X		X				X				E	1	M T	C	
	12	P6-1.5		1349					X															
	13	P7-0.0		1407	X					X														
	14	P7-1.5		1410					X															
	15	P8-0.0		1420						X														
	16	P8-1.5		1425					X															
	17	P9-0.0		1430	X					X														
	18	P9-1.5		1435					X															
	19	P10-0.0	8/2/11	0752						X														
	20	P10-1.5		0756					X															

QA/QC: RTNE ☐ CT ☑ SWRCB Logcode _____ OTHER _____

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02B
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	8/2/11	1530	On Trac	8/2/11	1530
			Marjo	8/3/11	815

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode_____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX) / MTBE	8015B (DRO) / TPH as D	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	189244-21	P11-0.0	8/2/11	0800	X					X		X				X				E	1	M T	C	
	22	P11-1.5		0804					X															
	23	P12-0.0		0833						X														
	24	P12-1.5		0837					X															
	25	P13-0.0		0848	X					X														
	26	P13-1.5		0852					X															
	27	P14-0.0		0903						X														
	28	P14-1.5		0910					X															
	29	P15-0.0		0919	X					X														
	30	P15-1.5		0923					X															

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02B
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	8/2/11	1530	OnTrac	8/2/11	1530
				8/3/11	805

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To: Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To: Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode_____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX) MTBE	8015B (DRO) TPH mo	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	119244-31	P16-0.0	8/2/11	0927						X		X				X				E	1	M T	C	
	32	P16-1.5		0931					X															
	33	P17-0.0		0951	X					X														
	34	P17-1.5		0957					X															
	35	P18-0.0		1001						X														
	36	P18-1.5		1005					X															
	37	P19-0.0		1017	X					X														
	38	P19-1.5		1021					X															
	39	P20-0.0		1035						X														
	40	P20-1.5		1039					X															

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Inc.
Attention: R. Day
Address: 6671 Brisa St
City: Livermore State: CA Zip Code: 94550
Tel: 925.371.5900
Fax: 925.371.5915

Project Name: Marin-Sonoma Narrows Segment B3
Project #: E8469-06-02B
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	8/2/11	1530	On Trac	8/2/11	1530
				8/3/11	805

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: R. Day
Print Name Date
Signature

Send Report To:
Attn: See Above
Co:
Addr:
City: State: Zip:

Bill To:
Attn: See Above
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Please send EDF and EXCEL to cook@geoconinc.com

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- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX) MTBE	8015B (DRO) / 8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	Total Lead	pH	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	119244-41	P21-0.0	8/2/11	1046	X					X		X			X				E	1	TM	C	
	42	P21-1.5	↓	1050					X			X			X				↓	1	TM	C	
	43	PW1	↓	1115					X							X			↓	4	GV	H	
		PW1	↓	1115						X						X			↓	2	GL	C	
		PW1	↓	1115								X				X			↓	1	P	N	

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode _____ OTHER _____

- TAT starts 8AM the following day if samples received after 3 PM

TAT: A = Overnight ≤ 24 hrs; B = Emergency Next Workday; C = Critical 2 Workdays; D = Urgent 3 Workdays; E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

August 17, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119244

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on August 03, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-
Lab Order: 119244

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for samples 119244-011A, 119244-013A, 119244-019A, 119244-022A, 119244-024A, 119244-028A, 119244-030A, 119244-033A, 119244-034A, 119244-036A, 119244-038A, 119244-040A and 119244-042A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 119244-033AMS and 119244-036AMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 119244-033ADUP and 119244-033AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119244-011 **Collection Date:** 8/1/2011 1:45:00 PM
Client Sample ID: P6-0.0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110816D	QC Batch: R135844			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/16/2011 12:39 PM

Lab ID: 119244-013 **Collection Date:** 8/1/2011 2:07:00 PM
Client Sample ID: P7-0.0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110816D	QC Batch: R135844			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/16/2011 12:42 PM

Lab ID: 119244-019 **Collection Date:** 8/2/2011 7:52:00 AM
Client Sample ID: P10-0.0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110816D	QC Batch: R135844			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/16/2011 12:52 PM

Lab ID: 119244-022 **Collection Date:** 8/2/2011 8:04:00 AM
Client Sample ID: P11-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110816D	QC Batch: R135844			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/16/2011 12:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119244-024 **Collection Date:** 8/2/2011 8:37:00 AM
Client Sample ID: P12-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 12:58 PM
Nickel	ND	1.0		mg/L	20	8/16/2011 12:58 PM

Lab ID: 119244-028 **Collection Date:** 8/2/2011 9:10:00 AM
Client Sample ID: P14-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:02 PM

Lab ID: 119244-030 **Collection Date:** 8/2/2011 9:23:00 AM
Client Sample ID: P15-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:05 PM

Lab ID: 119244-033 **Collection Date:** 8/2/2011 9:51:00 AM
Client Sample ID: P17-0.0 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B **EPA 6010B**						
RunID: ICP8_110815E QC Batch: 74919 PrepDate: 8/15/2011 Analyst: **IL**						
Lead	83	1.0		mg/Kg	1	8/15/2011 06:22 PM
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Lead	8.4	1.0		mg/L	20	8/16/2011 01:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab ID: 119244-034 **Collection Date:** 8/2/2011 9:57:00 AM
Client Sample ID: P17-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:12 PM

Lab ID: 119244-036 **Collection Date:** 8/2/2011 10:05:00 AM
Client Sample ID: P18-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:15 PM

Lab ID: 119244-038 **Collection Date:** 8/2/2011 10:21:00 AM
Client Sample ID: P19-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:37 PM

Lab ID: 119244-040 **Collection Date:** 8/2/2011 10:39:00 AM
Client Sample ID: P20-1.5 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
WET/ EPA 6010B						
RunID: ICP8_110816D QC Batch: R135844 PrepDate: Analyst: **IL**						
Chromium	ND	1.0		mg/L	20	8/16/2011 01:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *17-Aug-11*

CLIENT: Geocon Consultants, Inc.
Project: Marin-Sonoma Narrows Segment B3, E8469-06-

Lab Order: 119244

Lab ID: 119244-042
Client Sample ID: P21-1.5

Collection Date: 8/2/2011 10:50:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC						
			WET/ EPA 6010B			
RunID: ICP8_110816D	QC Batch: R135844			PrepDate:		Analyst: **IL**
Chromium	ND	1.0		mg/L	20	8/16/2011 01:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-74919** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/15/2011** RunNo: **135826**
Client ID: **PBS** Batch ID: **74919** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/15/2011** SeqNo: **2225281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	1.0									

Sample ID: **LCS-74919** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/15/2011** RunNo: **135826**
Client ID: **LCSS** Batch ID: **74919** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/15/2011** SeqNo: **2225282**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	52.125	1.0	50.00	0	104	80	120				

Sample ID: **119244-033A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/15/2011** RunNo: **135826**
Client ID: **P17-0.0** Batch ID: **74919** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/15/2011** SeqNo: **2225284**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	141.950	1.0						83.12	52.3	20	R

Sample ID: **119244-033A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/15/2011** RunNo: **135826**
Client ID: **P17-0.0** Batch ID: **74919** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/15/2011** SeqNo: **2225285**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	320.460	1.0	125.0	83.12	190	34	126				S

Sample ID: **119244-033A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **8/15/2011** RunNo: **135826**
Client ID: **P17-0.0** Batch ID: **74919** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **8/15/2011** SeqNo: **2225286**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	135.125	1.0	125.0	83.12	41.6	34	126	320.5	81.4	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-74900A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **PBS** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Lead	ND	0.050									
Nickel	ND	0.050									

Sample ID: **MB-74900A ST** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **PBS** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	1.0									
Lead	ND	1.0									
Nickel	0.045	1.0									

Sample ID: **LCS-74900** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **LCSS** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225568**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	1.700	1.0	2.000	0	85.0	85	115				
Lead	1.857	1.0	2.000	0	92.9	85	115				
Nickel	1.887	1.0	2.000	0.04533	92.1	85	115				

Sample ID: **119244-036A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **P18-1.5** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225579**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.126	1.0						0.1161	0	20	
Lead	0.019	1.0						0	0	20	
Nickel	2.365	1.0						2.844	18.4	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **119244-036A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **P18-1.5** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225580**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.643	1.0	2.500	0.1161	101	78	115				
Lead	2.688	1.0	2.500	0	108	80	118				
Nickel	5.870	1.0	2.500	2.844	121	78	120				S

Sample ID: **MB-74900B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **PBS** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225581**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Lead	ND	0.050									
Nickel	ND	0.050									

Sample ID: **MB-74900B ST** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **PBS** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225582**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	1.0									
Lead	ND	1.0									
Nickel	0.045	1.0									

Sample ID: **119244-042A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **P21-1.5** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225586**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.178	1.0						0.1639	0	20	
Lead	0.109	1.0						0.09552	0	20	
Nickel	1.879	1.0						1.800	4.31	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **119244-042A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **P21-1.5** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225587**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.298	1.0	2.500	0.1639	85.4	78	115				
Lead	2.344	1.0	2.500	0.09552	90.0	80	118				
Nickel	3.946	1.0	2.500	1.800	85.8	78	120				

Sample ID: **119244-042A-MSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **135844**
Client ID: **P21-1.5** Batch ID: **R135844** TestNo: **WET/ EPA 60** Analysis Date: **8/16/2011** SeqNo: **2225588**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.312	1.0	2.500	0.1639	85.9	78	115	2.298	0.594	20	
Lead	2.404	1.0	2.500	0.09552	92.3	80	118	2.344	2.50	20	
Nickel	4.026	1.0	2.500	1.800	89.0	78	120	3.946	2.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: Rick Day [day@geoconinc.com]
Sent: Wednesday, August 10, 2011 5:30 PM
To: Diane Galvan
Subject: RE: Results/EDD - Marin-Sonoma Narrows Segment B3 (119244)

Hi Diane -

Please run WET Chromium on samples with Total Chromium >50 mg/kg.

Please homogenize and re-run sample P17-0.0 for Total Lead - also run homogenized sample P17-0.0 for WET Lead.

Please run sample P12-1.5 for WET Nickel.

Standard TAT please.

Thanks.

Richard Day, PG, CEG, CHG | *Vice President*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900, ext. 201 Fax 925.371.5915 Cell 925.872.5860
www.geoconinc.com

August 25, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 119244

Rick Day
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

RE: Marin-Sonoma Narrows Segment B3, E8469-06

Attention: Rick Day

Enclosed are the results for sample(s) received on August 03, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: 8/25/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	119244
Project:	Marin-Sonoma Narrows Segment B3, E8469-06-	**Date Received**	8/3/2011 8:05:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
119244-033A	P17-0.0	ND	mg/L	75039	0.50	1	8/2/2011	8/24/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-75039A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **PBS** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229018**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.219	0.50									

Sample ID: **MB-75012A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **PBS** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229019**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.207	0.50									

Sample ID: **LCS-75039** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **LCSS** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229020**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.173	0.50	1.000	0.2190	95.4	80	120				

Sample ID: **119429-001A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **ZZZZZZ** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229027**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.275	0.50						0.2894	0	20	

Sample ID: **119429-001A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **ZZZZZZ** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229028**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.556	0.50	2.500	0.2894	90.7	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 119244
Project: Marin-Sonoma Narrows Segment B3, E8469-06

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **119429-001A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **8/22/2011** RunNo: **136029**
Client ID: **ZZZZZZ** Batch ID: **75039** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **8/24/2011** SeqNo: **2229029**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.716	0.50	2.500	0.2894	97.0	70	130	2.556	6.05	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Luann Beadle [beadle@geoconinc.com]
Sent: Thursday, August 18, 2011 12:26 PM
To: Diane Galvan
Subject: E8469-06-02 Marin Sonoma

Hi Diane,

1. Could you please run a TCLP for lead on Lab ID 119244-033?
2. Please cc me for results for Work Orders 119244 and 119164.
3. Also, I noticed the two versions of 119164 that I sent to you for clarification earlier had different QC Batch Numbers listed if it helps.

Thanks,
Luann

Luann Beadle | *Senior Staff Scientist*
Geocon Consultants, Inc.
6671 Brisa Street, Livermore, California 94550
Tel 925.371.5900 Fax 925.371.5915
www.geoconinc.com

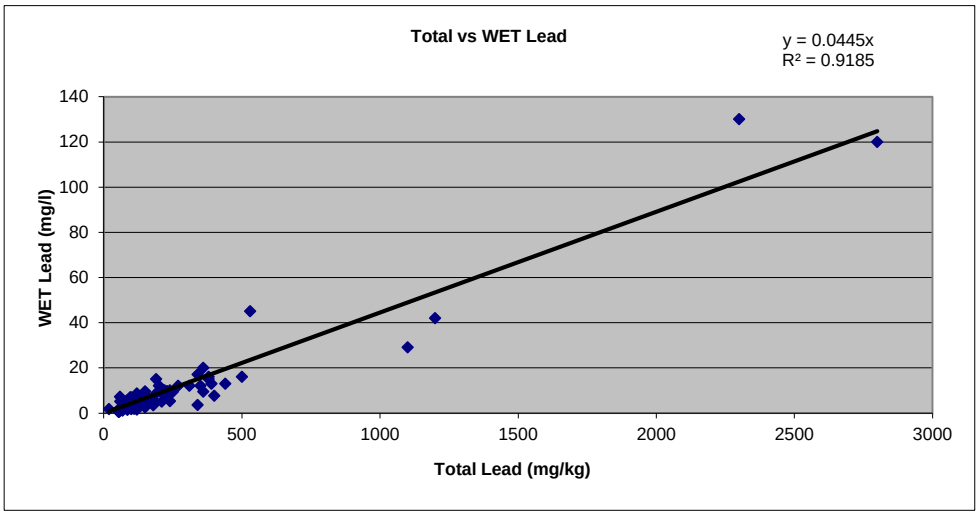
APPENDIX C

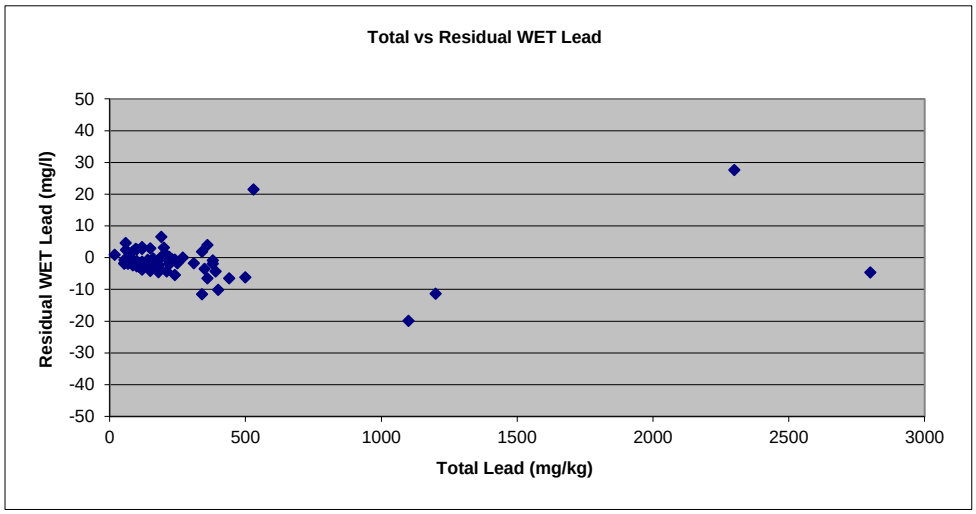
WET Lead Regression

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)
NBS 29-0	0	270	12	-0.02	0.00
SBS 40-0	0	220	10	0.20	0.04
NBS 10-1	1	160	6.9	-0.22	0.05
SBS 77-0	0	190	8.7	0.24	0.06
NBS 8-0	0	230	9.7	-0.54	0.29
NBS 18-0	0	74	2.7	-0.60	0.35
SBS 39-0	0	210	10	0.65	0.42
SBS 74-0	0	210	10	0.65	0.42
SBS 75-0	0	240	10	-0.69	0.47
NBS 7-0	0	140	5.5	-0.73	0.54
NBS 13-2	2	55	1.7	-0.75	0.56
NBS 4-0	0	220	9.0	-0.80	0.63
NBM 66-0	0	72	2.4	-0.81	0.65
SBS 34-1	1	84	2.9	-0.84	0.71
NBS 9-1	1	19	1.7	0.85	0.73
SBS 32-0	0	380	16	-0.92	0.85
NBM 68-0	0	86	2.8	-1.03	1.06
NBS 11-2	2	100	3.4	-1.05	1.11
NBS 15-0	0	58	1.3	-1.28	1.65
NBM 53-0	0	220	8.5	-1.30	1.68
NBS 1-0	0	84	2.4	-1.34	1.80
NBM 46-0	0	120	4.0	-1.34	1.80
SBS 38-0	0	64	1.5	-1.35	1.82
NBS 14-0	0	120	3.8	-1.54	2.38
NBS 28-0	0	130	4.0	-1.79	3.20
NBS 23-0	0	310	12	-1.80	3.25
NBS 3-0	0	85	5.6	1.82	3.29
NBM 58-0	0	250	9.3	-1.83	3.36
NBM 69-1	1	54	0.55	-1.85	3.44
SBS 76-0	0	340	17	1.86	3.46
NBS 16-1	1	55	0.54	-1.91	3.64
NBS 12-1	1	380	15	-1.92	3.69
SBS 35-0	0	68	1.1	-1.93	3.72
SBS 45-0	0	170	5.6	-1.97	3.88
NBM 51-0	0	160	5.1	-2.02	4.10
NBM 69-0	0	150	4.6	-2.08	4.32
NBM 47-0	0	220	7.7	-2.10	4.39
NBS 15-1	1	180	5.8	-2.22	4.91
NBS 20-0	0	60	5.1	2.43	5.90
SBS 33-1	1	86	1.4	-2.43	5.90
NBS 26-0	0	100	7.0	2.55	6.49
SBS 37-0	0	120	2.7	-2.64	6.99
NBS 25-0	0	96	7.0	2.73	7.43
SBS 36-1	1	100	1.7	-2.75	7.58
NBS 2-1	1	120	8.1	2.76	7.60
SBS 78-0	0	170	4.8	-2.77	7.67
NBM 50-0	0	170	4.8	-2.77	7.67
SBS 80-0	0	150	9.6	2.92	8.53
SBS 34-0	0	110	1.9	-3.00	8.99
SBS 71-0	0	180	5.0	-3.02	9.09
NBS 30-0	0	200	12	3.09	9.57
NBS 12-0	0	120	8.6	3.26	10.61
NBM 62-0	0	350	12	-3.58	12.85

WET Lead Regression

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)
NBS 18-2	2	120	1.5	-3.84	14.77
NBM 64-0	0	360	20	3.97	15.76
NBS 24-1	1	150	2.5	-4.18	17.47
NBM 65-0	0	210	5.0	-4.35	18.93
NBM 54-0	0	390	13	-4.37	19.06
NBS 22-0	0	59	7.2	4.57	20.91
NBS 15-2	2	180	3.4	-4.62	21.30
SBS 42-0	0	2,800	120	-4.68	21.90
NBM 52-1	1	240	5.2	-5.49	30.11
SBS 81-0	0	500	16	-6.26	39.24
NBM 67-0	0	360	9.5	-6.53	42.64
NBM 56-0	0	190	15	6.54	42.77
NBM 60-0	0	440	13	-6.59	43.46
NBM 63-0	0	400	7.6	-10.21	104.27
NBS 16-0	0	1,200	42	-11.43	130.74
NBM 65-1	1	340	3.6	-11.54	133.16
NBM 57-0	0	1,100	29	-19.98	399.25
NBS 17-0	0	530	45	21.40	457.96
SBS 79-0	0	2,300	130	27.58	760.92





NBS 0

Number of Valid Observations	31
Number of Distinct Observations	29
Minimum	4.9
Maximum	1200
Mean	140.6
Median	74
SD	226.6
Variance	51361
Coefficient of Variation	1.612
Skewness	3.777
Mean of log data	4.195
SD of log data	1.262
90% Standard Bootstrap UCL	190.6
95% Standard Bootstrap UCL	206.3

SBS 0

Number of Valid Observations	26
Number of Distinct Observations	23
Minimum	8.3
Maximum	2800
Mean	334.3
Median	160
SD	667
Variance	444909
Coefficient of Variation	1.995
Skewness	3.254
Mean of log data	4.845
SD of log data	1.328
90% Standard Bootstrap UCL	502.3
95% Standard Bootstrap UCL	542.8

NBS 1

Number of Valid Observations	31
Number of Distinct Observations	23
Minimum	2.5
Maximum	380
Mean	43.4
Median	11
SD	79.62
Variance	6339
Coefficient of Variation	1.835
Skewness	3.031
Mean of log data	2.672
SD of log data	1.437
90% Standard Bootstrap UCL	61.4
95% Standard Bootstrap UCL	66.42

SBS 1

Number of Valid Observations	26
Number of Distinct Observations	21
Minimum	2.5
Maximum	100
Mean	20.55
Median	9.7
SD	27.17
Variance	738.4
Coefficient of Variation	1.323
Skewness	2.153
Mean of log data	2.432
SD of log data	1.046
90% Standard Bootstrap UCL	27.29
95% Standard Bootstrap UCL	29.08

NBS 2

Number of Valid Observations	31
Number of Distinct Observations	19
Minimum	2.5
Maximum	180
Mean	20.13
Median	6.5
SD	40.39
Variance	1631
Coefficient of Variation	2.006
Skewness	2.998
Mean of log data	1.996
SD of log data	1.223
90% Standard Bootstrap UCL	29.16
95% Standard Bootstrap UCL	31.57

SBS 2

Number of Valid Observations	26
Number of Distinct Observations	19
Minimum	2.2
Maximum	37
Mean	7.519
Median	5.9
SD	7.306
Variance	53.38
Coefficient of Variation	0.972
Skewness	2.981
Mean of log data	1.735
SD of log data	0.717
90% Standard Bootstrap UCL	9.301
95% Standard Bootstrap UCL	9.861

NBM 0

Number of Valid Observations	24
Number of Distinct Observations	22
Minimum	5.3
Maximum	1100
Mean	224.2
Median	180
SD	232.1
Variance	53855
Coefficient of Variation	1.035
Skewness	2.43
Mean of log data	4.801
SD of log data	1.358
90% Standard Bootstrap UCL	282.7
95% Standard Bootstrap UCL	299.5

P 0

Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	3.3
Maximum	150
Mean	17.52
Median	11
SD	30.61
Variance	936.7
Coefficient of Variation	1.747
Skewness	4.46
Mean of log data	2.442
SD of log data	0.716
90% Standard Bootstrap UCL	25.71
95% Standard Bootstrap UCL	28.1

NBM 1

Number of Valid Observations	24
Number of Distinct Observations	20
Minimum	2.5
Maximum	340
Mean	32.4
Median	6.15
SD	81.42
Variance	6629
Coefficient of Variation	2.513
Skewness	3.311
Mean of log data	2.144
SD of log data	1.311
90% Standard Bootstrap UCL	52.78
95% Standard Bootstrap UCL	59.83

P 1.5

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	1.1
Maximum	11
Mean	4.752
Median	3.2
SD	3.23
Variance	10.44
Coefficient of Variation	0.68
Skewness	0.482
Mean of log data	1.302
SD of log data	0.762
90% Standard Bootstrap UCL	5.636
95% Standard Bootstrap UCL	5.883

NBM 2

Number of Valid Observations	24
Number of Distinct Observations	12
Minimum	1.6
Maximum	15
Mean	5.3
Median	2.5
SD	3.862
Variance	14.92
Coefficient of Variation	0.729
Skewness	1.063
Mean of log data	1.434
SD of log data	0.682
90% Standard Bootstrap UCL	6.271
95% Standard Bootstrap UCL	6.57

Appendix C - As, Co, Ni, V, and TPHmo UCLs

As

Number of Valid Observations	91
Number of Distinct Observations	15
Minimum	0.5
Maximum	5.6
Mean	0.941
Median	0.5
SD	0.981
Variance	0.963
Coefficient of Variation	1.043
Skewness	2.425
Mean of log data	-0.364
SD of log data	0.67
95% Standard Bootstrap UCL	1.111

Ni

Number of Valid Observations	91
Number of Distinct Observations	60
Minimum	9.4
Maximum	470
Mean	75.59
Median	48
SD	80.85
Variance	6537
Coefficient of Variation	1.07
Skewness	2.773
Mean of log data	3.932
SD of log data	0.876
95% Standard Bootstrap UCL	89.26

TPHmo

Number of Valid Observations	21
Number of Distinct Observations	17
Minimum	5.5
Maximum	91
Mean	27.8
Median	20
SD	18.36
Variance	337.1
Coefficient of Variation	0.66
Skewness	2.197
Mean of log data	3.156
SD of log data	0.598
95% Standard Bootstrap UCL	34.24

Co

Number of Valid Observations	91
Number of Distinct Observations	28
Minimum	6.1
Maximum	52
Mean	22.1
Median	21
SD	7.762
Variance	60.25
Coefficient of Variation	0.351
Skewness	1.293
Mean of log data	3.04
SD of log data	0.336
95% Standard Bootstrap UCL	23.45

V

Number of Valid Observations	91
Number of Distinct Observations	43
Minimum	19
Maximum	92
Mean	51.34
Median	48
SD	14.29
Variance	204.2
Coefficient of Variation	0.278
Skewness	0.644
Mean of log data	3.901
SD of log data	0.279
95% Standard Bootstrap UCL	53.76

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. MAJID MADANI
Office Chief
Office of Bridge Design West

Date: September 9, 2013

Attention: Randip Bains

File: 04-SON-101 (PM 0.0)
E-FIS 0400000735; EA 04-264091
Marin-Sonoma Narrows (MSN), B-3
Segment, Highway 101

From: S. YANG/S. AWAD/V. KHATA-O-KHOTAN
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject : Foundation Report for San Antonio Creek Bridge

This Foundation Report (FR) provides foundation recommendations for the proposed new San Antonio Creek Bridge (Bridge No. 27-0119), on the new alignment of Highway 101 in the City of Petaluma, at the border of Marin and Sonoma Counties (Fig. 1). This is part of the larger project to widen and realign the Marin-Sonoma Narrows, B-3 Segment.

1. SCOPE OF WORK

The following tasks were performed for the preparation of this FR:

- Review of as-built plans of the existing bridge structure.
- Review of geotechnical investigations previously performed (in 2005) at the project site, including two exploratory borings and laboratory testing results.
- Field geotechnical exploration, including drilling seven exploratory borings and three Cone Penetration Test borings, performing Standard Penetration Test (SPT) and Pocket Penetrometer (PP) Test, and collecting soil samples;
- Laboratory testing of selected samples, including particle gradation analysis, unit weight, moisture content, Atterberg Limits, consolidation, unconfined compression, and corrosion tests;
- Foundation design analysis; and
- Preparation of this FR.

2. PROJECT DESCRIPTION

Figure 1 shows the location of the project site. The bridge is located in North Bay, on the boundary between Marin County and Sonoma County. This new bridge is on the west side of the existing Bridge, as part of the Highway 101curve correction project. The proposed new bridge is a 4-span, 510 feet long structure.

The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to the investigation or design of the proposed structures.

4. FIELD INVESTIGATION AND TESTING PROGRAM

A total of seven geotechnical exploratory borings and three Cone Penetration Test (CPT) borings were drilled at the project site (Fig. 2) to investigate subsurface soil conditions for foundation design of the bridge. All were rotary wash borings, using a truck-mounted drill rig. Of the seven exploratory borings, three are on the north side of San Antonio Creek and four are on the south side (Fig. 2). The three CPT borings were along the northern abutment of the new bridge (Fig. 2). Table 1 lists the depths of these borings and the bedrock depths.

Table 1. Summary of field borings

Boring ID	Total Depth (ft)	Surface Elev. (ft)	Bedrock Elev. (ft)	Date of completion
RC-09-001	120	21.5	-31.5	6/10/09
RC-10-010	125	32.3	1.5	5/20/10
RC-10-011	150	33.1	-5	5/27/10
RC-10-018	101	22.5	-2	10/6/10
RC-10-019	79	23.3	-6.5	10/6/10
RC-10-022	85	22.7	-7	10/12/10
RC-10-023	95	23.6	-36	10/13/10
CPT-13-001	54.4	21.0	-33.5	8/9/13
CPT-13-002	42.7	21.0	-22	8/9/13
CPT-13-003	26.6	21.2	-5.5	8/9/13

In all exploratory borings, Standard Penetration Tests (SPT) were performed at 5-feet interval in soil strata. Pocket Penetrometer (PP) tests were conducted on soil samples showing apparent cohesion. Further, for rock material, continuous core samples were collected in boxes. Rock Quality Determination (RQD) and percent of sample recovery for each run were also recorded.

Soil and rock samples were selected at various depths for laboratory testing (see next Section).

5. LABORATORY TESTING PROGRAM

The laboratory testing program included one unit weight test, 37 moisture content tests, 15 gradation (particle distribution) analyses, 9 Atterberg Limits tests, 6 consolidation tests, 19 unconfined compression tests, and 5 corrosion tests.

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

Topography

The project site is entirely located in a small valley at an elevation of approximately 120 feet above sea level. North of San Antonio Creek, the elevation ranges from 500+ feet on the hilltops to less than 30 feet at stream crossings. South of San Antonio Creek, adjacent to Gnoss Airfield, Burdell Mountain rises 1400 feet above sea level and slopes to the Petaluma River about 6 feet.

Site Geology

The project site is located within the California Coast Ranges geomorphic province. Holocene alluvial fan sediments underlay the northeastern side of the project site (see the attached Quaternary map). These sediments were deposited by streams emanating from the mountains. These sediments include sand, gravel, silt and clay that are moderately to poorly sorted. The western side of the project is underlain by Holocene basin deposits. These sediments are more fine-grained than fan sediments. These sediments contain abundant clay. They may also contain layers of sand and silt (USGS, OF 98-460).

The Franciscan Formation, a complex assemblage of sedimentary and volcanic rocks underlie the Holocene deposits as bedrock for the entire project area. The southern side of the San Antonio Creek is underlain by mélange; a tectonic mixture of variably sheared shale and sandstone containing inclusions of greenstone, chert, greywacke and serpentinite. The northern side of San Antonio Creek is underlain chiefly by fractured and variably sheared metagraywacke. (USGS, Geologic map, Santa Rosa Quadrangle, 1982).

There are two active faults in close proximity of the project area: Rodgers Creek Fault is located 9 km northeast of the project site and San Andreas Fault is located at approximately 22.5 km west of the project site. Both faults are active and have produced major earthquakes historically.

Subsurface Conditions

Based on borings RC-10-010, RC-10-011, RC-10-018, and RC-10-019, subsurface materials on the south side of the creek consist of a layer of 9 to 20 feet of medium stiff to very stiff sandy lean clay (Pocket Penetrometer values varying from 0.5 to 4 tsf). This is underlain by a layer of 5 to 14 feet of medium dense to very dense clayey sand with gravel (N_{60} varying from 22 to more than 100) at three boring locations except R-10-010. At borings R-10-010 and R-10-011, the clay layer is also overlain by 15 to 20 feet of embankment fill, which is mostly dense silty sand or dense gravel with sand (N_{60} varying from 36 to 44). The surface of sedimentary bedrock is located at Elevation +1 to –5 feet approximately. The bedrock consists of mostly intensely fractured, intensely weathered sandstone, clay shale, and mudstone.

Based on borings RC-09-001, RC-10-022, and RC-10-023, subsurface materials on the north side of the creek consist of alternating layers of mostly soft to very stiff sandy lean clay (Pocket Penetrometer values varying from 0 to 4 tsf), and loose to dense clayey sand (N_{60} varying from 6 to 43). The bedrock consists of mostly intensely fractured, intensely weathered sandstone, mudstone, and shale. Bedrock elevation varies considerably: approximately -31.5 feet, -7 feet, and –20 feet at borings R-09-001, R-10-022, and R-10-023, respectively. The CPT borings show that bedrock elevation drops quickly from El. -5.5 feet on the right (west) side of Abutment 5 to El. -33.5 feet on the left (east) side of the abutment (Fig. 2).

Groundwater

Groundwater elevation was measured at RC-09-001 to be 8.7 feet below ground surface (El. 12.8 feet). Note that groundwater level typically fluctuates with season and correlates with the local geology, and topography.

7. SCOUR EVALUATION

According to Final Structures Hydraulic Report dated February 10, 2011, short-term scour elevation is 14.0 feet at both abutments and 4.0 feet at all three bent locations. There is no long-term scour at this site.

8. CORROSION EVALUATION

According to current Caltrans Corrosion Guidelines (2003), a soil is considered non-corrosive for structure foundation elements, if the minimum resistivity is greater than 1000 ohm-cm and the pH value is greater than 5.5. Based on our laboratory corrosion test performed on four soil samples (Table 2), the soil at the project site is non-corrosive.

Table 2. Soil Corrosion Test Summary

Location	SIC Number	Sample Depth (ft)	Min. Resistivity (ohm-cm)	pH
RC-10-011	C709279	11.5 – 16.5	2536	7.09
RC-10-018	9717-3P	16.5 – 17	2450	7.57
RC-10-018	9717-5P	17 – 20	1616	7.58
RC-10-019	9717-2P	18 – 21	1920	8.04
RC-10-022	9717-1P	11.5 – 25	1580	7.86

9. SEISMIC RECOMMENDATIONS

Please refer to the Memo from Hossain Salimi of our office to your Branch, dated January 25, 2011 for the final seismic design recommendations. The following is a brief summary of the proposed seismic design parameters:

Controlling Fault = Rodgers Creek Fault (6 miles northeast of project site)
Maximum Moment Magnitude, Mw = 7.1
Peak Ground Acceleration = 0.65 g
Surface Rupture Potential = Minimum

For clarification or additional information on seismic design aspects of the project, please consult Hossain Salimi at (916) 227-7147.

Near Abutment 1 (southern abutment), boring RC-10-019 indicates a liquefiable medium dense sand layer from El. 6 to 0 feet. Boring RC-10-011 indicates a liquefiable medium dense clayey gravel layer from El. 18 to 13 feet. Near Abutment 5 (northern abutment), boring RC-09-001 presents liquefiable medium dense clayey or silty sand layers reaching El. -26 feet. Borings RC-10-022 and RC-10-023 also show liquefiable sandy layers of various thicknesses.

10. AS-BUILT FOUNDATION DATA

The existing San Antonio Creek Bridge was built in 1929. It consists of two separate bridges, one for each direction of traffic. Based on As-Built drawings, the southbound bridge is founded on combined spread footings. The northbound bridge has its abutments founded on combined spread footings and bents on isolated spread footings.

11. FOUNDATION RECOMMENDATIONS

The foundation design analysis was performed in general using the methods outlined in AASHTO LRFD Bridge Design Specifications (2007); however, reduction factors for geotechnical strength parameters were based on Caltrans/DES/Geotechnical Services criteria.

Idealized subsurface soil profile and soil engineering parameters were defined based on the existing boring logs, field and laboratory testing results, relevant literature, and engineering judgment.

According to current Caltrans Bridge Design Specifications, the abutments are designed using the Working Stress Design (WSD) method, and the LRFD design method is used to design the bents. Structure Design has also provided scour information and structure loads as shown in Tables 3 through 5.

Table 3. Scour Data

Location	Long Term (Degradation & Contraction) Scour	Short Term (Local) Scour El. (ft)
Abut 1	N/A	14.0
Bent 2	N/A	4.0
Bent 3	N/A	4.0
Bent 4	N/A	4.0
Abut 5	N/A	14.0

Table 4. Foundation Design Data Sheet

Support No.	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)	Number of Piles per Support
					B	L		
Abut 1	WSD	Class 200 Steel Pipe pile	22	14.42	12	126.5	1	42
Bent 2	LRFD	78" CIDH	22	5	N/A	N/A	1	3
Bent 3	LRFD	78" CIDH (with 1" permanent casing at Column 1 and 2)	17	5	N/A	N/A	1	3
Bent 4	LRFD	78" CIDH	22	5	N/A	N/A	1	3
Abut 5	WSD	Class 200 Steel Pipe pile	22	14.42	12	126.5	1	42

Table 5. Foundation Design Loads

Support No.	Service Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max. Per Pile	Per Support	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile
Abut 1	-	200	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bent 2	N/A	3225	2550 / pile	N/A	4500			N/A	2750		
Bent 3	N/A	3225	2550 / pile	N/A	4500			N/A	2750		
Bent 4	N/A	3225	2550 / pile	N/A	4500			N/A	2750		
Abut 5	-	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

For the abutments, Caltrans Standard Plan Class 200 driven steel pipe piles are recommended. For the bents, Structure Design desires to use 78-inch-diameter CIDH piles and pile extensions (3 pile extensions per bent). Further, at Bent 3, Columns 1 and 2 (left side) will also have 1-inch permanent casing from cutoff elevation (El. 5 feet) extending down to El. –35 feet.

The computer program APILE PLUS (Version 4.0) was used to calculate nominal vertical bearing capacity for the Class 200 driven pipe piles. In this program, the API method (1986, 1987, 1994) was selected to calculate soil resistance. Both skin friction and end bearing capacity were considered in pile resistance calculations. Unsuitable penetrated layers, including liquefiable (extreme event only) and scourable soils, were excluded from the bearing capacity calculation. Furthermore, skin friction from non-liquefiable layers overlying significant liquefiable layers were considered as downdrag force (extreme event only).

The computer program SHAFT (Version 5.0) was used to calculate nominal vertical bearing capacity for the 78-inch CIDH piles. The computational methods in this program conform to the 1999 FHWA recommendations for drilled shafts (O'Neil and Reese 1999). Only skin friction was considered in pile resistance calculations. For Bent 3, Columns 1 and 2, the portion of the piles that are encased in permanent steel casing (Elev. 5 ft to –35 ft), was excluded in skin friction calculations. Unsuitable penetrated layers, including liquefiable (extreme event only) and scourable soils, were excluded from the bearing capacity calculation. Furthermore, skin friction from non-liquefiable layers overlying significant liquefiable layers were considered as downdrag force (extreme event only).

Tables 6 and 7 provide a summary of foundation design recommendations for abutments and bents, respectively. Table 8 is the pile data table. The computed settlement under service load is less than one inch in all cases. In Tables 6 and 8, the nominal driving resistance is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers, if any, which do not contribute to the design resistance.

Note that due to great variation of bedrock depth across Abutment 5, pile tip elevation is specified at left end, center, and right end of the abutment. The acceptance criteria for actual pile tip elevations shall be based on Gates formula (Caltrans Standard Specifications 49-2.01A(4)(b)).

Table 6. Abutment Foundations Design Recommendations

Support Location		Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load per Support (kips)		LRFD Service-I Limit State Total Load per Pile (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
				Total	Permanent					
Abut 1		Class 200 steel pipe pile	14.42	-	-	200	400	-10 (a)	-10	400
Abut 5	Left end		14.42	-	-	200	400	-35 (a)	-35	400
	Center		14.42	-	-	200	400	-25 (a)	-25	400
	Right end		14.42	-	-	200	400	-10 (a)	-10	400

Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit).
2) The specified tip elevation shall not be raised above the design tip elevation for Compression.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, scourable, etc.), if any, which do not contribute to the design resistance. Unsuitable soil layers extend to Elevation 14 feet at Abutments 1 and 5.

Table 7. Bent Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (in)	Required Factored Nominal Resistance (kips)				Design Tip Elevation (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Event			
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1)	Tension (φ=1)		
Bent 2	78" CIDH	5	3225 per pile	1	6429	N/A	2750	N/A	-90 (a) -57 (c) -60 (d)	-90
Bent 3, Column 1 Column 2	78" CIDH with permanent casing	5	3225 per pile	1	6429	N/A	2750	N/A	-110 (a) -74 (c) -100 (d)	-110
Bent 3, Column 3	78" CIDH	5	3225 per pile	1	6429	N/A	2750	N/A	-90 (a) -57 (c) -60 (d)	-90

Bent 4	78" CIDH	5	3225 per pile	1	6429	N/A	2750	N/A	-98 (a) -63 (c) -60 (d)	-98

Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
2) The specified tip elevation shall not be raised above the design tip elevation for Settlement.
3) The design tip elevation for Lateral Load was provided by Structure Design.

Table 8. Pile Data Table

Support No.		Pile Type	Nominal Resistance (kips)		Cutoff El. (ft)	Design Tip El. (ft)	Specified Tip El. (ft)	Nominal Driving Resistance (kips)
			Compression	Tension				
Abut 1		Class 200 pipe pile	400	N/A	14.42	-10 (a)	-10	400
Bent 2		78" CIDH	6429	N/A	5	-90 (a) -57 (c) -60 (d)	-90	N/A
Bent 3, Column 1 Column 2		78" CIDH with permanent casing	6429	N/A	5	-110 (a) -74 (c) -100 (d)	-110	N/A
Bent 3, Column 3		78" CIDH	6429	N/A	5	-90 (a) -57 (c) -60 (d)	-90	N/A
Bent 4		78" CIDH	6429	N/A	5	-98 (a) -63 (c) -60 (d)	-98	N/A
Abut 5	Left end	Class 200 pipe pile	400	N/A	14.42	-35 (a)	-35	400
	Center		400	N/A	14.42	-25 (a)	-25	400
	Right end		400	N/A	14.42	-10 (a)	-10	400

Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
2) The specified tip elevation shall not be raised above the design tip elevation for Settlement.
3) The design tip elevation for Lateral Load was provided by Structure Design.
4) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, scourable, etc.), if any, which do not contribute to the design resistance. Unsuitable soil layers extend to Elevation 14 feet at Abutments 1 and 5.

12. CONSTRUCTION CONSIDERATIONS

12.1. Ground Improvement Near Bridge Abutments

In view of potentially large consolidation settlement as well as liquefaction induced settlement near the bridge abutments, we have proposed ground improvement under the approach embankment at both abutments. The Rammed Aggregate Pier (RAP) technique will be used for the ground improvement, as detailed in the Geotechnical Design Report to Mark Thomas & Company dated September 2013. In addition to ground improvement, we recommend a layer of temporary fill surcharge be placed on top of the approach embankments, for a waiting period of 3 months minimum to accelerate the settlement and to shorten the consolidation time. Piling at the bridge abutments shall begin after the waiting period is complete.

12.2. CIDH Pile

All CIDH piles shall be constructed in accordance with Section 49-3 of the Caltrans Standard Specifications and "Guidelines for CIDH Piles Cast in Wet Conditions." Drilling of the CIDH piles, placement of rebar cage, and concrete pour shall be completed in a continuous operation.

Difficult pile installation is anticipated due to the presence of sandstone and shale bedrocks and groundwater. The contractor shall submit the drilling logs for CIDH piles for review after the completion of drilling. The drilling log shall include penetration rate, material descriptions, estimated volume of cuttings (poor, good, excessive) and other information pertaining to the drilling process (loss of circulation, zones of caving, down pressure, etc.) Excavated materials and drilling fluid shall be handled and disposed of in accordance with the contract plan.

Due to the presence of groundwater, temporary casing may be needed to prevent caving. The use of temporary casing will require that it be removed while the concrete is being placed in order to develop the expected pile capacity and to facilitate the casing removal. Prior to placement of concrete, the interior surface of the shaft including the bottom should be cleaned of residue from drilling operations.

12.3 Driven Pile

Hard pile driving is anticipated because of zones of dense sand and claystone and sandstone rocks. Reinforcing the pile tips is strongly recommended.

Pile acceptance criteria for all driven piles shall be based on Gates formula (Caltrans Standard Specifications Section 49-2.01A(4)(b)).

Pre-drilling oversize holes through embankment fill and/or drilling beyond existing piles (leading row) at the abutments is permitted per Caltrans Standard Specifications Section 49-2.01C(4). If the base of the fill is below the original grade or the pre-drilling beyond the existing pile is deeper than anticipated, our office shall be notified.

13. DISCLAIMER AND CONTACT INFORMATION

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by the Office of Structure Design West. If any conceptual changes are made during final project design, the Office of Geotechnical Design West, Design Branch A should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hooshmand Nikoui at (510) 286-4811.

c: TJPokrywka, HNikoui, Daily File, Route File, J Stayton (DES Office Engineer)

SYang/mm

REGISTERED PROFESSIONAL ENGINEER
ZHAOHUI YANG
No. 71801
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

Fig. 1. Location of San Antonio Creek Bridge.

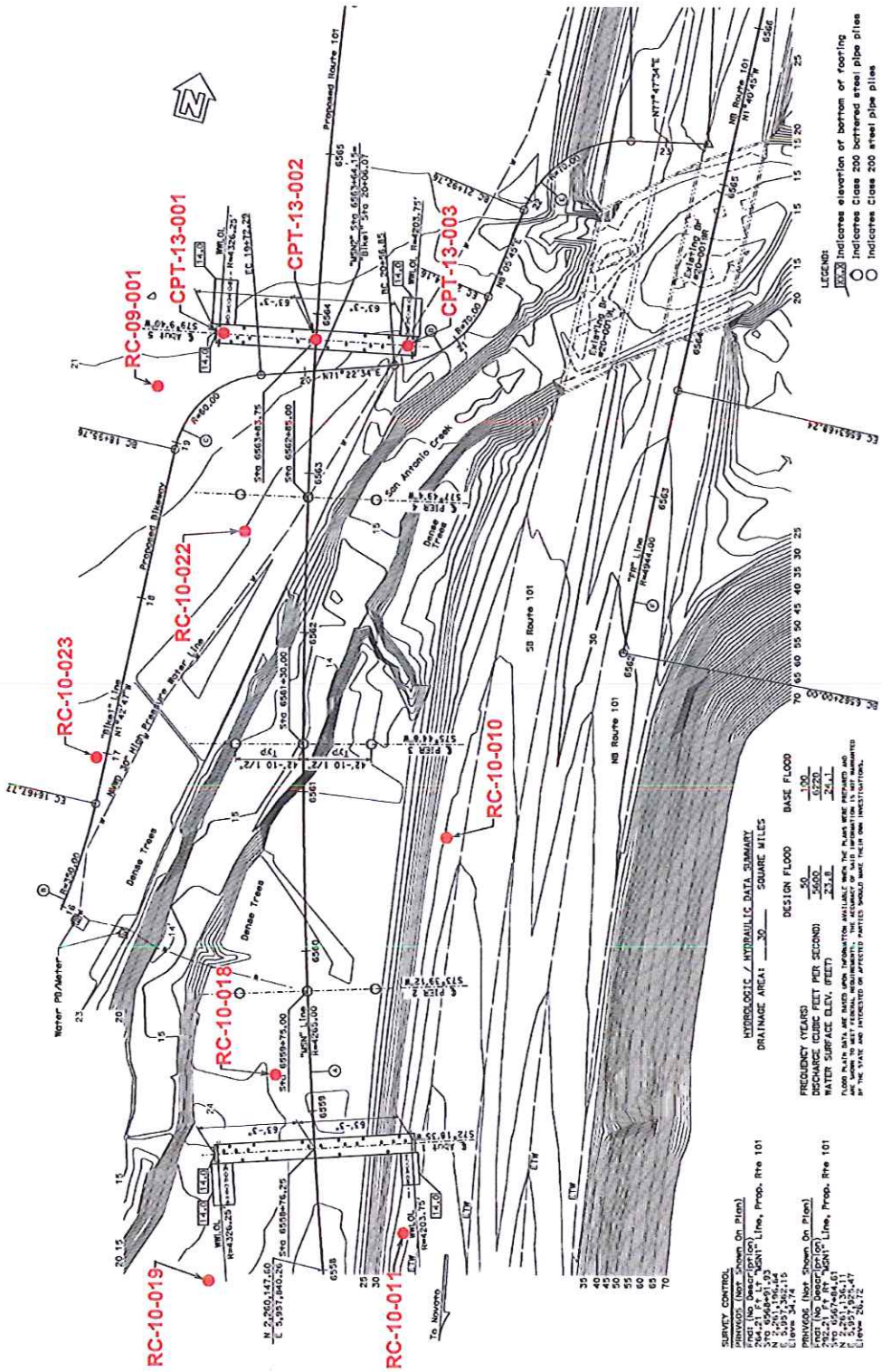


Figure 2: Structure Plan showing boring locations.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
Division of Engineering Services
Office of Geotechnical Design - West

FINAL
GEOTECHNICAL DESIGN REPORT

CONTRACT B3 – MARIN-SONOMA NARROWS
ROUTE 101 UPGRADE AND WIDENING
BETWEEN THE CITIES OF NOVATO AND PETALUMA
MARIN COUNTY AND SONOMA COUNTY, CALIFORNIA

04 – MRN-101 PM 27.0/27.6, SON-101 PM 0.0/1.9
04 – 264091
September 2013

PREPARED FOR:

CALTRANS DISTRICT 4
OFFICE OF DESIGN NORTH COUNTIES

PREPARED BY:

DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN – WEST
GEOTECHNICAL SERVICES
BRANCH A

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1. INTRODUCTION

The Marin Sonoma Narrows (MSN) HOV Widening project proposes to add High Occupancy Vehicle (HOV) facilities to U.S. 101 from the junction of State Route 37 in the City of Novato to just north of the Corona Road Overcrossing in the City of Petaluma, a distance of approximately 16 miles. The project has been divided into three main segments. Segments A and C consist of the existing freeway in the Cities of Novato and Petaluma, respectively. Segment B is the existing expressway between the two cities.

Through Segment B, locally referred to as the "Novato Narrows," it is proposed to upgrade the existing facility from an expressway, with at-grade intersections and driveway access, to a freeway, with interchange and frontage roads to provide access to intersecting roadways and adjacent parcels. The project will also improve the safety of the route by increasing visibility (sight distance), improving drainage to address recurring flooding and providing wider shoulders for emergencies.

As part of Segment B, the limits of Segment B-3 (Fig. 1) cover the northernmost 0.5 miles of the expressway in Marin County (MRN-101 PM 27.1/27.6) and the southernmost 1.7 miles of the expressway in Sonoma County (SON-101 PM 0.0/1.7).

The Segment B-3 project proposes to build a new San Antonio Creek Bridge. The project also proposes construction of new embankments and cut slopes. In addition, three new retaining walls and two overhead signs will be constructed. The purpose of this Geotechnical Design Report (GDR) is to document subsurface geotechnical conditions, provide analyses of the anticipated site conditions as they pertain to the project described herein and to recommend design and construction criteria for the roadway portions of the project. This report also establishes a geotechnical baseline to be used in assessing the existence and scope of changed site conditions. The foundation investigation and recommendations for the proposed new San Antonio Creek Bridge is addressed in a separate report dated September 9, 2013.

DIVISION OF ENGINEERING SERVICES
Geotechnical Design West

FIGURE 1: LOCATION MAP

04-MRN-101 PM 27.1/27.6
04-SON-101 PM 0.0/1.7

EA 04-264091 JULY 2011

Marin Sonoma Narrows B-3 Segment

In summary, the following tasks were performed for the preparation of this GDR:

- Geologic literature study;
- Review of as-built plans and geotechnical investigations previously performed at the project site.
- Field geotechnical exploration, including drilling 7 exploratory borings for the new San Antonio Creek Bridge and 20 borings for roadway alignment and retaining walls, performing Standard Penetration Test (SPT) and Pocket Penetrometer (PP) Test, and collecting soil samples. In addition, 7 Cone Penetration Test (CPT) soundings were conducted near the northern abutment of the new San Antonio Creek Bridge.
- Laboratory testing of selected samples, including particle size analysis, moisture content, Atterberg Limits, consolidation test and corrosion tests;
- Slope stability analysis for embankments and cut slopes;
- Settlement analysis and ground improvement design for embankment fills; and
- Preparation of this GDR.

This report is intended for use by the project design engineer, construction personnel, bidders and contractors. The Consultant for the Segment B-3 project is Mark Thomas & Company, Inc.

The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

2. EXISTING FACILITIES AND PROPOSED IMPROVEMENTS

2.1 Project Background/ Existing Facilities

Within the limits of the B-3 project, the existing U.S. 101 is a four-lane expressway with two lanes in each direction. Much of the existing roadway does not meet current horizontal alignment, vertical profile and site distance requirements for the 70 mph corridor design speed.

2.1.1 Existing Utilities

The proposed freeway upgrade through Segment B will require a significant number of intricate utility relocations. The existing utilities through segment B-3 include PG&E underground gas distribution lines, PG&E overhead electric transmission line, AT&T overhead telephone line, AT&T underground fiber optic cable, and North Marin Water District (NMWD) 30-inch pipeline. Most of these utilities need to be relocated.

2.2 Proposed Improvements

The proposed improvements include upgrading the existing facility from an expressway, with at-grade intersections and driveway access, to an access-controlled freeway, with interchange and frontage roads with Class I and II Bikeways on both sides of the highway to provide access to intersecting roadways and adjacent parcels. The improvements also include correction of nonstandard horizontal and vertical curves, and construction of HOV lanes in both directions. The project will improve the safety of the route by increasing visibility (sight distance), improving drainage to address recurring flooding and providing wider shoulders for emergencies. Within Segment B-3, the project proposes to build a new San Antonio Creek Bridge (Bridge No. 27-0119). The project also proposes construction of new embankments and cut slopes. In addition, three retaining walls will be constructed.

3. PERTINENT REPORTS AND INVESTIGATIONS

Reference is made to the following reports, which provide background information:

- Yang, S., Awad, S., and Khata-O-Khotan, V., and Nikoui, H., 2013, Foundation Report for San Antonio Creek Bridge, Caltrans Office of Geotechnical Design West, submitted to Alcantara, O., Caltrans Office of Bridge Design West, September 9.
- Yang, S. and Nikoui, H., 2011, Foundation Recommendations for the Proposed MSE

Wall and Culverts, Caltrans Office of Geotechnical Design West, submitted to Mai, P., Caltrans District 4 Office of Design South – Santa Clara B, July 11.

- Salimi, H., 2011, Soil Springs and Final Seismic Design Recommendations, Caltrans Office of Geotechnical Design West, submitted to Mori, B., Caltrans Office of Bridge Design West, January 25.
- Salimi, H., 2010, Revised Preliminary Seismic Design Recommendations, Caltrans Office of Geotechnical Design West, submitted to Mori, B., Caltrans Office of Bridge Design West, March 24.
- Caltrans, 2009, Route 101 – Marin/Sonoma Narrows Project Report, June.
- Caltrans, 2009, Geotechnical Design Report for MSN B-2 Contract, Office of Geotechnical Design West, submitted to Mai, P., Caltrans District 4 Office of Design South – Santa Clara B, December.
- Caltrans, 2007 Fault Database and Map.
- Wagner, D.L. and Bortugno, E.J., 1982, Geologic Map of the Santa Rosa Quadrangle, CDMG.
- Caltrans ARS Online (http://dap3.dot.ca.gov/ARS_Online/index.php).
- USDA, 1972, Soil Survey, Sonoma County, California.
- USGS, 1958, Geology and Ground Water in the Santa Rosa and Petaluma Valley Areas, Sonoma County, California.
- Caltrans As-Built Files.

4. PHYSICAL SETTING

4.1 Climate

The climate of the job site is characterized by moderate temperature and precipitation. Sonoma and Marin Counties have cool to warm, dry summers and cool, moist winters. Temperatures are highest in July and coldest in January. The average temperature in Novato is 59.6 degrees. June through September the average temperature is 67.25 degrees, and December through February is 50.9 degrees. In the summer, little rainfall occurs. The

rainy season begins about October and ends about April. The average rainfall is 29.54 inches, with December through February averaging 5.79 inches a month, the rainy season. (Data taken from Soil Survey of Marin County California, USDA Soil Conservation Service, March 1985, and Soil Survey of Sonoma County California, USDA Soil Conservation Service, March 1973.)

4.2 Topography and Drainage

The project site is located in Marin and Sonoma counties. North of the Petaluma River is low in elevation lying with the alluvial plane of the Petaluma River. South of the Petaluma River the project is located in rolling grassy hills at elevation of 500 to 600 feet. The highest peak in the area is Burdell Mountain at 1400 ft.

Numerous creeks drain the rolling hills to the Petaluma River, or to the tidal flats and eventually San Pablo Bay.

4.3 Regional Geology and Seismicity

The project is located in the Sonoma Valley within the Coast Range Geomorphic Province of Central California, a series of northwest-trending mountain ranges and intermountain valleys, bounded in the east by the Great Valley and to the west by the Pacific Ocean. The Sonoma Valley is a broad, sediment-filled basin, bordered to the east by the Mayacama Mountains, to the west by the Sonoma Mountains and to the southeast by the San Pablo Bay.

There are three active faults in close proximity to the project area: Rodgers Creek Fault is located anywhere from 4.9 to 8 miles east of the project site, San Andreas Fault is located at approximately 12.4 to 14.5 miles west of the project site, and the Hayward Fault is located 8 miles southeast of the southern end of the project. All three faults are active and have produced major earthquakes in historic time. The site is not in the vicinity of any Alquist Priolo earthquake fault zones; therefore surface rupture should not be an issue.

5. EXPLORATION

Geotechnical Design-West conducted the foundation investigation for this project. This investigation included site visits, studying the geology of the area, and drilling a total of 27 power borings (See Table 1 below) and 7 Cone Penetration Test (CPT) soundings. These power borings and CPTs were conducted in the vicinity of the proposed new San Antonio Creek Bridge and new roadway alignment. Refer to Section 7.2 of this report for detailed descriptions of the foundation materials. The Log of Test Borings (LOTB) sheets will be furnished with the final Project Plans.

Table 1. Summary of Geotechnical Boring Information

Boring ID	Station	Offset (ft)	Total Depth (ft)	Surface Elev. (ft)	Date of completion	GW depth (ft)	Date GW measured
RC-09-001	6563+48.99	98.00 LT	120	21.5	6/10/09	8.7	8/9/13
RC-09-002	6568+64.49	27.87 RT	46.5	18.6	6/11/09	#	
RC-09-003	6610+28.18	25.02 LT	34	156.5	6/16/09	Dry	6/17/09
RC-09-004	6606+20.37	171.88 LT	36	205.3	6/17/09	Dry	6/17/09
A-09-005	6630+13.63	23.83 LT	25.5	76.2	8/18/09	Dry	
A-09-006	6614+56.12	82.19 LT	25.5	157.5	8/18/09	Dry	
A-09-008	6581+51.01	62.03 LT	41.5	58.4	8/26/09	Dry	
A-09-009	6573+54.73	27.63 LT	40	14.3	8/26/09	32	8/26/09
RC-10-010	6560+70.02	90.01 RT	125	32.3	5/20/10	#	
RC-10-011	6558+19.70	52.32 RT	150	33.1	5/27/10	#	
RC-10-012	6581+98.51	207.61 LT	50	101.9	7/28/10	#	
RC-10-013	6582+61.52	133.66 LT	50	80.8	7/29/10	#	
RC-10-014	6593+19.72	80.89 LT	40	80.6	8/3/10	12	8/3/10
RC-10-015	6597+83.80	92.39 LT	40	58.1	8/3/10	7	8/4/10
RC-10-016	6591+10.16	54.24 LT	40	49.9	8/4/10	#	
RC-10-017	6586+32.46	63.66 LT	35	39.2	8/5/10	12	8/5/10
RC-10-018	6559+23.56	22.12 LT	101	22.5	10/6/10	#	
RC-10-019	6557+98.64	72.33 LT	79	23.3	10/6/10	#	
RC-10-020	6553+36.78	94.17 LT	30	21.5	10/6/10	#	
RC-10-021	6556+04.13	70.90 LT	34	21.5	10/7/10	#	
RC-10-022	6562+62.36	39.91 LT	85	22.7	10/12/10	#	
RC-10-023	6561+21.51	130.11 LT	95	23.6	10/13/10	#	
A-12-024	6652+00	69 LT	39.5	33	7/25/12	Dry	
A-12-025	6649+80	69 LT	30.5	37	7/25/12	Dry	
A-13-026	6655+59	70 RT	26.5	32	4/17/13	Dry	
A-13-027	6538+00	66 LT	31.5	85	4/17/13	Dry	
A-13-028	6532+20	60 LT	26.5	97	4/17/13	Dry	

Groundwater depth was not measured due to rotary wash method of drilling.

5.1 Drilling and Sampling

All power borings were drilled using a truck-mounted or track-mounted drill rig equipped with 6-inch hollow stem auger or 4-inch rotary wash. Standard Penetration Test (SPT) samples were recovered on foundation soils. These tests utilized a 1.4-inch inside diameter sampler driven with a 140-pound hammer falling 30 inches over an 18-inch sample interval in accordance with ASTM test Designation D-1586. In addition, a number of relatively undisturbed 2-inch Modified California samples were obtained for laboratory testing. The materials encountered were logged continuously in the field during drilling operations. Bulk samples were taken for laboratory testing. Table 1 shows boring elevations, depths, and dates of completion.

5.2 Cone Penetration Test (CPT)

Seven CPTs were conducted near the northern abutment of the new San Antonio Creek Bridge. Table 2 summarizes the location and depth information of these CPTs.

Table 2. Summary of Cone Penetration Test Information

CPT ID	Station*	Offset* (ft)	Total Depth (ft)	Surface Elev. (ft)	Date of completion
CPT-13-001	6563+85	60 LT	54.4	21.0	8/9/13
CPT-13-002	6563+85	0	42.7	21.0	8/9/13
CPT-13-003	6563+85	60 RT	26.6	21.2	8/9/13
CPT-13-004	6564+85	60 RT	41.7	21.2	8/9/13
CPT-13-005	6565+85	60 RT	33.5	20.8	8/9/13
CPT-13-006	6565+85	60 LT	52.0	20.8	8/9/13
CPT-13-007	6564+85	60 LT	49.7	21.0	8/9/13

* Stations and offsets are approximate.

6. GEOTECHNICAL TESTING

6.1 In Situ Testing

In all borings, Standard Penetration Tests (SPT) were performed at 5-feet interval in soil

strata. Pocket Penetrometer (PP) tests were conducted on soil samples showing apparent cohesion. Visual soil classifications were made in the field in accordance with the Unified Soil Classification System. Soil samples were collected at various depths for laboratory testing.

6.2 Laboratory Testing

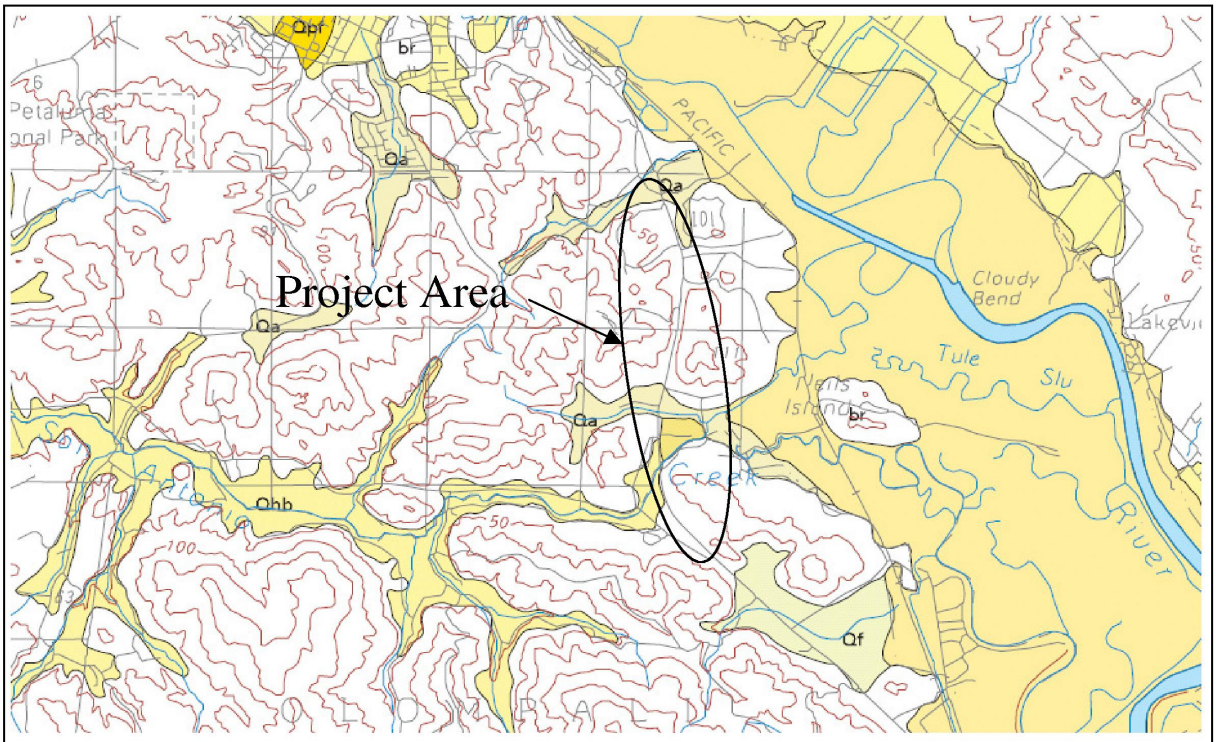
The laboratory testing program included unit weight tests, moisture content tests, gradation (particle distribution) analyses, Atterberg Limits tests, consolidation tests, and corrosion tests. Refer to Appendix B for the laboratory test results.

7. GEOTECHNICAL CONDITIONS

7.1 Site Geology

The project site is located within the California Coast Ranges geomorphic province. Hwy 101 is located along the tidal flat areas on the outskirts of San Pablo Bay. The area where Hwy 101 is built is on Holocene bay mud. The bay muds die out to the north. Then Quaternary deposits and Franciscan Formation become the dominant geology (Figure 2).

The Quaternary colluvium and landslide deposits at the base of the slopes are from the flow or slump of the adjacent hillsides and make up part of the sediments, on which Hwy 101 was built. Also, Holocene stream, terrace, and alluvial fan deposits underlie the majority of the project. Streams emanating from the mountains deposited these sediments. These sediments include sand, gravel, silt and clay that are moderately to poorly sorted. These sediments are more fine-grained than landslide and colluvial fan sediments. These deposits are the dominant deposits above the Petaluma River.



MAP EXPLANATION

- Qhb Holocene basin deposits
- Qht Holocene terrace deposits
- Qhf Holocene fan deposits
- Qha Holocene alluvium, undifferentiated
- Qs Late Pleistocene to Holocene dune sands
- Qb Late Pleistocene to Holocene basin deposits
- Qt Late Pleistocene to Holocene terrace deposits
- Qf Late Pleistocene to Holocene fan deposits
- Qa Late Pleistocene to Holocene alluvium, undifferentiated
- Qpt Late Pleistocene terrace deposits
- Qpf Late Pleistocene fan deposits
- br Pre-Quaternary deposits and bedrock. Includes Quaternary landslides

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FIGURE 2: GEOLOGY MAP

04-MRN-101 PM 27.1/27.6
04-SON-101 PM 0.0/1.7

EA 04-264091 JULY 2011

Marin Sonoma Narrows B-3 Segment

The Franciscan Formation, a complex assemblage of sedimentary and volcanic rocks are locally exposed along the entire project area south of the Petaluma River, the Franciscan Formation mélange and schist separate the Quaternary deposits at the base of the slopes. This formation is a tectonic mixture of variably sheared shale and sandstone containing inclusions of greenstone, chert, greywacke, and exotic metamorphic rocks embedded in a sheared, shaley matrix. The Franciscan Schist is comprised of schist, phyllte and semischist (slightly to well foliated metasedimentary and metavolcanic rocks).

7.1.1 Natural Slope Stability

The flat area of the bay muds and fan deposits are typically not prone to landslides. Landslides are abundant in the rolling hills within the project area. The Franciscan Formation with its sheared rock and clayey matrix and loose quaternary deposits are prone to landslides.

At SON-101 PM 0.8-1.1 (approximate Station 6608+00 to 6624+00), a landslide on the right (east) side of the highway was repaired in 2002. The Franciscan Complex Schist underlies this location, which is a sheared, shaley matrix that is susceptible to landslides. On the *Petaluma River Geologic Quadrangle map,* two Quaternary landslides are mapped that encroach onto the footprint of Hwy 101.

At SON-101 PM 0.70 (approximate Station 6601+00), the toe of a landslide on the left (west) side of the highway is located within the fill portion of the project limits. The landslide extends approximately 1000 feet to the northwest of the toe, so the landslide itself does not pose a threat to the new construction. There is a deep existing ditch at the toe of the slide, which runs parallel to the highway southerly to Station 6594+00. This ditch will be buried under the new embankment.

7.2 Soil and Groundwater Conditions

Surficial soils in the project area can be divided into the following groups: alluvium soils, hill soils, terrace soils, tidal and marsh, and man made pits, quarries and fills. The alluvium soils are Zamora Silty Clay Loam and Alluvial Land Sandy. These soils are alluvium derived from shale, sandstone and granites, are somewhat poorly drained to well drained. They comprise the basin floors and alluvial fans, and their classification are silty clay loam, clay loam, sandy clay loam and gravely clay loam, gravelly clay sandy clay, making up the basin floors and alluvial fans. The erosion rates for the alluvial soils are slight to medium, and the runoff is slow to medium. Stream channels cut into the alluvial soils.

The hills in the project area have the following soils: Goulding Cobbly Clay, Los Osos Clay Loam, Los Osos Bonnydoon Complex. These soils are derived from metavolcanics and sedimentary rocks, including sandstone, and shale. They are well drained cobbly loam, very gravelly clay loam, clay loam, clay, and weathered and unweathered bedrock. The soils in the hills have a medium to very high rate of erosion and a moderate to very rapid runoff rate.

The terrace deposits Haire Clay Loam are moderately well drained alluvium, derived from sedimentary rock. It consists of clay, loamy clay, very cobbly clay loam with a medium to high rate of erosion, and runoff rate is slow to rapid. The basin floors include the Clear Lake Clay, which is derived from sedimentary rock. It is a poorly drained clay, that has a slight erosion rate and slow runoff rate. Reyes Silty Clay and Tidal Marsh make up the marshes, within the project area. Both the Reyes Silty Clay and the Tidal Marsh are poorly drain silty clay and are derived from alluvium. Both have a low erosion potential and very slow runoff. The remaining soils, Xerorthents, pits and Quarries, are man made deposits. Soil strength tests should be performed over the area before considering the use of soils from the site for embankments.

Groundwater data is limited. Based on our field exploration (see Table 1 above), in general, groundwater depth varies from approximately 7 to 32 feet along the B-3 alignment.

7.2.1 Subsurface Conditions

The subsurface soil conditions at the project site were evaluated using the data obtained from the borings (Refer to Section 5) drilled for this project. The subsurface soil conditions along the new roadway alignment are described below. Detailed descriptions of the foundation soils and boring locations are presented on the LOTB sheets.

Table 3: Approximate Limits of Fill and Cut for New Alignment

Begin Station	End Station	Left Side		Right Side	
		Fill / Cut	Max. Height (ft)	Fill / Cut	Max. Height (ft)
6528+00	6540+00	-		Cut	55
6545+00	6559+00	Fill	20	-	
6564+00	6576+00	Fill	20	Fill	20
6576+00	6583+00	Cut	55	Fill	20
6583+00	6603+00	Fill	40	Fill	30
6603+00	6612+50	Cut	120	Cut	20
6612+50	6625+00	Cut	70	Cut	20
6625+00	6631+00	Fill	15	Fill	10
6631+00	6643+00	Cut	20	Fill	10

Refer to General Plans and Table 3 above. From Station 6528+00 to 6540+00, there is cut slope on the right side with maximum height of 55 feet. No borings were drilled at this segment. It is noted that the proposed cut slope will be flatter than the existing slope.

From Station 6545+00 to 6559+00, there is new embankment fill with maximum height of 20 feet. Based on the two borings drilled at this segment (RC-10-020 and RC-10-021), there are 20 feet of medium stiff to hard sandy lean clay (Pocket Penetrometer values ranging from 0.75 to 4.5 tsf) below ground surface. This is underlain by approximately 7 feet of loose to very dense sand with gravels (SPT N_{60} values ranging from 8 to greater

than 100). Sandstone or mudstone rock was encountered at 27 to 29 feet depth (Elev. –5.5 to –7.5 feet). Groundwater level was not measured at these borings (Table 1).

From Station 6564+00 to 6576+00, there is new embankment fill with maximum height of 20 feet. Based on boring RC-09-001, the subsurface soils consists of mainly interlayers of medium stiff to stiff lean clay or sandy lean clay (PP = 0.5 – 1.75 tsf) and medium dense clayey sand or silty sand (N_{60} = 16 – 28). Bedrock was encountered at approximately 55 feet depth (Elev. –23.5 feet). Similar to RC-09-001, boring RC-09-002 shows 40 feet of interlayers of stiff to very stiff lean clay with sand (PP = 1.5 – 3 tsf) and medium dense clayey sand or clayey gravel (N_{60} = 21 – 25). Very dense sand was encountered at 40 feet depth (Elev. –21.5 feet). Subsurface soil becomes more competent toward north. Boring A-09-009 shows 20 feet of hard lean clay or sandy lean clay (PP > 4.5 tsf). Bedrock was encountered at 20 feet depth (Elev. –5.5 feet).

Groundwater level was measured at boring RC-09-001 at 8.7 feet depth (Elevation 12.8 feet) on August 9, 2013 (Table 1). At A-09-009, groundwater was measured at 32 feet depth (Elevation –17.7 feet) on August 26, 2009. Note that groundwater level typically fluctuates with season and correlates with the local geology, and topography.

From Station 6576+00 to 6583+00, there is cut slope on the left side with maximum height of 55 feet, and embankment fill on the right side with maximum height of 20 feet. Three borings were drilled on the existing slope on the left side, A-09-008, RC-10-012 and RC-10-013. Borings A-09-008 and RC-10-012 show 10 to 16 feet of hard sandy lean clay (PP > 4.5 tsf), underlain by intensely weathered, moderately hard to very soft, intensely fractured Graywacke or shale bedrock. RC-10-013 shows 5 feet of hard sandy lean clay and 7 feet of medium dense to dense clayey sand (N_{60} = 28 – 39). Intensely weathered, very soft, very intensely fractured mudstone bedrock was encountered at 12 feet depth.

Groundwater level was not measured at borings RC-10-012 and RC-10-013. Boring A-

09-008 was dry during the time of drilling (Table 1).

From Station 6583+00 to 6603+00, there is new embankment fill with maximum height of 40 feet. Four borings, RC-10-014, RC-10-015, RC-10-016, and RC-10-017, were drilled. Based on these borings, subsurface materials mainly consist of 5 to 30 feet of stiff to hard sandy lean clay (PP = 1.0 - 4.5 tsf). In borings R-10-014 and R-10-015, the clay layer is underlain by 5 feet of very dense clayey sand (N_{60} = 64 - 81). The surface elevation of sedimentary bedrock increases drastically from south to north, varying from approximately Elevation 12 feet (30 feet below ground surface) at boring RC-10-017 to Elevation 70 feet (10 feet below ground surface) at boring RC-10-015. The bedrock consists of mostly intensely fractured, intensely weathered, soft clay shale and sandstone.

Groundwater was measured at 12 feet depth (Elev. 68.6 feet) at boring RC-10-014, 7 feet depth (Elev. 51.1 feet) at boring RC-10-015, and 12 feet depth (Elev. 27.2 feet) at RC-10-017, respectively.

From Station 6603+00 to 6612+50, there is a major cut slope on the left side with maximum height of 120 feet, and minor cut on the right side with maximum height of 20 feet. Two borings, RC-09-003 and RC-09-004, were drilled on the existing slope on the left side. Boring RC-09-003 shows 21 feet of very stiff to hard lean clay with gravel and hard silt, underlain by very intensely fractured sandstone rock (Elev. 135 feet). Boring RC-09-004 shows 11 feet of dense to very dense sand with gravel and silty gravel (N_{60} > 61), underlain by intensely to very intensely fractured sandstone rock (Elev. 194 feet). Both borings were dry during the time of drilling.

From Station 6612+50 to 6625+00, there is a cut slope on the left side with maximum height of 70 feet, and minor cut on the right side with maximum height of 20 feet. One boring, A-09-006, was drilled on the existing slope on the left side. In addition, a boring, A-09-116, was drilled for the B-2 contract, at approximate Station 6621+50, on the footprint of the proposed Kastania Road extension. Boring A-09-006 shows 5 feet of

medium dense gravelly sand, underlain by very intensely fractured sandstone rock (Elev. 152.5 feet). Boring A-09-116 shows 13 feet of hard sandy lean clay, underlain by very dense clayey sand with gravel (N_{60} > 78). Both borings were dry during the time of drilling.

From Station 6625+00 to 6631+00 is 10 to 15 feet of fill embankment. According to boring A-09-005 drilled here, the top 5 feet is medium dense silty sand with gravel, underlain by 16 feet of stiff to hard sandy lean clay (PP = 1.5 – 4 tsf). Very intensely fractured sandstone rock was encountered at 21 feet depth (Elev. 55 feet). The boring was dry during the time of drilling.

From Station 6631+00 to 6643+00, there is minor cut slope of 20 feet maximum height on the left side and minor fill embankment of 10 feet maximum height on the right side. One boring, A-09-118, was drilled for the B-2 contract, at approximate Station 6636+00, on the footprint of the proposed Kastania Road extension. At boring A-09-118, decomposed Franciscan Melange and Serpentine rock were encountered from the surface (Elev. 115 feet). The boring was dry during the time of drilling.

7.3 Project Site Seismicity

Please refer to the Seismic Design Recommendations (dated March 24, 2010 and January 25, 2011) produced separately by H. Salimi of this office. Table 4 shows the major faults in the region, their distance from the project, and maximum magnitude.

Table 4. Major Faults near Project Area

Fault	Distance (mile)	Maximum Magnitude (Mw)
Rodgers Creek	6	7.1
San Andreas, North Coast Section	14.5	7.9

7.3.1 Ground Motions

Ground shaking: Based on Probabilistic Seismic Hazard Analysis using the 2008 USGS

Interactive Deaggregation procedure and assuming a 975-year return period (5% probability of exceedance in 50 years), the peak ground acceleration at the project site varies from 0.65 to 0.7g.

Liquefaction: Liquefaction is a phenomenon in which loose, saturated, fine-grained granular soils behave like a fluid when subjected to high intensity ground shaking. Liquefaction occurs when three general conditions exist: (1) shallow ground water; (2) low-density, fine, sandy soils; and, (3) high-intensity ground motion. Saturated, loose and medium dense, cohesionless soils exhibit the liquefaction potential, while dense cohesionless soil and cohesive soil exhibit the lowest, negligible liquefaction potential. Effects of liquefaction on ground surface include sand boils, settlement and lateral spreading.

The boring logs indicate that the subsurface materials encountered along the roadway alignment in general contain very high fines content. Therefore, the potential for liquefaction during a seismic event is minimum. Near San Antonio Creek Bridge abutments, layers of loose to medium dense sandy materials were found (RC-10-020, RC-10-021, RC-09-001, RC-09-002), although the relatively high fines content in these materials will significantly reduce the liquefaction effect. Nonetheless, ground improvement is proposed near the bridge abutments, as discussed in Section 8.2 below.

7.3.2 Ground Rupture

The project area is not intersected by any known active faults and there is no risk of ground rupture.

8. GEOTECHNICAL ANALYSES AND DESIGN

8.1 Cuts and Excavations

Significant cuts are planned mostly on the left (west) side of the new alignment. In

particular, there is a large cut slope on the left side from approximately Station 6603+00 to Station 6613+00, with maximum height of approximately 110 feet. Based on our field geotechnical exploration (Section 7.2), the subsurface materials at all new cut slopes are competent soils (very stiff to hard clay, dense to very dense sand or gravel) and soft rocks. It is recommended to use 2H:1V slope for all the new cut slopes.

We also recommend benching for only one big cut slope from Station 6603+00 to Station 6613+00. The highest bench elevation is 40 feet above roadway elevation. Please consult Caltrans Maintenance for the width of and access to the bench. For drainage, concrete drainage ditch is required on the bench at the toe of the upper slope. The ditch must be connected to drainage inlet(s) and downdrain(s) to bring the collected water down to roadway level. Please consult District Hydraulics for drainage details.

Based on the LOTBs, bedrock encountered along all the major cuts consisted of intensely to very intensely fractured sandstone, mudstone, and shale. This suggests rippable conditions at all cut locations.

The materials obtained from cuts and excavations may be used for construction of the embankments if they meet the requirement of the Standard Specifications for Imported Borrow. Otherwise, they may be used for contour grading and landscaping purposes.

8.1.1 Grading Factors

Most of the embankment will be constructed from imported borrow. Use 0.95 and 0.90 for earthwork factor for embankment material and native soil (respectively) excavated and reused in embankment construction. Use 1.0 for the earthwork factor for materials obtained from obliteration of existing roadway.

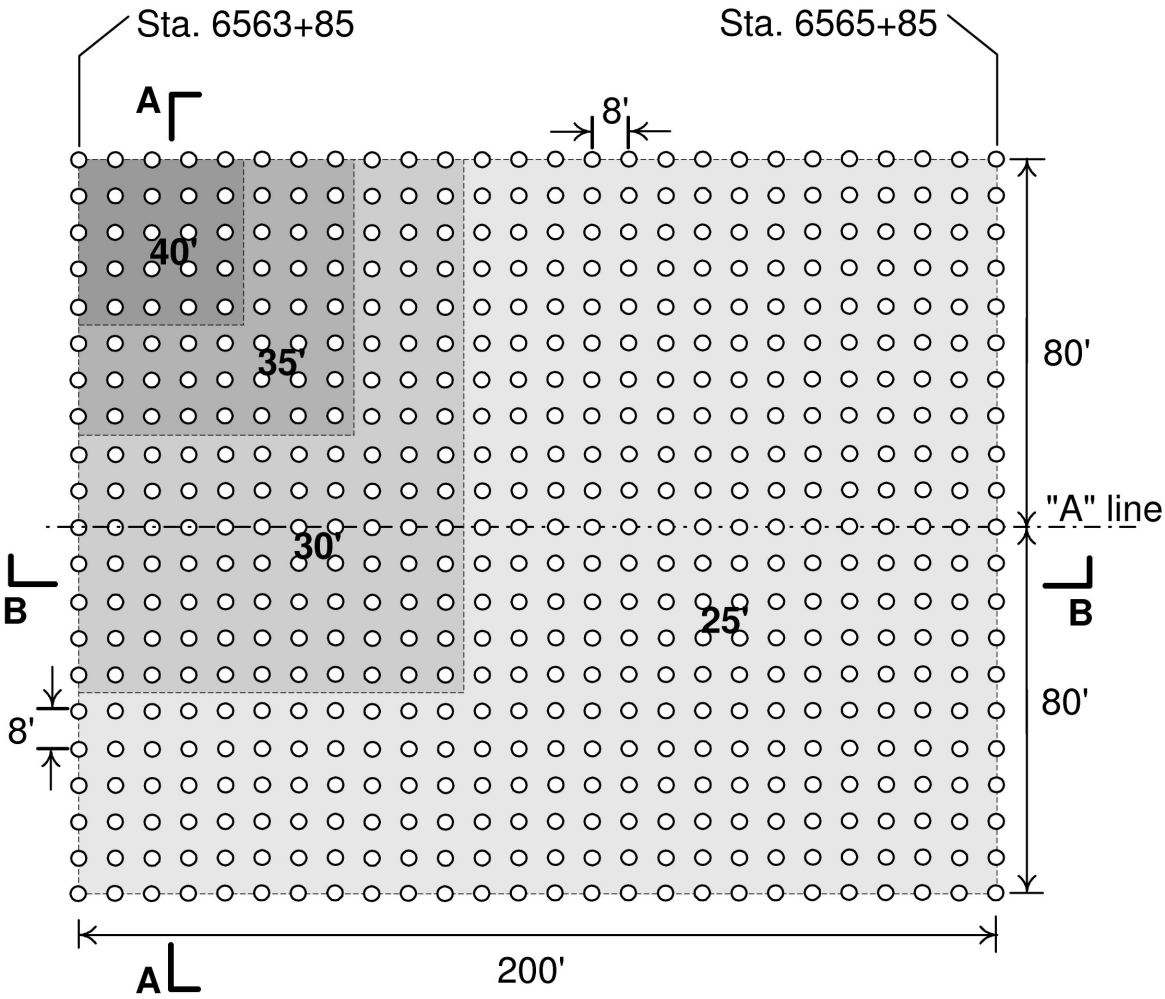
8.2 Embankment Fills

In general, fill material should be a soil or soil/rock mixture that is free of organic matter and other deleterious substances in accordance with Section 19 "Earthwork" of Caltrans Standard Specifications. In addition, imported borrow material should have a minimum R-value of 15. Asphalt concrete and aggregate base that are pulverized to meet the size requirements for fill material could be reused as fill.

We recommend the use of 2H:1V slope for all embankment construction. All fill should be constructed in accordance with Caltrans Standard Specifications Section 19 "Earthwork". Relative compaction of no less than 90% should be achieved in all fill materials, except where 95% is required.

Long-term settlement analysis has been performed to estimate the amount of consolidation settlement of foundation soils under new embankment fill. The settlements range from one inch to over 7 inches. Larger settlements are predicted from Station 6583+00 to 6595+00 where the embankment is higher (25 - 40 feet). This portion of the embankment should be constructed at a controlled rate of no more than 5 feet per week.

Larger settlements are also predicted near the abutments of San Antonio Creek Bridge. We propose to use Rammed Aggregate Pier (RAP) ground improvement technique to minimize consolidation settlement, as well as to mitigate potential liquefaction induced settlement at the north approach embankment. The limits and depths of the improvement areas are shown in Figure 3. The diameter of all RAPs shall be 30 inches with the accepted tolerance specified in the Non-Standard Special Provisions (NSSP) in Attachment A. The gradations for the in-fill open graded stones are also specified in the NSSP. We estimate that an area improvement ratio of 0.077 will be needed (8 feet center-to-center distance).

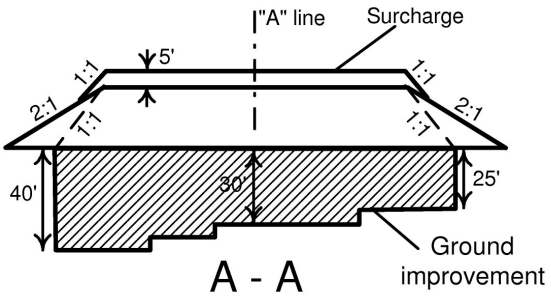


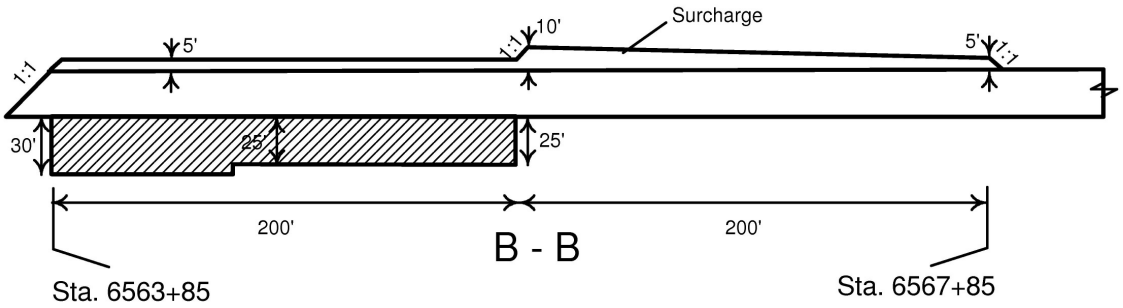
Plan view of ground improvement limits and depths

Notes: 1. Different shades showing zones of different pier lengths.
2. See Figure 4 for cross sections A-A and B-B.

DIVISION OF ENGINEERING SERVICES Geotechnical Design West	**FIGURE 3: LIMITS AND DEPTHS OF GROUND IMPROVEMENT**
	04-MRN-101 PM 27.1/27.6 **04-SON-101 PM 0.0/1.7** **EA 04-264091**
	Marin Sonoma Narrows B-3 Segment

North approach embankment ground improvement and surcharge details (See Figure 3 for plan view)





South approach embankment surcharge profile

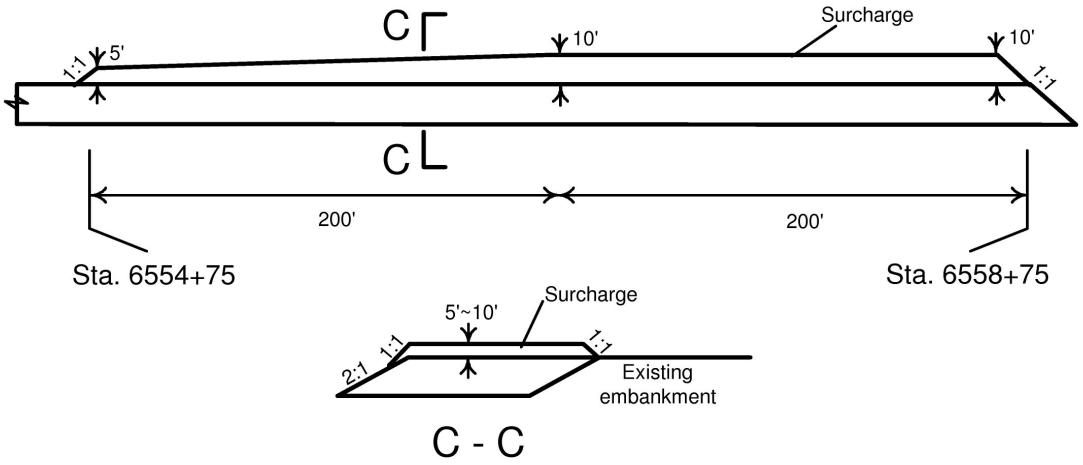


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FIGURE 4: GROUND IMPROVEMENT AND SURCHARGE

04-MRN-101 PM 27.1/27.6
04-SON-101 PM 0.0/1.7

EA 04-264091

Marin Sonoma Narrows B-3 Segment

In addition to ground improvement, we recommend a layer of 5 to 10 feet temporary fill surcharge be placed on top of both approach embankments (Figure 4), for a minimum duration of 3 months to accelerate the settlement and to shorten the consolidation time prior to construction of the structural section. The surcharge fill should meet the requirements of imported borrow, and should be compacted to 90% relative compaction. The fill slope of the temporary surcharge should be 1V:1H or flatter.

8.3 Earth Retaining Systems

Three new retaining walls are proposed within the B-3 segment. These walls are all proposed to be Caltrans Standard Plan walls, as detailed below. However, it is noted that Caltrans Standard Plan walls are only applicable for peak ground accelerations up to 0.6g. The PGA within the project limits is greater than 0.6g. Therefore, checking for seismic loading and/or special design is needed for all three walls.

8.3.1 Retaining Wall No.1

Retaining wall No. 1, from Station 6593+20 to Station 6599+31, is Caltrans Standard Type 1 wall with maximum height of 6 feet. This wall is situated along the existing northbound roadway. Based on borings drilled in the vicinity of the wall (RC-10-014, RC-10-015, RC-10-016), the subsurface materials consists of 5 to 30 feet of stiff to hard sandy lean clay (PP = 1.0 - 4.5 tsf). Using an average cohesion of 2 ksf, the foundation soil has a factored bearing capacity of at least 5.6 ksf (with a resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 1.8 ksf for a 6-foot-high Type-1 retaining wall per Caltrans Revised Standard Plans B3-1A (2012). The computed peak ground acceleration at this location is approximately 0.68g. It is recommended to excavate one foot below the bottom and to each side of the wall footing, and place Structure Backfill at 95% relative compaction. The computed total (immediate and consolidation) settlement is less than one inch.

8.3.2 Retaining Wall No.2

Retaining Wall No. 2, from Station 6533+74 to Station 6537+66, is Caltrans Standard Type 1 wall with wall height varying from 6 to 8 feet. This wall is situated at the existing southbound embankment slope. Based on borings drilled in the vicinity of the wall (A-13-027 and A-13-028), the subsurface materials consists of stiff to very stiff sandy lean clay (PP = 1.5 - 3.5 tsf). Using an average cohesion of 2 ksf, the foundation soil has a factored bearing capacity of at least 5.6 ksf (with a resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 2.3 ksf for an 8-foot-high Type-1 retaining wall per Caltrans Revised Standard Plans B3-1A (2012). The computed peak ground acceleration at this location is approximately 0.67g. It is recommended to excavate one foot below the bottom and to each side of the wall footing, and place Structure Backfill at 95% relative compaction. The computed total (immediate and consolidation) settlement is less than one inch.

8.3.3 Retaining Wall No.3

Retaining wall No. 3 consists of two segments. From Station 6651+56 to Station 6657+00 is Caltrans Standard Type 5 wall with a height varying from 6 to 14 feet. From Station 6657+70 to Station 6658+09 is Caltrans Type 7B wall with a height of 6 feet. This wall is situated to the east of the existing northbound roadway. A 4'x3' box culvert runs through the wall at Station 6654+70. Geotechnical field investigations (A-12-024, A-12-025, and A-13-026) showed that the subsurface soils are stiff to very stiff sandy silt and sandy lean clay with PP values ranging from 1.5 to 3.5 tsf. The existing subsurface condition shall provide sufficient bearing capacity for this wall. Using an average cohesion of 2 ksf, the foundation soil has a factored bearing capacity of at least 5.6 ksf (with resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 4.0 ksf for a 12-foot-high Type-5 retaining wall per Caltrans Revised Standard Plans B3-4A (2012). This is also greater than the required gross uniform bearing stress of 1.0 ksf for a 6-foot-high Type-7B retaining wall per Caltrans Bridge Standard Detail

Sheet xs14-375-2 (2011). The computed peak ground acceleration at this location is approximately 0.7g. It is recommended to excavate two feet below the bottom and one foot to each side of the wall footing, and place Structure Backfill at 95% relative compaction. The computed total (immediate and consolidation) settlement is less than two inches.

8.4 Minor Structures

8.4.1 Overhead Signs

The project proposes one Standard Plan Type VI, truss - single post overhead sign (sign No. A) and one Standard Plan Model 500, truss - single post changeable message sign (sign No. B). Sign No. A is located next to NB shoulder near Station 6637+50. The top of the post foundation is at elevation 71.5 feet. The closest boring to the proposed sign is A-09-005 (Table 1). According to A-09-005, the subsurface soil is mainly stiff to hard sandy lean clay with PP values greater than 1.5 tsf. Sandstone bedrock was encountered at approximately 55 feet elevation. Based on this information, it is recommended that 22 feet standard plan 60-inch CIDH pile be used for this sign. Note that drilling of the CIDH pile may encounter bedrock.

Sign No. B is located next to NB shoulder at Station 6521+30. The top of the post foundation is at elevation 115 feet approximately. The closest boring is A-13-028 (Table 1). According to A-13-028, the subsurface soil is mainly stiff to very still sandy lean clay with PP values greater than 1.5 tsf. Based on this information, it is recommended that 22 feet standard plan 60-inch CIDH pile be used for this sign. It is noted that drilling of the CIDH pile may encounter bedrock.

8.4.2 Culverts

As mentioned in Section 7.1.1, there is a deep existing ditch on the west side of the existing roadway that begins at the toe of a landslide near Station 6601+00, and runs

parallel to the highway southerly to Station 6594+00. This ditch will be buried under the new embankment. We recommend additional underdrain system be installed along the bottom of this to-be-buried ditch to collect potential surface runoff that may seep under the new embankment. The recommended underdrain is shown in Figure 5 below.

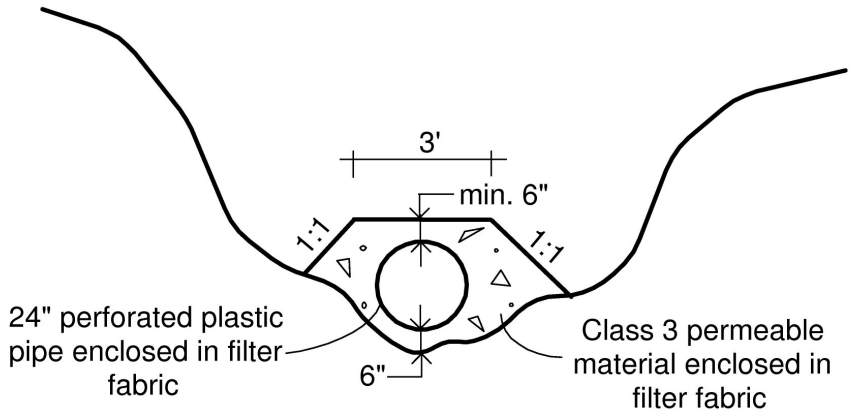

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FIGURE 5: RECOMMENDED UNDERDRAIN AT EXISTING DITCH

04-MRN-101 PM 27.1/27.6
04-SON-101 PM 0.0/1.7

EA 04-264091

Marin Sonoma Narrows B-3 Segment

There is a new 42.7'x4'x3' box culvert extension at Station 6654+40 on "FR" line. For this box culvert extension, we recommend the following (Figure 6): in addition to Standard Plan excavation and backfill requirements for culverts (2010 Standard Plan A62E/A62G): Excavate all material to a minimum depth of one foot below and one foot to each side of the culvert. Place subgrade enhancement geotextile across the bottom of the excavation and replace the excavated material with Structure Backfill at 95% relative compaction.

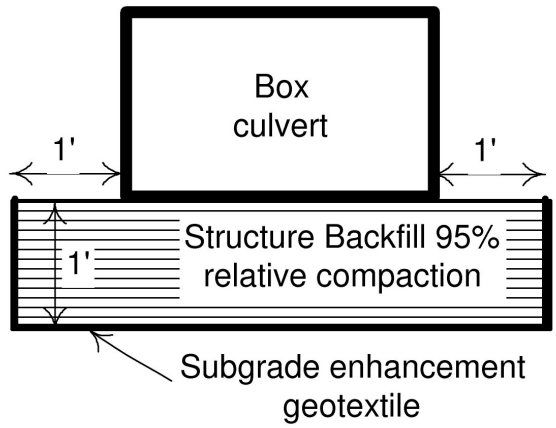

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FIGURE 6: FOUNDATION TREATMENT OF BOX CULVERT

04-MRN-101 PM 27.1/27.6
04-SON-101 PM 0.0/1.7

EA 04-264091

Marin Sonoma Narrows B-3 Segment

9. MATERIAL SOURCES

This section is covered in the Materials Report.

10. MATERIAL DISPOSAL

Excess material shall be disposed of outside State R/W as per Section 19 of the Standard Specifications.

11. CONSTRUCTION CONSIDERATIONS

11.1 Construction Monitoring and Instrumentation

To facilitate the Resident Engineer to determine whether to increase or decrease the duration of settlement periods, we recommend the embankment construction at the San Antonio Creek Bridge approach embankments be monitored. This can be most effectively achieved by installing the Settlement Platforms.

We recommend fluid level settlement platforms be installed at the locations determined in the field by the Geotechnical Engineer. The device should be installed by qualified personnel in accordance with California Test 112, "Method for Installation and Use of Embankment Settlement Devices." The platform of the device should be placed on either the original ground or a working table not more than 2 feet above the original ground.

Representative from our Office should be at the site when installing these instruments. Qualified personnel should monitor and record the amount of the settlement during and after construction is completed. The settlement monitoring interments should be evaluated weekly by the project Geotechnical Engineer to determine the end of the settlement period.

11.2 Differing Site Conditions

Early communication between the Resident Engineer, the Contractor and the Office of Geotechnical Design – West is recommended as soon as differing site conditions are recognized during construction.

See Section 4-1.06 of the Caltrans Standard Specifications for details.

12. APPENDIX

A. Non-Standard Special Provisions (NSSP) for Rammed Aggregate Pier / Stone Column (in 2006 format)
B. Laboratory Test Results

Appendix A

Non-Standard Special Provisions for Rammed Aggregate Piers (2006 Format)

10-1.__ RAMMED AGGREGATE PIERS/STONE COLUMNS

GENERAL

Summary

This work includes specifications for–constructing rammed aggregate piers/stone columns. The work shall commence in advance of the installation of retaining wall footing and construction of embankments at locations shown on the plans, and after the removal of any existing AC and PCC pavements.

Rammed aggregate pier or stone column shall be selected by the Contractor to be used for construction.

Rammed aggregate piers/stone columns shall conform to the details shown on the plans, as specified in these special provisions, and as directed by the Engineer. The work includes the supply of all materials and equipment and the performance of all work necessary for, and incidental to, the densification of the subsurface soils in accordance with the plans and these special provisions, and with additions or deletions as directed by the Engineer. The rammed aggregate piers/stone columns shall extend to the specified elevations as shown on the plans or refusal criteria as specified in these special provisions, and as directed and approved by the Engineer. Foundation recommendations are included in the "Supplemental Project Information," in these special provisions

Comply with Section 7-1.11, “Preservation of Property,” of the Standard Specifications regarding damage from rammed aggregate piers/stone columns operations to existing utilities, improvements and facilities.

Submittals

The Contractor shall submit to the Engineer, for review and approval, the rammed aggregate pier/stone column element layout for the ground improvement area shown on the plan.

Pre-construction Submittals

The Pre-construction submittal for approval of the Engineer shall contain as a minimum:

1. Rammed aggregate pier/stone column elements layout drawings (within the ground improvement area shown on the plans).
2. Working drawings showing the construction sequence and layout of number-identified rammed aggregate pier/stone column diameter, and depths.
3. Detailed drawings of the load test.
4. Access grading plan with any additional erosion control items noted.
5. Sample of rammed aggregate pier/stone column in-fill material or certified test results.
6. Ground movement, vibration, and noise control and monitoring plans.
7. Anticipated maximum and average discharge wastewater flows from the subgrade improvement work.
8. Erosion and sedimentation control procedures in the access grading plan.
9. Type of vibro displacement equipment to be used including dimensions, horsepower and maximum amperage rating (for stone columns).
10. Type of crane including expected boom length and maximum operating height (for stone columns).

The listed submittals and other additional submittals shall conform to the requirements in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and these special provisions.

Quality Assurance

Rammed aggregate pier/stone column construction shall be carried out by a contractor having experience in the supervision and execution of densification by rammed aggregate pier/stone column techniques.

All rammed aggregate pier/stone column work shall be under the direct control of skilled personnel employed by the Contractor and experienced in the use of the equipment. On-site supervisors shall have a minimum two-year experience in rammed aggregate pier/stone column construction, and equipment operators shall have a minimum one-year experience in rammed aggregate pier/stone column construction. The Contractor shall submit a list identifying the on-site supervisors and equipment operators who will be assigned to the project. The list shall contain a summary of each individual's qualifications and experience.

The Contractor shall submit, for review by the Engineer, a statement of the previous work experience similar to that specified in these special provisions. The statement shall include at least 5 successful rammed aggregate pier/stone column projects within the past three years. This statement shall include a written description of each project, contract title and number, owner's name and current phone number, the dates and the extent of the work, the manner of its execution, and any other information that supports the contractor's ability to carry out the work specified in these special provisions.

SITE CONDITIONS

The Contractor shall review the soil subsurface information provided. The soil subsurface information is included in the Plans and "Supplemental Project Information." Information shown represents existing conditions at the specific boring locations at the time the borings were performed.

Difficult rammed aggregate pier/stone column installation is anticipated due to the presence of large blocks of hard rock in a soft clay matrix, loose/soft slide mass, presence of high groundwater, subsurface concrete debris, underground utilities, sound control, vibration monitoring, and traffic control equipment. Subsurface strata may contain rubble, concrete, abandoned foundations, utilities, and other materials obstructing installation of the elements. Known obstructions and areas of known obstructions are indicated in the plans and these special provisions.

The Contractor shall visit the site and carry out all necessary examinations or investigations and shall make independent interpretations of all available information regarding the requirements, limitations, constraints of the work, and the conditions under which the work will be performed. The Contractor shall inspect the site and review available drawings to become fully aware of all existing facilities, underground utilities and site conditions. The Contractor shall promptly notify the Engineer of any ambiguity, inconsistency, or error in the plans and specifications that may be discovered. The Contractor shall be responsible for the completion of any additional site grading required to facilitate the rammed aggregate pier/stone column work, and for access to job site.

MATERIALS

Rammed pier/stone column in-fill aggregate shall consist of hard, durable, angular, clean crushed rock, and shall be free from clay lumps, cementation, organic material, and other deleterious substances. Rammed pier/stone column in-fill shall have a Durability Index of not less than 40 in accordance with California Test Method 229 and shall conform to the following gradation:

Sieve Sizes	Percent Passing by Weight
76.2 mm (3 in)	100
38.1 mm (1-1/2 inch)	90 - 100
25.4 mm (1 inch)	80 - 100
19 mm (3/4 inch)	0 – 85

The in-fill aggregate under the Airport Boulevard approach embankments and the Airport Boulvard/SR101 on-ramp Embankment shall meet the requirement and gradation given above.

For rammed aggregate pier/stone column only, the top 3 feet (minimum) of the in-fill aggregate under the retaining wall footing shall be Class 2 aggregate base. If the groundwater is deeper than 3 feet below the top of aggregate pier under the retaining wall footing, Class 2 aggregate base shall be used as in-fill aggregate above the groundwater. Regardless of the location of groundwater, in-fill aggregate for the bottom lift or bottom bulb shall meet the requirement and gradation given above.

The sieve designations for the gradation shall conform to the ASTM Standards (ASTM C136). Specific gravity and unit weight of rammed aggregate pier/stone column in-fill will be determined by California Test Methods 206 and 212, respectively.

Equipment (Rammed Aggregate Pier)

Special high-energy densification apparatus shall be employed to densify the rammed aggregate pier elements during installation. The apparatus shall apply direct downward impact energy to each lift of the aggregate. Contractor shall use a breaker and tamper capable of developing that impact energy to meet the requirements as determined by the modulus test pier. The tamper shall be beveled, and shall have a minimum energy rating of 2950 pound force-foot (4000 joules of force) per blow. The foot of the tamper shall be at least 25 inches in diameter.

Equipment (Stone columns)

The vibrating probes shall be of the bottom feed type and shall be rated by the manufacturer to provide at least 150 horsepower and 44.1 Kips of horizontal force and designed to penetrate the soil vertically to required depths. The vibrating probes and equipment required for the work shall be in good working order and shall be adequate to densify the soils in accordance with the specified acceptance criteria at the design spacing and to the depths required.

CONSTRUCTION

Test Areas

Before production work, the Contractor shall install rammed aggregate pier/stone column at 2 test areas at locations specified by the Engineer, to evaluate and to facilitate refinement of the method, equipment, and procedure to be used by the Contractor and provide an initial assessment of the rammed aggregate pier/stone column performance.

The test area shall be approximately about 50 by 24 feet and shall use production rammed aggregate piers/stone columns. The rammed aggregate piers/stone columns shall be installed in accordance with the plans at each test area location.

Rammed Aggregate Pier Requirements

Rammed aggregate pier shall be constructed at a maximum spacing of 8 feet center to center under San Antonio Creek Bridge north approach embankment as shown on the approved plans, unless otherwise approved by the Engineer. The diameter of the Aggregate Piers at any depth shall be no less than 30 inches. The thickness of each aggregate lift shall not exceed 16 inches before compaction. The specified minimum aggregate pier diameter and maximum center-to-center spacing is to achieve a minimum area replacement ratio of 7.7% below San Antonio Creek Bridge north approach embankment. The area replacement ratio is calculated as the area of a ground improvement to the tributary area of a single aggregate pier.

Stone Columns Requirements

The Contractor shall not use water jet to aid the advance of the vibrating probe or assist the installation of the stone column. After penetration to the full treatment depth, the vibrating probe shall be slowly retrieved in 1 to 1.5 foot increments to allow in fill placement. The vibrating probe shall be re-driven several times through each increment into a recently treated depth interval to observe amperage build up.

Vibro displacement stone columns shall be constructed at a maximum spacing of 4 feet center to center under the retaining wall footing and 8 feet center to center under the Airport Boulevard approach embankments and Airport Boulevard/SR101 On-Ramp embankment as shown on the approved plans, unless otherwise approved by the Engineer. The diameter of the Vibro displacement stone columns at any depth shall be no less than 30 inches and shall be increased where necessary to achieve the required criteria. The lift thickness of each Vibro lift shall not exceed 42 inches before vibration. The specified minimum Vibro displacement stone column diameter and maximum center-to-center spacing is to achieve a minimum area replacement ratio of 7.7% below San Antonio Creek Bridge north approach embankment. The area replacement ratio is calculated as the area of a ground improvement to the tributary area of a single column.

Contractor shall facilitate automated real time data collection and monitoring systems to record and monitor vibration energy and stone column volume as a function of depth in each column. The systems shall be operational to the satisfaction of the Engineer prior to beginning the installation of stone column work station used. The systems, as a minimum, shall monitor and record continuous depth of probe in feet of:

1. **Power consumption of vibrating probe (Amperage), or other equipment specific parameters which are measures of penetration resistance and densification; and**
2. **Weight Volume of processed in fill material and stone column diameter in English units.**

The Contractor shall provide to the Engineer an electronic copy of the data and a graphic printout of the key parameters as part of the daily log of each stone column construction. The daily log shall be delivered to the Engineer the next working day. The recorded data and graphic printout log shall identify the date, name, location, equipment used, and the equipment operators.

Rammed Aggregate Pier Testing

Aggregate pier modulus load test(s) shall be performed at two locations under San Antonio Creek Bridge north approach embankment. The locations shall be approved by the Engineer. The modulus load test shall be performed on the neat diameter of the aggregate pier. Each modulus test shall be performed to a maximum of 120% of the design load on a 30 inch diameter aggregate pier. The design load is 40 kips.

ASTM D1143 shall be used as a guide to establish load increments, load increment duration, and load decrements. A telltale shall be installed at the midway point and at the bottom of the test pier so that the mid point and bottom of the pier deflections may be determined. The deflection at the bottom of the pier shall be no more than 20 percent of the top of pier deflection at the design stress level.

Modulus test shall be performed in accordance with the requirements outlined in the contractor's submittal and these special provisions. The modulus test results shall exceed the minimum modulus of 150 psi/inch at 100% design load. The tamping time, aggregate lift thickness, and production schedule will be determined by the contractor and approved by the Engineer based on the results of the modulus testing. If the modulus, as determined form the test result, is less than that shown on the plans, the rammed aggregate pier elements design may need modifications including changes to the shaft length and diameter. All such changes will be approved by the Engineer.

After completion of the bottom rammed aggregate pier bulb (lift), the energy source shall be turned off and the bottom stabilization verification test (BST) shall be performed as follows:

1. **Place a reference bar over the rammed aggregate pier cavity and measure to a reference point on the tamper shaft that has been left on top of the aggregate bulb (lift).**
2. **After ramming the bottom lift, wait 60 seconds and then apply the installation energy for 15 seconds.**
3. **Measure the vertical deflection of the tamper shaft. If the vertical movement is greater than 150 percent of the movement achieved during the modulus test BST, energy shall be applied to re-densify the bulb. The procedure for measuring shall then be repeated. If there is still movement, a lift of aggregate may be placed on top of the bottom bulb and the BST shall be performed on this second lift after it is densified. If there is movement on the second lift, a third lift shall be placed and tested.**
4. **Movement shall be limited to less than 150 percent of the values recorded during the modulus test installation before completion of the lower half of the pier shaft.**

Stone Columns Verification Testing

Verification that the specified densification has been improved and achieved shall be determined following treatment of initial test column areas and at regular intervals thereafter by the Contractor. Cone penetration test method, performed in accordance with ASTM Designation: D-3441, shall be used for verification testing. Cone penetration tests shall be performed by cone penetration equipment that are capable of penetrating the soil vertically to the stone column tip elevation shown on the plans.

A comparing set of two cone penetration tests, one before the stone column installation, and the other after the stone column installation, shall be performed for each 1550 square feet of stone column area respectively to monitor the magnitude of soil improvement by stone columns. Locations of cone penetration tests within each comparing set shall be

placed no more than 10 feet apart. Each cone penetration test shall be centered between a group of 3 or 4 adjacent stone columns that are arranged in a pattern similar to the corner of a polygon with nearly equal sides. The location of cone penetration tests shall be approved by the Engineer and shall be recorded on the as-built layout plan.

One Additional cone penetration test shall be performed for each 3100 square feet of stone column area after stone column installation, at random with locations identified by the Engineer during construction. Additional cone penetration test locations and cone penetration tests may be required as directed by the Engineer where the method of densification is changed.

Compensation for required additional cone penetration tests ordered by the Engineer required where the method of soil densification is changed will be paid for as extra work as provided in Section 4-1.05, "Changes and Extra Work," of the Standard Specifications.

In cone penetration tests, cone tip resistance, q_c; sleeve friction, f_s; and pore water pressure, U; shall be measured at 2 inch depth increments, or less, throughout the length of the test probes.

In cone penetration tests, normalized corrected cone tip resistance will be calculated using the following formula, Qc, sleeve friction, f_s, and pore water pressure, U, shall be measured at 2 inch (50 mm) depth increments, or less, throughout the length of the test probes.

$$q_T = q_c + (1-a)*u_{bt}$$

$$a = d^2/D^2$$

where
q_T is corrected cone tip resistance, psi
q_c is cone tip resistance, psi
d is diameter of load cell support, ft
D is diameter of cone, ft
u_{bt} is pore water pressure reading behind the cone tip, psi, measured at depth increments of 2 inch or less

The acceptance criteria for foundation ground improvement will include the following: The minimum corrected q_T value as measured in the center of any equilateral triangle formed by the stone column pattern, shall be no less than 1160 psi (84 tons per square foot). The average cone tip resistance values over a 5-feet depth interval shall be no less than 1450 psi (110 tons per square foot).

All strata, seams, lenses or pockets of soils exhibiting a Soil Behavior Type Index, I_c, greater than 2.6 will not be included in the calculation of the average corrected cone tip resistance. The Soil Behavior Type Index, I_c, shall be calculated based on the formula presented by Jefferies and Davies in the paper "Estimation of SPT N values from the CPT" ASTM, 1993.

If the cone penetration tests indicate the specified criteria have not been met, the Contractor shall perform additional cone penetration tests, as directed by the Engineer, to define the limits of the area of failing to meet the criteria. Additional stone columns shall be installed in areas in which the specified criteria are not met. Additional stone columns shall be centered between groups of 3 or 4 already installed stone columns. Additional cone penetration tests required by the Engineer will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. Additional stone columns

will be installed at the Contractor's expense. Additional cone penetration tests will be conducted at the Contractor's expense.

Site Grading

The working site grade at the time of Notice to proceed will be that as shown in the plans.

The Contractor shall be responsible for the completion of any additional site grading required to facilitate the rammed aggregate pier/stone column work, and to provide for access to the jobsite. In addition, the Contractor shall be responsible for the preparation of any required working platforms or earth berms related to sediment control.

Layout and Scheduling

The Contractor shall accurately set out the compaction points at the site, in accordance with the plans, or approved construction drawings. The Contractor shall locate and construct the rammed aggregate piers/stone columns with a deviation not to exceed 4 inches horizontally from the positions shown on the plans or on the approved Contractor's alternative plans and at any other additional or alternative locations as specified by the Engineer. The completed rammed aggregate piers/stone columns shall not deviate by more than 2 inches in 10 feet vertically. Diameter of the rammed aggregate piers/stone columns shall not be more than 10 percent below the planned diameter. The Contractor shall be responsible for the design of the layout plans and all required construction details, surveying, and staking.

Vibration, Ground Movement, Noise Control, and Monitoring

The Contractor shall carry out the work without damaging existing structures and services by excessive vibration, by inducing vertical or lateral ground movements beneath or adjacent to them, by the rise of groundwater levels, or by the off-site discharge of unacceptable waste water and/or sediment.

The Contractor shall take adequate precautions such that vibration and ground movement from rammed aggregate pier/stone column installation will not cause undue interference or damage to neighboring properties or buildings. Monitoring system shall be incorporated into the noise control and monitoring plan submitted as a part of the Pre-construction submittal. The Contractor shall submit the Pre-construction submittal for the Engineer's approval at least 15 days prior to beginning of work. The Contractor shall install the monitoring systems according to the approved plan. The Contractor shall monitor ground movement, ground vibrations, and noise level during the operation of the rammed aggregate pier/stone column equipment and monitor ground movement throughout the duration of the construction.

Erosion and Sedimentation Control features shall be incorporated into the access grading plan submitted as a part of the Pre-construction submittal.

When and if, in the opinion of the Engineer, ground vibrations, movements or noise from rammed pier/stone column installation adversely affect the project and neighboring properties and buildings, the Engineer may direct the Contractor to use alternative methods or procedures. Alternate methods shall be subject to the prior approval of the Engineer, but shall remain the responsibility of the Contractor.

Based on the results of the verification testing and subject to the discretion of the Engineer, rammed aggregate piers/stone columns addition to or deletion from those indicated on the approved drawings may be required to achieve ground improvement

requirements. The Engineer will advise the Contractor as to the location and depth of any additional or deleted rammed aggregate piers/stone columns. With the possible exception of the area replacement ratio density and spacing criteria, the construction of the additional rammed aggregate piers/stone columns shall be in accordance with these special provisions. If the approved drawings are based on the Contractor's alternative plan, the Contractor shall determine the location and depth of any additional or deleted rammed aggregate piers/stone columns and submit the changes to the Engineer for approval.

Following verification testing of the initial test pattern of rammed aggregate piers/stone columns to achieve the specified densification criteria, the Contractor may be required to adjust the construction methodologies and/or the spacing and/or the arrangement of rammed aggregate piers/stone columns to achieve the specified densification criteria. Additions to, or deletions from the total number of rammed aggregate piers/stone columns may also be required.

Site Cleanup

The Contractor shall be responsible for removal from the site, and satisfactory disposal off-site, of all deleterious materials, including silt, organic material, sediment, disturbed materials, and construction debris.

Heave and/or collapse of the ground surface at the work site may result from the densification effort, by rammed aggregate pier/stone column construction. Restoration of the area of treatment and adjoining areas affected by the work shall be the responsibility of the Contractor, unless otherwise approved by the Engineer.

All cavities, depressions, and irregularities, resulting from the Contractor's activities, shall be repaired by grading and compacting the area to match the surrounding terrain.

The cost of such site cleaning and restoration shall be considered incidental to the prices bid for the work in this Contract, and no additional payment will be made.

Removal of AC and PCC pavement

Before the installation of rammed aggregate piers/stone columns, all AC and PCC pavement shall be removed from the areas shown on the plans to receive rammed aggregate piers/stone columns. The Contractor shall be responsible for removal from the site, and satisfactory disposal off-site, the removed pavement as directed by the Engineer.

Disposal of PCC pavement grooving, grindings and boring residues shall comply with "Disposal of Portland Cement Concrete (PCC) Pavement Grooving and Grinding Residues" in these special provisions.

Field Records for Rammed Aggregate Piers/Stone Columns

The Contractor shall maintain the following field records for each rammed aggregate pier/stone column:

1. **Identification and location.**
2. **Date and time required for completion.**
3. **Elevation of the ground surface immediately before and after completion.**
4. **Pier/stone column length and drilled diameter.**
5. **Average lift thickness of each rammed aggregate pier.**
6. **Elevation of and depth to the lowest penetration level of each stone column vibro-displacement probe.**
7. **Quantity of stone used per lineal foot of each stone column.**

8. **Maximum vibration energy (indicated by electrical current output) vs. depth throughout the entire duration of each vibro-displacement process.**
9. **Type and size of equipment used.**
10. **Depth of groundwater and any unusual conditions encountered.**
11. **Monitored vibration, ground movement, and noise levels.**

The Contractor shall provide the Engineer with a copy of all the field records at the next day of production, for all of the rammed aggregate piers/stone columns installed on the previous day.

Wastewater

Wastewater from the rammed aggregate pier/stone column construction operations shall not be permitted to enter local drainage systems or wetlands, and shall conform to "Construction Site Management" and "Temporary Active Treatment System" in these special provisions. Erosion and Sedimentation Control features shall be incorporated into the access grading plan submitted as a part of the Pre-construction submittal. All surface runoff and water from dewatering operations shall be captured and conveyed to the storm water detention and treatment sites. No direct discharge to adjacent drainage systems or surrounding wetlands will be allowed.

As part of the pre-construction submittal, the Contractor shall state the anticipated maximum and average discharge wastewater flows from the rammed aggregate pier/stone column work.

Silty material and other debris washed out of the soil during the densification process shall be disposed of as provided in Section 19-2.06, "Surplus Material" of the Standard Specifications, and must not be incorporated into the work and or allowed to contaminate the site soil.

Acceptance

Acceptance of the rammed aggregate pier/stone column work will be based on review by the Engineer of the verification test results in conjunction with the Contractor's daily record sheets indicating compliance with the performance criteria and materials requirements specified herein.

If a zone of ground improvement area fails to meet the performance specification, the Contractor shall continue to work to achieve the required performance and may employ any methods that are acceptable by the Engineer in order to attain the required performance.

MEASUREMENT AND PAYMENT

Rammed aggregate piers/stone columns, including piers/stone columns in test areas, will be measured and paid for by the linear feet of the sizes listed in the Engineer's Estimate. The quantity to be paid for shall be the depth of rammed aggregate pier/stone column installed between the top and bottom elevations of the rammed aggregate pier/stone column as shown on the approved plans, or ordered by the Engineer.

The contract prices paid per linear foot of the sizes listed in the Engineer's Estimate for rammed aggregate piers/stone columns shall include full compensation for furnishing all materials, labor, tools, equipment and incidentals and for doing all the work involved in rammed aggregate piers/stone columns, complete in place, including ground improvement area layout plans, monitoring, predrilling and backfilling for predrilled holes, site clearing

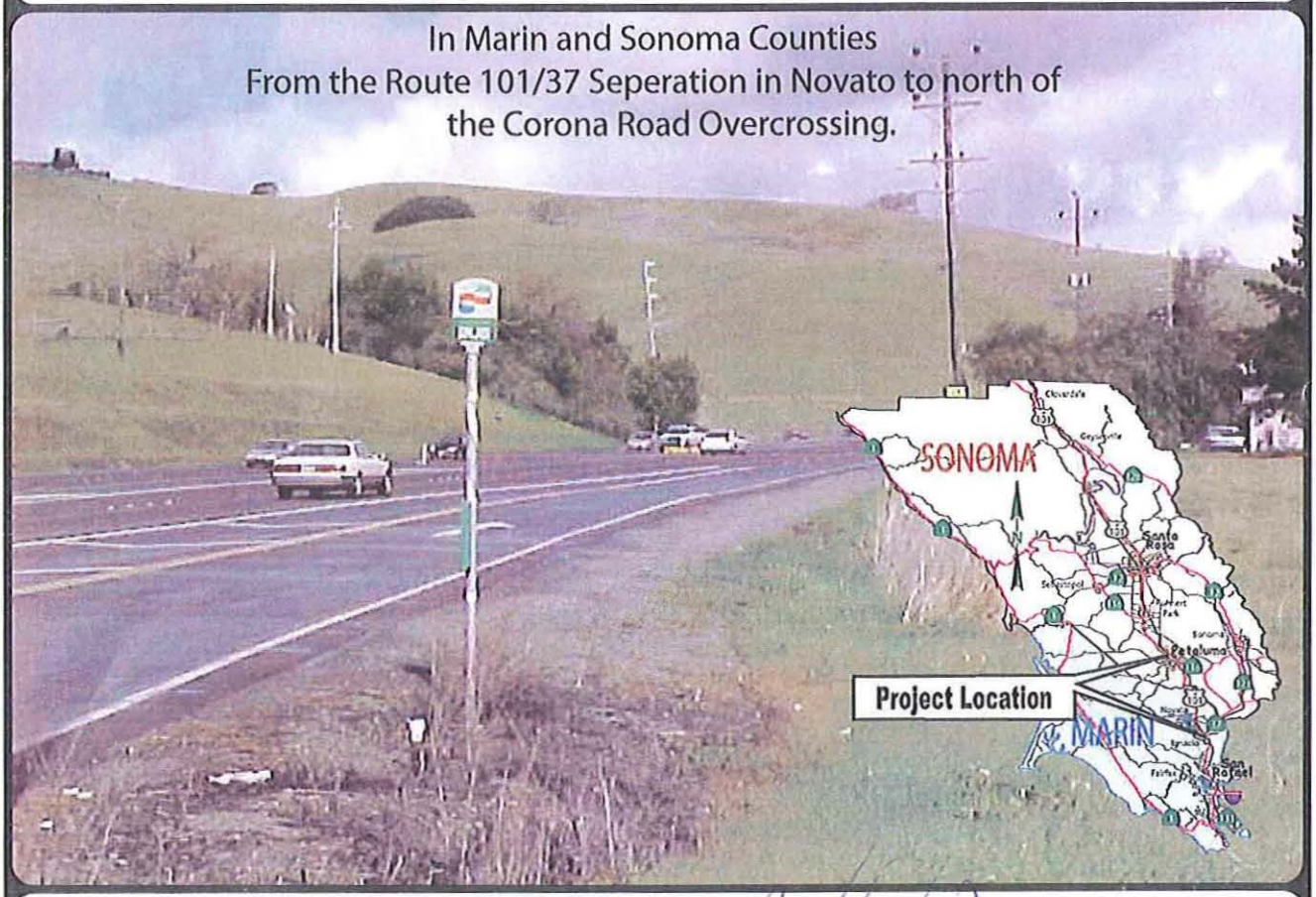
and restoration, field records, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Full compensation for removal and disposal of AC and PCC pavement from the rammed aggregate pier/stone columns work shall be considered included in the contract prices paid per linear foot of the sizes listed in the Engineer's Estimate for rammed aggregate piers/stone columns, and no additional compensation will be allowed therefore.

Mrn-101 KP 30.0/44.5 (PM 18.6/27.6)
Son-101 KP 0/11.5 (PM 0/7.1)
04-264000
October 2007

DRAFT PROJECT REPORT
ROUTE 101 - MARIN / SONOMA NARROWS

In Marin and Sonoma Counties
From the Route 101/37 Seperation in Novato to north of
the Corona Road Overcrossing.



I have reviewed the right of way information contained in this Draft Project Report and the R/W Data Sheet attached hereto, and find the data to be complete, current and accurate:

for R.A. MACPHERSON
Deputy District Director
Division of Right of Way, District 4

APPROVAL RECOMMENDED:

for JIT PANDHER
Regional Project Manager

APPROVAL:

HELENA (LENKA) CULIK-CARO
Deputy District Director - Design, District 4

10/9/07
Date

This Draft Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

10/1/07

John L. Martin, P.E.
Registered Civil Engineer

Date

REGISTERED PROFESSIONAL ENGINEER
JOHN L MARTIN
No. 47576
Exp. 12/31/07
CIVIL
STATE OF CALIFORNIA

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GLOSSARY OF TERMS

ABAG	Association of Bay Area Governments		OH	Overhead (Bridge over Railroad)
AC	Asphalt Concrete		PA&ED	Project Approval and Environmental Document
ADA	Americans with Disabilities Act		PAG	Policy Advisory Group
ADL	Aerially Deposited Lead		PCR	Project Change Request
AH	Ahead		PDT	Project Development Team
APS	Advance Planning Study		PID	Project Initiation Document
BMP	Best Management Practice		POC	Pedestrian Overcrossing
BK	Back		PSR	Project Study Report
CEQA	California Environmental Quality Act		RAC	Rubberized Asphalt Concrete
CHP	California Highway Patrol		RCB	Reinforced Concrete Box Culvert
CMIA	Corridor Mobility Improvement Account		RTP	Regional Transportation Plan
COZEEP	Construction Zone Enhanced Enforcement Patrol		SB	Southbound
DED	Draft Environmental Document		SCT	Sonoma County Transit
EIR/EIS	Environmental Impact Report/ Environmental Impact Study		SCTA	Sonoma County Transportation Authority
EMS	Extinguishable Message Sign		SIP	State Implementation Plan
FEMA	Federal Emergency Management Agency		SHELL	State Highway Extra Legal Load
FHWA	Federal Highway Administration		SHP	State Historic Park
FRTIP	Federal Regional Transportation Improvement Program		SMART	Sonoma Marin Area Rail Transit
GGT	Golden Gate Transit		SOH	Separation & Overhead
HOT	High Occupancy Toll		SOV	Single Occupancy Vehicle
HOV	High Occupancy Vehicle		SR	State Route
IC	Interchange		Sta	Station
ITIP	Inter-regional Transportation Program		STAA	Surface Transportation Assistance Act
ITS	Intelligent Transportation Systems		STIP	State Transportation Improvement Plan
K-rail	Temporary Concrete Railing		SWDR	Storm Water Data Report
LOS	Level of Service		SWPPP	Storm Water Pollution Prevention Plan
MCTD	Marin County Transit District		TAM	Transportation Authority of Marin
MOU	Memorandum of Understanding		TASAS	Traffic Accident Surveillance and Analysis System
MSN	Marin-Sonoma Narrows		TCE	Temporary Construction Easement
MTA	Mendocino Transit Authority		TCM	Transportation Control Measures
MTC	Metropolitan Transportation Commission		TCRP	Traffic Congestion Relief Program
NB	Northbound		TMP	Transportation Management Plan
NEPA	National Environmental Policy Act		TOS	Traffic Operations Systems
NOI	Notice of Intent		TSM	Transportation Systems Management
NOP	Notice of Preparation		UC	Undercrossing (Street under Freeway)
NPDES	National Pollutant Discharge Elimination System		US	United States Highway
NWP	Northwestern Pacific Railroad		VA	Value Analysis
OC	Overcrossing (Street over Freeway)			

SECTION 1 - INTRODUCTION

The Marin-Sonoma Narrows (MSN) HOV Widening Project proposes to add High Occupancy Vehicle (HOV) Facilities to United States Highway (US) 101 from the junction of State Route (SR) 37 in the City of Novato to just north of the Corona Road Overcrossing (OC) in the City of Petaluma, a distance of approximately 25.7 km (16.0 mi). The project limits have been divided into three segments, corresponding to the type of existing facility. Segments A & C consists of the existing freeway in the cities of Novato and Petaluma, respectively. Segment B is the existing expressway between the two cities. There are two build alternatives being studied: Fixed HOV lanes throughout the project limits; and fixed HOV lanes thru the cities of Novato and Petaluma and a reversible HOV lane between the two cities. A Location Map is included as Attachment B.

Through Segment B, locally referred to as the "Novato Narrows," it is proposed to upgrade the existing facility from an expressway, with at-grade intersections and driveway access, to a freeway, with interchanges and frontage roads to provide access to intersecting roadways and adjacent parcels. There are four Access Options being studied within this segment, varying in the locations of proposed interchanges, frontage roads and bikeways. The project will also improve the safety of the route by increasing visibility (sight distance), improving drainage to address recurring flooding and providing wider shoulders for emergencies.

The project costs for the build alternatives were estimated in June 2007 and vary from $746.6 million to $750.6 million, depending on alternative and access option. These escalated costs include $541.3 million to $545.7 million for construction, $51.9 million for Right-of-Way and Environmental mitigation, and $153.4 million to $154.3 million for support. The estimated construction cost for each build alternative is shown in Table 5-7 in Section 5. Phased construction of this project is proposed, with funding from a combination of programs beginning in the 9/10 FY including STIP, CMIA, TCRP, Sonoma County Local Measure M, SAFETEA-LU, and TEA21 Demonstration. The project has been assigned the Project Development Processing Category 1 because it requires substantial new right of way, access control and new Freeway Agreements.

SECTION 2 - RECOMMENDATION

Approval is recommended to publicly circulate the Draft Environmental Document (DED) and schedule public hearings in the "open house" format.

SECTION 3 - BACKGROUND

3.1 - Project Background

The MSN Project was originally programmed as three separate projects that were initiated to achieve the corridor goal of reducing recurring congestion using a multi-modal approach. To continue the individual characteristics of these original programming documents, three segments were created in the MSN Project, corresponding with the existing facility types and limits of the original Project Initiation Documents (PIDs):

- The Project Study Report (PSR) for Segment A of the project (04-28200K) was approved on April 24, 2001, and proposes HOV operational improvements to the existing freeway portion of US 101 in Marin County, in the city of Novato from 0.5 km (0.3 miles) south of the Route 101/37 separation to 1.4 km (0.9 miles) north of Atherton Avenue interchange (IC). This segment is 6.8 km (4.2 miles) in length. The estimated construction cost was $75 million with a total project cost, including R/W and support, of $94 million.

- The PSR for Segment B of the project (04-26400K), locally referred to as the "Novato Narrows," was approved on January 29, 1999, and proposes HOV operational improvements and upgrading the existing expressway portion of US 101 to a controlled-access freeway from 1.4 km (0.9 miles) north of the Atherton Avenue IC in the city of Novato, Marin County, to 0.2 km (0.1 miles) south of the Lakeville Highway/SR 116 Interchange in the city of Petaluma, Sonoma County. The expressway-to-freeway conversion will improve traffic flow and safety by providing interchanges and replacing access, improving visibility, providing wider shoulders and emergency pullouts, and eliminating recurrent flooding. This segment 13.1 km (8.1 miles) in length. The estimated construction cost was $170 million with a total project cost, including R/W and support, of $216,166,000.

- The PSR for Segment C of the project (04-28112K) was approved on August 3, 2001, and proposes HOV operational improvements to the existing freeway portion of US 101 in Sonoma County from 0.2 km (0.1 miles) south of the Lakeville Highway/SR 116 Interchange in Petaluma to 0.5 km (0.3 miles) north of the Corona OC in Petaluma. This segment is 5.8 km (3.7 miles) in length. The estimated construction cost was $63 million with a total project cost, including R/W and support, of $72,085,000.

As these PIDs were finalized, Caltrans and its partner agencies, the Federal Highway Administration (FHWA), the Transportation Authority of Marin (TAM) and the Sonoma County Transportation Authority (SCTA), realized the benefits of combining the three projects into a single study area to address potential cumulative impacts in a comprehensive Environmental Impact Report/Environmental Impact Statement (EIR/EIS). A Project Change Request (PCR) was prepared to combine the study limits under EA 04-264000. Approval of this PCR is pending. Studies on this combined project were initiated with a strong emphasis on pursuing early detailed studies (change control) for: surveys, aerial photography, stage construction, geotechnical work, bridge studies, and utility mapping.

The formal environmental process was initiated when the Notice of Preparation (NOP) was published in the Governor's Office of Planning and Research State Clearinghouse on April 23, 2001. This was followed by the publication of the Notice of Intent (NOI) in the Federal Register on May 2, 2001.

Project development during the PID and Project Approval & Environmental Document (PA&ED) phases utilized the International System of units (Metric). Per current Caltrans policy, the final design will use U.S. Customary Units (English). This document, where

appropriate, contains dual dimensions to indicate the English dimension to be used in the construction documents.

3.2 - Route History

US 101 was originally constructed in 1917 as a two-lane highway, utilizing Redwood Boulevard through the City of Novato and Petaluma Boulevard through the City of Petaluma. It functioned in this capacity until 1929, when the placement of a new San Antonio Creek Bridge allowed expansion to a four-lane divided highway. In the mid- to late 1940s, the newest San Antonio Creek Bridge was constructed, allowing upgrade to the four-lane expressway that we still see today between Novato and Petaluma.

That route configuration remained until the growth of local traffic forced modifications that moved through-traffic out of downtown Novato and Petaluma. This was accomplished with the freeway construction during the mid-1950s in Petaluma and the early 1970s in Novato. A variety of rehabilitations, operational improvements and safety improvements have brought us to the route that we see today.

3.3 - Existing Facility

The individual characteristics of the existing facilities vary significantly along this portion of the US 101 corridor, from urban freeway to rural highway. Caltrans' 2003 congestion monitoring studies indicate that recurrent delays occur within the study limits during the AM peak traffic period on the southbound US 101 and during the PM peak traffic period on northbound US 101. The results of these studies indicate that traffic demands for some study area roadway sections are either at or exceed their existing capacities. Consequently, congestion occurs at the approaches to several critical bottleneck locations. The roadway within the project limits has been rehabilitated several times with varying methods, culminating in a relatively smooth riding surface.

3.3.1 - Existing Facility Adjacent to the Project Limits:

- US 101 south of the project limits is an eight-lane freeway with fenced access control and a 6.6 m (22 ft) paved median with a concrete barrier. It includes a contiguous HOV lane in both directions. Monday through Friday, HOV lane traffic is restricted to vehicles with two or more persons, and motorcycles and permitted fuel efficient vehicles between 6:30 and 8:30 a.m. in the southbound direction and between 4:30 and 7:30 p.m. in the northbound direction. Outside of these periods HOV lanes are open to mixed-flow traffic.

- US 101 north of the project limits is a four-lane freeway with fenced access control and a 6.6 m (22 ft) non-paved median containing a double thrie-beam barrier. Studies for upgrading this facility, similar to the scope of the MSN Project, are ongoing under 04-0A1800.

3.3.2 - Existing Facility within the Project Limits:

DS 70mph

- Segment A of the project through the City of Novato is a six-lane freeway with fenced access control, typically comprising three 3.66 m lanes in each direction, 3.0 m (10 ft) outside shoulders and 1.5 m (5 ft) inside shoulders. The majority of the existing curves in this segment meet current horizontal alignment, vertical profile and sight distance requirements for the 110 km/h (70 mph) corridor design speed. The non-paved median varies in width from 8.5 m (28 ft) to 13.7 m (45 ft) and contains a double thrie-beam barrier. The majority of the drainage facilities through this segment can be utilized for the MSN Project with only minor modifications; no historical drainage issues or recurring flooding has been documented.

- Segment B of the project is a four-lane expressway with two 3.66 m lanes in each direction. Much of the existing facility in this segment does **not** meet current horizontal alignment, vertical profile and sight distance requirements for the 110 km/h (70 mph) corridor design speed. The shoulders are variable width, with the outside shoulders varying from 1.5 m to 2.4 m (5 to 8 ft) and the inside shoulders varying from 0.6 m to 1.2 m (2 to 4 ft). The non-paved median varies in width from 3.4 m (11 ft) to 15.5 m (51 ft) and contains a double thrie-beam barrier. Local traffic accesses the expressway utilizing 31 driveways and seven (7) at-grade intersections. Although access control has not been purchased for this portion of the route, privately owned fencing adjacent to the State right of way does exist. The majority of the drainage facilities through this segment must be replaced or upgraded due to their age, capacity or condition. There are two locations where roadway flooding has historically recurred.

- Segment C of the project through the City of Petaluma is a four-lane freeway with fenced access control, 3.66 m traffic lanes, 3.0 m (10 ft) outside shoulders and 1.5 m (5 ft) inside shoulders. The majority of the existing curves in this segment meet current horizontal alignment, vertical profile and sight distance requirements for a 110 km/h (70 mph) design speed. The non-paved median varies in width from 8.6 m (28 ft) to 10.5 m (35 ft) and contains a double thrie-beam barrier. The majority of the drainage facilities through this segment can be utilized with only minor modifications. Localized flooding has historically been a problem west of the freeway in the City of Petaluma.

- The existing structures within the project limits are shown in Table 3-1 below.

Table 3-1. Existing Structures

Bridge Number	Bridge Name	KP	Length (m)	Width (m)	Vertical Clearance (Railroad) (m)	Year Built (Widen)
27-0081H	Ignacio Separation & OH	30.5	322.8	10.4	5.59	1964
27-0081F	W37/N101 Connector OH	30.5	201.8	8.0	6.15	1964
27-0085F	S101-E37 Connector	30.4	93.0	10.4	5.69	1964
27-0108H	Ignacio OH	30.5	221.6	10.4	6.27(8.20)	1964
27-0086K	South Novato Blvd. OC	30.5	48.8	8.0	4.92	1964
27-0088	Rowland Blvd OC	R32.5	332.2	27.6	5.11	1974
27-0089R/L	Novato Creek	R33.0	58.5	18.5 R, 16.1 L	N/A	1974
27-0090R/L	Franklin Ave OH	R33.7	117.3	16.1 R, 19.1 L	(7.13)	1974
27-0091	De Long Ave OC	R34.0	67.4	29.2	5.15	1974
27-0103Y	De Long Ave OH	R34.0	67.1	22.6	(7.80)	1974
27-0092R/L	Olive Ave UC	R34.5	38.1	16.1 R & L	4.65	1974
27-0093	Atherton Ave OC	R35.4	71.3	28.3	5.26	1974
27-0104Y	Atherton Ave OH	R35.4	35.7	25.0	(7.05)	1974
27-0101	North Rush Creek RCB	R35.4	116.0	7.9	N/A	1974
27-0100	Rush Creek (S Branch)	R35.5	8.8	44.5	N/A	1974
27-0094R/L	North Novato OH	35.9	135.6	16.1 R & L	(7.15)	1974
27-0115	Redwood Landfill OC	40.8	77.2	10.5	5.48	2007
27-C0051	S. San Antonio Creek	N/A	30.8	8.5	N/A	1917
20-0019R/L	San Antonio Creek	44.5/0.0	36.6	12.2 R, 10.1 L	N/A	1947
20-0156R/L	South Petaluma UC	5.6	43.0	10.3 R & L	4.57	1956
20-0154R/L	Petaluma River	5.3	270.1	9.6 R & L	21.33#	1955
20-0155L*	Route 101/116 SOH	5.8	162.8	9.7	4.72(6.92)	1956(2007)
20-0155R	Route 101/116 SOH	5.8	195.4	9.7	5.23(7.77)	1956
20-0245	Caulfield Lane OC	6.4	75.0	18.9	5.26	1974
20-0247	Kenilworth School POC	7.3	197.2	3.2	5.64	1971
20-0246	East Washington St OC	7.7	76.2	27.6	5.18	1975
20-0163R/L	Washington Creek	7.7	20.4	16.4 R, 13.0 L	N/A	1955
20-0164K	Washington Creek S/B Off	7.7	36.6	8.4	N/A	1955
20-0162R/L	Lynch Creek	8.3	24.1	13.0 R & L	N/A	1955
20-0158R/L	North Petaluma OH	9.3	96.9	12.1 R & L	(7.57)	1955(94)
20-0160	Corona Rd OC	11.0	107.0	10.6	5.11	1955

*Project currently under construction that should be completed prior to PA&ED of MSN.
Clearance over waterway

3.3.3 - Multi- Modal Facilities:

- Bike and Pedestrian Facilities – Bicyclists and pedestrians are not permitted on US 101 in the Segments A & C; there are alternate parallel routes on local streets. Access across US 101 is provided at interchanges throughout the corridor. Through Segment B bicyclists and pedestrians utilize the shoulder of the expressway.

- Buses - Transit service along the corridor is provided by several entities, including Golden Gate Transit, Marin County Transit, Sonoma County Transit and Petaluma

Transit. Golden Gate Transit, with an annual patronage of nearly nine million riders, is the primary provider of bus transit services in Marin County. It provides both intra-county trips and travel between Marin, Sonoma, San Francisco and Contra Costa counties. The Marin County Transit District currently contracts with Golden Gate Transit and Whistlestop Wheels to provide four different types of service, including local fixed route services, supplemental school services, rural service and paratransit service. Petaluma Transit provides local service in the city of Petaluma and connections to Sonoma County Transit, which provides for intercity trips.

- Rail - The Sonoma Marin Area Rail Transit (SMART) / Northwest Pacific (NWP) rail line is currently inactive due to the Federal Railroad Authority Stop Order "Emergency Order Number 21" of 2001. The track generally parallels US 101 throughout the project limits, crossing under the facility four times. The crossings occur at: Franklin Overhead (OH), North Novato OH, Route 101/SR 116 Separation and Overhead (SOH) and North Petaluma OH.

- Park and Ride - There are several existing Park and Ride facilities within the MSN project limits. Their location, size and usage are summarized in Table 3-2 below.

Table 3-2. Existing Park and Ride Lots

Location	Available Space		Usage		Comments
	Cars	Bikes	Cars	Bikes	
Rowland (East)	240	6L/1R	60%	Low	
Atherton (East)	62	2L	74%	Low	Both locations
Redwood Blvd (West)	50	N/A	70%	Low	Informal location
Petaluma Blvd. S. (East)	40	N/A	105%	Low	
Lakeville Hwy/SR 116 (West)	111	7R	90%	Low	

L=Bike Locker R=Bike Rack

- Ramp Metering/California Highway Patrol (CHP) Enforcement - There are no existing ramp metering facilities or CHP Enforcement Areas within the MSN project limits.

3.4 - Community Interaction

Throughout the development of this document an emphasis has been placed on keeping the community and local stakeholders informed of the scope and potential impacts of this project. Numerous meetings, both formal and informal, have been held to gather input and assist in formalizing these studies, including:

- Public Map Display meetings
- Policy Advisory Group (PAG) meetings
- Mineta Transportation Institute's April 2002 "Hot Spot Forum"
- NEPA 404 Agency meetings and field reviews
- Local Partners Team meetings
- External Project Development Team meetings
- Aesthetics Committee meetings

- Matrix Evaluation Team meetings
- Local Developer meetings
- City and County Board meetings

SECTION 4 - NEED AND PURPOSE

The purpose of this project is to reduce congestion and improve mobility while providing an incentive for commuters to use buses, carpools or vanpools for peak period travel, and to improve freeway operations including providing safe access to and from the facility in Segment B.

4.1 - Problem, Deficiencies, Justification

US 101 is the only continuous north-south route through Marin and Sonoma counties. Due to the lack of a parallel arterial system, US 101 is used for the majority of north-south trips within the vicinity of the proposed project. Based on the most current commuter survey by RIDES for Bay Area Commuters, Marin County has the largest number of trips per household in the region, and by necessity, many of these trips involve travel on US 101.

The majority of the State Highway system within the project limits was planned, designed and built between the 1950s and the 1970s. Not only have these facilities aged beyond their original design life, they have been subjected to significantly higher truck and auto traffic than was originally planned. This combination of age and increased usage has caused increasingly longer travel times, higher concentration of accidents and faster rates of pavement deterioration.

Since this corridor is so important to the economic vitality and social fabric of the local community, it is imperative that US 101 operate as smoothly and efficiently as possible. The delays experienced by motorists during the AM and PM peak commuting periods are among the worst in the Bay Area.

- The 2002 Bay Area Freeway Congestion Data Report completed by Caltrans shows vehicle hours of delay within the project limits varying from 570 to 3,520 during the AM peak and 100 to 680 during the PM peak.

- The 2002 Transportation Corridor Concept Report authored by Caltrans found that although there were only 10 vehicle hours of delay in 1990, the number had grown to more than 1,240 vehicle/hours of delay by 1998. It is estimated that, without improvements, this segment of US 101 will operate at Level of Service (LOS) F during both the AM and PM peak periods by 2015.

- The 2003 congestion monitoring studies done by Caltrans calculated an existing maximum vehicle delay of 16 minutes for SB traffic and 6 minutes for NB traffic.

With the most recent of its construction occurring in 1955, the 13.4 km (8.2 mi) long "Novato Narrows" is showing its age as the only missing piece of freeway within this 112

km- (70 mi) section of US 101. This existing expressway portion includes narrow shoulders of varying widths, seven locations with limited visibility (sight distance), two locations with recurring flooding, and at-grade intersections and driveway accesses that adversely impact mainline operations.

4.2 - Regional and System Planning

Due to the size and complexity of the improvements needed, coordination among Caltrans, FHWA, PAG, Metropolitan Transportation Commission (MTC), the various transit agencies, the cities of Novato and Petaluma, and the counties of Marin and Sonoma is ongoing to ensure compatibility between roadway and mass transit facilities, as well as coordination of continuous bicycle and pedestrian paths through the corridor.

US 101 serves as the primary transportation facility for Marin and Sonoma counties, as well as for regional traffic along the northwest coastal corridor between the San Francisco Bay Area and Oregon.

4.2.1 - Identify Systems:

- Interstate System: Not on the Interstate System.
- National Highway System: Non-Interstate Strategic Highway Network.
- Freeway & Expressway System: Yes.
- Scenic Highway System: The portion of US 101 between State Route 37 near Ignacio and the unconstructed portion of State Route 37 near Novato is listed as "Eligible State Scenic Highways - Not Officially Designated."
- Interregional Road System: US 101 is both an Interregional Road System "Focus Route" and a regional freight corridor, carrying timber products, wine, agricultural and mineral products, linking the San Francisco Bay Area with the rest of northwestern California.
- STAA & SHELL Route System: This portion of the route has been included in the STAA and the SHELL route systems and functions as the principle truck route for Marin and Sonoma counties.

4.2.2 - State Planning:

- Route Concept Report: The MSN Project is consistent with the current Route Concept Report dated March 13, 1986. A draft Transportation Corridor Concept Report was prepared in May 2002 but was never approved. The District is currently working on a revised draft Transportation Corridor Concept Report and anticipates approval in 2008.
- Transportation System Development Plan: Caltrans developed a Statewide System Management Plan (1998) that includes a strategy for Bay Area transportation corridors. This study found that congestion relief in the US 101 corridor will require a multi-modal (carpool, bus, rail, ferry, bicycle, and pedestrian) approach.

4.2.3 - Regional Planning:

The MSN Project is listed as a Track 1 (RTP Reference Numbers 98154 and 98147) in the Golden Gate Corridor section of the current MTC Transportation 2030 Plan approved in February 2005. The Final MTC Transportation Amendment to the 2030 Plan includes $320 million for the Marin County portion of the MSN Project (RTP#98154) and $220 million for the Sonoma County portion (RTP#98147). The proposed project is consistent with the Congestion Management Plan and is intended to fulfill the following objectives:

- Maximize travel time benefits for high-occupancy vehicle lanes and transit in entire (Golden Gate) corridor.
- Protect operational capability of reliever routes to US 101 for short trips during the peak period.
- Maintain interchange spacing and ensure improvements to connecting east-west routes do not adversely affect operations on US 101.
- Develop ramp-metering plan for US 101 at key access points to balance access for local and through trips.
- Maintain reliable US 101 operations in off-peak period for freight mobility.
- Expand commute-period transit options in (the Golden Gate) corridor.
- Improve transit service between cities.
- Develop bicycle and pedestrian travel options for commuting, recreation and tourism.
- Develop bicycle and pedestrian access to existing and future rail and ferry facilities.

4.2.4 - Local Planning:

This project is being proposed in partnership with TAM, SCTA and FHWA. The completion of the HOV system through Marin and Sonoma counties has been a consistent goal expressed in regional planning documents such as the US 101 Corridor Strategic Plan, the Marin County Congestion Management Plan, the Sonoma/Marin 1997 Multi-Modal Transportation & Land Use Study, the MTC 2005 HOV Master Plan and the MTC Transportation 2030 Plan.

In addition, HOV alternatives show lower regional emission of air pollutants than mixed-flow alternatives and MTC studies have related HOV lanes to reductions in emissions of Reactive Organic Gases and oxides of nitrogen. The Bay Area Air Quality Management District's Clean Air Plan includes a list of Transportation Control Measures (TCM) to be implemented to reduce vehicle emissions. TCM 8 is the Bay Area 2000 Clean Air Plan to Construct Carpool/Express Bus Lanes on Freeways.

4.2.5 - Transit Operator Planning:

- Background/Coordination: After the last of the MSN scoping documents were approved in 2001, a change in statewide direction and potential funding came about, resulting in an emphasis on enhancing transit facilities. Due to this potentially significant change in study direction, the Project Development Team proposed adding this scope to the studies through the PCR process.

While awaiting the outcome of the PCR process, an Intermodal Transit Coordination Team was developed. This team comprised members from the local transit agencies (listed below), the local partners (TAM, SCTA, City of Novato and City of Petaluma) and Caltrans Planning and Design. Three team meetings were held in 2002 and 2003 to facilitate communication among these agencies and to coordinate the planned or ongoing planning exercises of each agency.

During these meetings, a potential concept was identified that could enhance the overall Transit Corridor by creating "full service" transit hubs that would service SMART, local bus service, bicycles, pedestrians and corridor bus service through the use of Park & Ride facilities and direct access HOV ramps. Preliminary studies identified ten potential locations for these facilities and investigated their feasibility. Where feasible, it was found that limited benefit would be provided until the adjacent HOV lanes and/or SMART facilities were completed.

Project meetings were suspended in the Fall of 2003, due to a downturn in the economy and the realization by the funding partners (TAM, SCTA and Caltrans) that the MSN Project would require a long-term funding strategy and a phased construction plan. This phased concept requires prioritization of potential construction elements and competition for limited available funds. Due to the anticipated funding shortfall, and the limited benefit of constructing transit hubs without their supporting infrastructure, direction was received to re-focus the remaining studies on "standard transit" applications and to set aside the transit hub concept for future studies.

- Transit Agencies: **Sonoma-Marin Area Rail Transit** (SMART) released a Final EIR in June 2006 that studied a proposed project to provide passenger rail service along approximately 70 miles of the SMART corridor from Larkspur in Marin County to Cloverdale in Sonoma County, with 14 rail stations, passing sidings and a rail maintenance facility. The EIR was certified in July 2006. The proposed project also includes the implementation of a bicycle/pedestrian pathway, generally within or adjacent to the rail corridor, that includes a combination of Class I and Class II facilities. A bond measure to provided funding for the rail project was not approved by voters. SMART is considering heavy rail or a demonstration train service for the line, and is currently preparing an EIS under NEPA.

  Marin County Transit District (MCTD) currently contracts with Golden Gate Transit and Whistlestop Wheels to provide four different types of service: Local fixed route services (Novato), supplemental school services, rural service and paratransit service.

  Sonoma County Transit (SCT) offers connections to local transit services provided by Cloverdale Transit, Healdsburg Transit, Santa Rosa CityBus and Petaluma Transit. SCT also provides links to Mendocino Transit Authority (MTA)

for service to the Sonoma/Mendocino Coast and Golden Gate Transit for regional service to Marin and San Francisco counties.

Petaluma Transit provides local service in the City of Petaluma and connections to Sonoma County Transit for intercity trips.

Golden Gate Transit (GGT) provides regional, fixed-route bus service throughout the day and evening between San Francisco, Marin and Sonoma counties, including basic and commute bus routes. Limited service is also available between San Rafael, in central Marin County, and the El Cerrito del Norte BART Station in western Contra Costa County. Marin County Local Service is provided within Marin County on weekdays, with limited weekend service, under contract with the Marin County Transit District (MCTD). The paratransit service provided through most of GGT's service area by Whistlestop Wheels complements GGT's regular intercounty non-commute, off-peak bus service. In addition, Golden Gate Transit also offers special express service to 49er games at Monster Park at Candlestick Point.

4.3 - Traffic

US 101 within the project limits experiences recurrent congestion, southbound in the morning and northbound in the afternoon. This congestion is expected to worsen in the future with the projected increase in traffic volumes. Future-year traffic volumes were projected for both the No Build and build alternatives. The projected traffic volumes for the HOV lane were projected to be similar for both of the build alternatives. The operational analysis predicts traffic delays in the study years with both the no-build and build alternatives, although significantly less delay with the build alternatives.

4.3.1 - Existing Traffic Volumes:

Existing traffic volumes were collected during 2004 for the AM and PM peak hours along the project corridor. These results are summarized from the "2004 Traffic Volumes on California State Highways" and listed in the Table 4-1 below.

Table 4-1. Existing Traffic Volumes

Location	AADT	Peak Month	Peak Hour	T
SR 37 to Rowland	127,000	132,000	9,900	4.4%
Rowland to DeLong	107,000	111,000	8,300	4.7%
DeLong to Atherton	92,000	96,000	7,200	4.7%
Atherton to Petaluma Blvd. S	85,000	88,000	6,600	4.7%
Petaluma Blvd. S. to SR 116	79,000	82,000	6,100	6.4%
SR 116 to East Washington	90,000	94,000	6,900	5.0%
E. Washington to Pengrove	92,000	96,000	7,100	5.7%

4.3.2 - Existing Traffic Operations:

Caltrans 2003 congestion monitoring studies indicate that recurrent delays occur within the study limits during the AM peak traffic period on SB US 101 and during the PM peak traffic period on NB US 101. SB traffic congestion within the study limits typically occurs between 6:30 and 9:30 a.m. in Marin County and between 5:30 and 8:30 a.m. in Sonoma County. NB traffic congestion generally develops between 3:00 and 6:30 p.m., primarily in Marin County. The results of these studies indicate that traffic demands for portions of the roadway within the project area are either at or exceed their existing capacities.

The two SB locations within the study limits where traffic exceeds the existing capacity and regularly causes congestion during the AM peak period are:

- The SB on-ramp at the Petaluma Boulevard South Interchange, where congestion typically extends upstream to the Old Redwood Highway Interchange in northern Petaluma. Maximum vehicle delay is 9 minutes.

- The SB on-ramp at Lincoln Avenue, where congestion typically extends upstream to the Rowland Boulevard Interchange in central Novato. Maximum vehicle delay is 16 minutes.

The NB location within the study limits where traffic exceeds the existing capacity and regularly causes congestion during the PM peak period is:

- The NB lane drop just north of the Atherton Avenue Interchange, where congestion typically extends downstream to the DeLong Avenue Interchange in northern Novato. Maximum vehicle delay is 6 minutes.

In addition, minor delays are also experienced on the various uphill sections of the roadway in the Sonoma County portion of the study area.

4.3.3 - Forecasted Traffic Volumes:

The project's forecasted traffic volumes were prepared for the years 2010 and 2030 by the Caltrans District 4 Traffic Forecasting Branch. The growth factors used to forecast these traffic volumes were derived from trip tables developed by TAM models based projections developed by the Association of Bay Area Governments (ABAG). The PM peak hour (4:00-5:00) projected volumes were based on the MTC's PM travel model network. The AM peak hour (8:00-9:00) projected volumes were derived from the AM network using Miller Creek Road as the controlling point of congestion. At the same time, traffic forecast studies for SCTA projects were performed utilizing similar methodology, but with a controlling point of congestion in central Sonoma County. Comparisons were made where these two independent studies converged at the northerly MSN Project limits, and adjusted to balance. The final "balanced" results are summarized in Table 4.2 below.

Table 4-2. Forecasted Traffic Volume

	Northbound						Southbound					
	No Build Alternative		Fixed HOV Lane Alternative		Reversible HOV Lane Alternative		No Build Alternative		Fixed HOV Lane Alternative		Reversible HOV Lane Alternative	
Location	Total	HOV	Total	HOV	Total	HOV	Total	HOV	Total	HOV	Total	HOV
2010 AM Peak Hour												
SR 37 to Rowland	4666	---	4651	514	4681	499	5725	---	5754	744	5751	748
Rowland to DeLong	4202	---	4183	512	4209	498	5008	---	5084	628	5075	632
DeLong to Atherton	3475	---	3451	415	3476	402	4253	---	4244	600	4241	603
Atherton to Petaluma Blvd. S	3241	---	3179	346	3234	---	4205	---	4274	572	4284	574
Petaluma Blvd. S. to SR 116	3224	---	3124	377	3175	383	3580	---	3726	552	3736	553
SR 116 to East Washington	3885	---	3864	466	3899	470	3633	---	3799	509	3813	509
E. Washington to Pengrove	3970	---	4005	508	4017	500	3703	---	3813	565	3790	551
2010 PM Peak Hour												
SR 37 to Rowland	5735	---	5797	1005	5803	980	5778	---	5927	710	5885	705
Rowland to DeLong	4890	---	5054	897	5026	863	5185	---	5332	709	5289	704
DeLong to Atherton	3848	---	3998	817	3987	771	4417	---	4571	628	4523	624
Atherton to Petaluma Blvd. S	3970	---	4079	718	4076	718	3840	---	3942	528	3915	---
Petaluma Blvd. S. to SR 116	3645	---	3821	726	3817	724	3667	---	3825	542	3802	538
SR 116 to East Washington	4171	---	4378	791	4380	789	4114	---	4265	687	4245	591
E. Washington to Pengrove	4278	---	4419	873	4426	826	4246	---	4349	753	4352	648
2030 AM Peak Hour												
SR 37 to Rowland	4911	---	5017	540	5036	543	6289	---	6592	850	6533	891
Rowland to DeLong	4497	---	4489	538	4510	542	5529	---	5876	719	5810	817
DeLong to Atherton	3718	---	3703	434	3732	439	4624	---	4899	684	4835	679
Atherton to Petaluma Blvd. S	3533	---	3503	381	3535	---	4646	---	4890	655	4846	649
Petaluma Blvd. S. to SR 116	3481	---	3457	418	3484	404	3861	---	4352	637	4307	631
SR 116 to East Washington	4169	---	4175	520	4215	511	3971	---	4400	584	4400	600
E. Washington to Pengrove	4321	563	4498	581	4512	571	4006	---	4752	615	4752	628
2030 PM Peak Hour												
SR 37 to Rowland	5800	---	6243	1152	6218	1155	6396	---	6639	793	6550	768
Rowland to DeLong	5407	---	5803	960	5803	962	5751	---	5984	785	5896	758
DeLong to Atherton	4365	---	4704	825	4710	825	4821	---	5006	698	4933	688
Atherton to Petaluma Blvd. S	4404	---	4788	843	4788	843	4290	---	4455	597	4363	---
Petaluma Blvd. S. to SR 116	3929	---	4505	851	4504	851	3910	---	4353	617	4264	605
SR 116 to East Washington	4419	---	5065	914	5069	913	4367	---	4728	675	4664	664
E. Washington to Pengrove	4636	---	5345	988	5355	986	4610	728	5187	820	5138	792

4.3.4 - Forecasted Traffic Operations:

The freeway operational analyses for the project, detailed in the February 2005 Traffic Operational Analysis Report, are based on unconstrained year 2010 and year 2030 traffic projections. This analysis utilized the simulation model FREQ12 to perform the freeway operational analysis.

The freeway operational analysis indicates that recurrent delays will occur within the study limits. The duration and location of these delays is dependent upon the selected alternative. The forecasted delay is summarized in Table 4-3 below.

Table 4-3. Forecasted Traffic Delay

		Delay, minutes					
		2010			2030		
Location	Traffic Type	No Build Alternative	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative
AM Peak Hour							
Southbound	Mixed Flow	10.4	1.4	1.4	15.0	5.0	4.7
	HOV	10.2	0.2	0.2	14.6	0	0
Northbound	Mixed Flow	1.6	0.6	1.3	3.3	0.8	3.0
	HOV	1.5	0.4	1.0	3.1	0	1.8
PM Peak Hour							
Southbound	Mixed Flow	5.3	0.9	5.3	10.4	1.9	11.1
	HOV	5.2	0.2	1.6	8.9	0	3.0
Northbound	Mixed Flow	9.1	5.8	5.6	14.5	7.4	7.3
	HOV	5.1	0.8	0.7	7.9	0	0

The operational analysis projected a travel time savings for vehicles in the HOV lanes under the build alternatives. The expected HOV delay savings are shown in Table 4-4 below.

Table 4-4. Expected HOV Delay Savings

	Savings, minutes			
	2010		2030	
Location	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative
AM Peak Hour				
Southbound	1.2	1.2	5.0	4.7
Northbound	0.2	0.3	0.8	1.2
PM Peak Hour				
Southbound	0.7	3.8	1.9	8.1
Northbound	5.0	4.9	7.4	7.3

Signalized intersections of interest were analyzed using the computer simulation model SYNCHRO5. Intersection operations throughout the MSN Project limits were evaluated and the Atherton Avenue ramp intersections were determined to be critical. Consequently, Level of Service (LOS) calculations were performed at these locations, and the results were the same for the no-build and build alternatives. The southbound ramp intersection is expected to operate at LOS A or B during the study years (current is LOS A). The northbound ramp intersection is expected to operate at LOS B or C in 2010 and LOS C to D in 2030 (current is LOS C). The actual intersection operations may be worse because this intersection is heavily influenced by the poor operation and proximity of the Redwood Blvd/Atherton intersection.

4.3.5 - Accident Rates:

Accident rates for the last 3 years, from 08/01/03 to 07/31/06, and compared to the statewide average utilizing accident data from the Traffic Accident Surveillance and Analysis System (TASAS). These data were analyzed separately for northbound and southbound US 101 mainline. The accident data from TASAS Table B are shown in Table 4-5 below.

Table 4-5. Accident Analysis

Location	Number of Accidents/Significance					Accident Rate (acc/mvm*)					
	Total	Fat	Inj	Wet	Dark	Actual			Average		
						Fat	F+I	Total	Fat	F+I	Total
NB Segment A Mrn KP 30.0/R36.8 (PM 18.6/R22.9)	145	1	58	26	50	0.004	0.23	0.55	0.007	0.29	0.91
SB Segment A Mrn KP 30.0/R36.8 (PM 18.6/R22.9	81	0	22	25	38	0.00	0.08	0.31	0.007	0.29	0.91
NB Segment B Mrn KP R36.8/Son 5.7 (PM R22.9/Son 3.5)	262	6	98	38	76	0.016	0.28	0.69	0.027	0.49	1.11
SB Segment B Mrn KP R36.8/Son 5.7 (PM R22.9/Son 3.5)	221	2	88	45	69	0.005	0.24	0.59	0.027	0.49	1.11
NB Segment C Son KP 5.7/11.5 (PM 3.5/7.1)	110	0	44	8	41	0.00	0.24	0.61	0.015	0.48	1.32
SB Segment C Son KP 5.7/11.5 (PM 3.5/7.1)	129	0	46	28	43	0.00	0.25	0.71	0.015	0.48	1.32

acc/mvm = accidents per million vehicle miles
Post Mile Equations: KP 32.472 BK = R32.472 AH (PM 20.178 BK = R20.178 AH)
KP R37.452 BK = 37.770 AH (PM R23.272 BK = 23.470 AH)
KP 44.460 BK = 0.0 AH (PM 27.627 BK = 0.0 AH)

Segment A, NB. There were 145 accidents during the last 3-year period with a total accident rate of 0.55, lower than the statewide average rate of 0.91 for similar facilities. 70 (or 48.3%) of the accidents were rear end type of collision, 38 (26.2%) were hit object, and 30 (20.7%) were sideswipe.

Of these accidents, 76 (or 52.4%) of the accidents were caused by speeding, 25 (17.2%) by improper turn, 22 (15.2%) by other violations, 9 (6.2%) by influence of alcohol. There was one fatal accident due to DUI, the vehicle collided with the guardrail, chain link fence, and overturned in Novato Creek.

Segment A, SB. There were 81 accidents during the last 3-year period with a total accident rate of 0.31, lower than the statewide average rate of 0.91 for similar facilities. 33 (or 40.7%) of the accidents were hit object collisions, 19 (23.5%) were rear end, and 18 (22.2%) were sideswipe.

Speeding has been the primary collision factor 44.4% of total accidents, 17.3% were caused by other violations, 14.8% by improper turn, and 12.3% by influence of alcohol.

Segment B, NB. There were 262 accidents during the last 3-year period with a total accident rate of 0.69, lower than the statewide average rate of 1.11 for similar facilities. 108 (or 41.2%) of accidents were rear end, 90 (34.4%) were hit object, and 35 (13.4%) sideswipe.

Speeding has been the primary collision factor for 119 accidents or 45.4% of total. 26% of total accidents were caused by improper turn, and 11.8% by other violations.

There were 6 fatal accidents within the limits of this segment. One was caused by DUI, in which the driver lost control of the vehicle, causing it overturning and colliding with a power pole. One accident was due to unsafe turning movement that caused the vehicle to hit the center divider and bounced back across both lanes and hit the guardrail at the right shoulder at San Antonio Creek. Unsafe turning movement resulting in losing control of the vehicle, allowing it to run off the roadway and colliding with a power pole or striking a log and then a tree was the cause of two other fatal accidents. One fatal accident was caused when a pedestrian crossing in the middle of the highway then, with unknown reason, slipped and felled in the #1 lane and being hit by on coming vehicle, which is unable to stop in time. One fatal accident was caused when a pedestrian under the influence of drug walking into the travel way of on coming vehicle.

Segment B, SB. There were 221 accidents during the last 3-year period with a total accident rate of 0.69, lower than the statewide average rate of 1.11 for similar facilities. 108 (or 41.2%) of accidents were rear end, 90 (34.4%) were hit object, 35 (13.4%) sideswipe.

119 (or 45.4%) of all accidents were caused by speeding, 68 (26%) improper turn, 31 (11.8%) by other violations, 19 (7.3%) influence alcohol.

There were two fatal accidents happened on SB Mrn 101. One due to DUI and speeding. The driver lost control of the vehicle causing it overturning and being collided by two other vehicles. The other fatal accident was a broadside type collision, due to failure to yield the right of way to through traffic, and the through traffic vehicle was the associated factor in the collision by traveling at an unsafe speed.

Segment C, NB. There were 110 accidents during the last 3-year period with a total accident rate of 0.61, lower than the statewide average rate of 1.32 for similar facilities. 51 (or 46.4%) of accidents were rear end, 35 (31.8%) hit object and 16 (14.5%)

sideswipe. Speeding was the primary collision factor for 45.5% of all accidents, 22.7% were caused by improper turn, 14.5% by other violations, 10.9% by influence alcohol.

Segment C, SB. There were 129 accidents during the last 3-year period with a total accident rate of 0.71, lower than the statewide average rate of 1.32 for similar facilities.

48 (or 37.2%) of accidents were hit object type of collision, 47 (36.4%) were rear end, 26 (20.2%) were sideswipe. 49 (or 38%) were caused by speeding, 31 (24%) by improper turn, 23 (17.8%) by other violations.

In general, most of the accidents within the limits of all 3 segments were related to congestion condition of the highway.

SECTION 5 - ALTERNATIVES

The alternatives under consideration have been analyzed at an equal level of detail and include a No-Build Alternative. As studies progressed, alternatives have been refined to avoid, minimize or mitigate environmental impacts to the greatest extent possible.

Due to the nature of the initial scoping documents and the existing characteristics of the facilities, the build alternatives that have been studied fall into two categories. These categories are "HOV Operational Improvement Alternatives," which applies to all three segments, and "Expressway to Freeway Upgrade Options" which applies only to Segment B.

5.1 - Viable Alternatives

5.1.1 - No Build:

The No-Build alternative proposes no modifications to US 101 in the project area, other than routine maintenance and rehabilitation and the currently planned and programmed projects within the area. This alternative would not meet the need and purpose for the project as it does not address congestion and mobility, nor does it give commuters incentives for using buses or carpools during peak periods. Bus, carpool and other HOVs will experience the same delays as the mixed flow traffic. As shown in Table 4-3 above, projected maximum delays for the SB direction during the peak hour are 10 minutes in 2010 and 15 minutes in 2030. The NB direction would experience maximum delays during the peak hour of 9 minutes in 2010 and 14 minutes in 2030. The No Build Alternative also does not address access in Segment B. Freeway operations will continue to be impacted by poor access and nonstandard alignment.

There are currently three projects in varying stages of completion that are part of this alternative:

- Lakeville Highway/SR 116 SB Bridge Replacement: This bridge replacement (04-276004) recently completed construction in the summer of 2007 reconfiguring the SB onramp to create an acceleration lane to allow for better merging.

- Petaluma SB Auxiliary Lane: Construction of this SB Auxiliary Lane (04-281114) along US 101, between the on-ramp at the East Washington Street Interchange and the off-ramp at the Lakeville Highway/SR 116 Interchange, is scheduled for construction in 2008.

- East Washington Interchange: Construction of a new NB on-ramp to US 101 for WB East Washington traffic, realignment and widening of the SB on-ramp, and widening the on- and off-ramp terminus in the southeast quadrant. This project is scheduled for construction in 2009.

5.1.2 - High Occupancy Vehicle (HOV) Lanes:

MTC found, as part of its HOV Master Plan, that Bay Area HOV lanes convey more people during commute times than any of the adjacent mixed-flow lanes. In addition, MTC studies have correlated the presence of HOV lanes to improvements in air quality due to decreased vehicle emissions.

The local community has also expressed its desire to reduce the adverse environmental and societal impacts of building new infrastructure, while acknowledging the need to maximize the efficiency of both the existing transportation system and future transportation improvements. One way of achieving this is to promote HOV modes of travel (such as carpools, vanpools and buses) as preferred alternatives to the single-occupancy vehicle (SOV) traffic. The proposed extension of Marin and Sonoma counties' HOV lane systems is consistent with this concept.

The Traffic Operational Analysis Report indicates that if HOV lanes were constructed, overall traffic delays will be reduced, with HOV users experiencing less delay than the mixed-flow traffic. The report projects that there will still be delay during peak periods, but much less delay with the build alternatives than with the no build. Table 4-3 above summarizes the forecasted delay.

Two viable HOV alternatives were developed. In addition numerous options for providing access for the proposed freeway upgrade in Segment B were considered. Through a screening process, four access options were selected for study. These access options are independent of the HOV alternative selected.

- Fixed HOV Lane Alternative. This alternative would construct an HOV lane in each direction throughout the project limits. The HOV lane would be contiguous with the adjacent existing mixed flow lanes, separated by a traffic stripe. Outside of posted hours, HOV lanes may be used by all vehicles. This alternative includes improvements to the existing on-ramps in Segments A & C as well as constructing new interchanges, frontage roads and bike paths in Segment B.

- Reversible HOV Lane Alternative. This alternative would construct a fixed HOV lane in each direction through Segments A & C, as described above. In Segment

B, due to a favorable directional split, a reversible HOV lane would be constructed. This single HOV lane would have concrete barriers on both sides to separate it from both NB and SB mixed flow traffic. Ingress and egress would be provided only at the beginning and end, north of the Atherton Ave Interchange on the south end and south of the Petaluma Boulevard South Interchange on the north end. Automatic switching devices would be installed at the ingress/egress points to open the appropriate direction during peak hours. Advanced extinguishable message signs (EMSs) would also be installed to notify motorists of the status of the fixed reversible lane.

The reversible lane would serve HOV users in the predominant traffic flow during peak travel period, i.e. southbound HOV traffic during morning peak hours and northbound HOV traffic during afternoon peak hours. Outside of peak periods, the reversible lane would be closed to traffic. As with the Fixed HOV Lane Alternative above, this alternative includes improvements to the existing on-ramps in Segments A & C as well as constructing new interchanges, frontage roads and bike paths in Segment B.

- Access Options. Converting the expressway in Segment B to an access-controlled freeway will require a combination of interchanges and frontage roads to maintain access to intersecting roadways and adjacent parcels, as well as replace bicycle and pedestrian access. A number of access options were evaluated. A weighted matrix was prepared for each option, with weights assigned to specific resource areas (e.g., potential growth inducement, hazardous waste and watershed/wetland resources). Under each resource area, specialists identified criteria to measure potential impacts. For instance, under Watershed/Wetlands, biologists could measure an alternative by the "number of hectares of wetlands" that might be impacted by a particular access alternative.

  Each access option began the evaluation process with the same benchmark score. Individual team members then deducted points based upon their judgment of the potential impacts to a resource due to a chosen access option. For instance, biologists deducted points based upon potential impacts to wetlands, and impacts to a high-quality wetland or habitat might garner a higher deduction than a low-quality wetland or barren upland.

  The assigned points, ratings and weights factored into a numeric score used to rank the access alternatives. The findings were reviewed by the PDT and Local Partners, and in a public forum at a Policy Advisory Group meeting. Next, they were forwarded to NEPA/404 interagency members for concurrence. Four of the 26 options studied scored above the other options and were selected for studies.

  The interchanges, frontage roads and bikeways proposed with each of the four Access Options are shown in Table 5-1 below. An overview of the four Access Options is included as Attachment C.

Table 5-1. Access Option Features

	Access Options			
	4b	12b	14b	14d
Interchanges				
Construct ramps for diamond interchange at Redwood Landfill OC	X	X		
Construct new diamond interchange south of existing San Antonio Rd	X		X	X
Reconstruct Petaluma Boulevard South Interchange to Diamond	X	X	X	X
Frontage Roads				
Extend Redwood Blvd north to Olompali State Historic Park	X	X	X	X
East side between new Redwood Landfill IC and Landfill/Marina	X	X		X
East side between Marina/Landfill and new San Antonio IC			X	
East side between new San Antonio interchange and Skinner Rd	X		X	X
West side between new San Antonio interchange and San Antonio Rd	X		X	X
East side between Gunn Dr and the new Petaluma Blvd South IC	X	X	X	X
West side between Gambini Rd and the new Petaluma Blvd South IC	X		X	X
West side between new Redwood Landfill IC and San Antonio Road		X		
East side between San Antonio Cr and the new Petaluma Blvd S. IC		X		
West side between Redwood Landfill OC and new San Antonio IC				X
West side between Redwood Landfill to San Antonio Rd IC				X
Class I Bikeway				
West side between Olompali SHP and the Redwood Landfill OC.	X	X	X	X
West side between new Redwood Landfill and San Antonio ICs	X			
Along San Antonio Creek between existing and proposed US 101	X	X	X	X
East side between Skinner Gambini roads	X		X	X

The traffic projections indicate that the two build alternatives have similar vehicle throughput in Segments A & C. In Segment B, the throughput is similar for both alternatives in the predominant direction, while the Fixed HOV Lane Alternative is projected to have more throughput in the off-peak direction.

The fixed HOV lanes are available to SOV traffic during off peak periods, while the fixed reversible lane is closed. The reversible lane could be opened during non-commute periods to accommodate special events. However, the reversible lane would not be available to relieve congestion in the event of an accident within Segment B.

The Fixed HOV Lane Alternative allows for changes in regional employment centers that lead to an increase in the reverse commute (AM NB/PM SB). If these changes due occur, the reversible lane could be converted to fixed lanes. The conversion would be problematic at overcrossings due to the center column placement.

The Fixed HOV Lane Alternative has the same footprint and impacts as the Reversible HOV Lane Alternative. However the reversible lane requires an additional concrete barrier, ingress/egress switching and safety devices, and advanced extinguishable

message signs to notify motorist whether the reversible lane is open to their direction of traffic.

The reversible lane requires continuous monitoring and maintenance of the ingress/egress switching devices while the fixed HOV lane is relatively maintenance free. The advanced signage also requires monitoring to ensure proper operation.

The specific proposed improvements are described in the remainder of this section. Since the only difference in the two built alternatives is the fixed versus reversible HOV lane in Segment B, unless otherwise noted, the improvements described apply to both build alternatives.

- Proposed Engineering Features: Between the US 101/SR 37 Interchange and north of the Atherton Avenue Interchange (Segment A) the existing 6-lane freeway will be widened in the median to provide an additional 3.6 m (12 ft) lane in each direction separated by a concrete barrier and varying-width inside shoulders. The median width from the start of the project to the Atherton Ave IC varies between 6.6 m and 8.8 m (22-28 ft) and will be paved. The median between the Atherton Ave IC and Olompali SHP the median will vary between 8.8 m and 13.6 m (28-44 ft) with 3.0 m (10 ft) minimum paved shoulders and the remainder unpaved.

  Between north of the Atherton Avenue Interchange and south of the Lakeville Highway/SR 116 Interchange (Segment B) the existing 4-lane expressway will be substantially reconstructed as a freeway. Existing nonstandard horizontal and vertical curves will be corrected. The Fixed HOV Lane Alternative would result in a six lane freeway, two mixed flow lanes and one HOV in each direction. The typical section would be the same as that proposed for Segment A, except with a constant 6.6 m (22 ft) median.

  The Reversible HOV Lane Alternative would result in a five-lane freeway in Segment B. The fixed reversible HOV lane would have concrete barriers on both sides and include a 3.6 m (12 ft) lane with a 3.0 m (10 ft) shoulder on both sides. The adjacent mixed flow lanes would have 1.5 m (5 ft) inside shoulders and 3.0 m (10 ft) outside shoulders.

  Depending on Access Option, new diamond-type interchanges are proposed at the Redwood Landfill OC and south of San Antonio Road. The existing Petaluma Blvd South Interchange would be reconstructed as a diamond-type interchange under all of the Access Options under study.

  The proposed horizontal alignment shifts from the existing thru Segment B in order to correct nonstandard curves. The location of the proposed alignment relative to the existing is shown in Table 5-2 below. Approximately 75% of the

existing alignment will be reconstructed with new structural section. The remaining portion will be widened similar to Segments A & C.

Table 5-2. Proposed Alignment Shift in Segment B

Approximate Location	Approx Station	Proposed Alignment
Begin to Olompali SHP	1368 to 1393	Maintain existing alignment
Olompali SHP to Redwood Landfill OC	1393 to 1408	Shifts easterly up to 27 m (90 ft)
Redwood Landfill OC to Silveira Dairy	1408 to 1417	Shifts westerly up to 21 m (70 ft)
Silveira Dairy to San Antonio Rd	1417 to 1436	Maintain existing alignment
San Antonio Rd to S. Kastania	1436 to 2031*	Shifts westerly up to 79 m (260 ft)
S. Kastania to N. Kastania	2031 to 2039	Shifts easterly up to 21 m (70 ft)
N. Kastania to Petaluma River	2039 to 2052	Shifts westerly up to 34 m (110 ft)
Petaluma River to SR 116	2052 to 2058	Maintain existing alignment

* Sta Equ 1440+80 BK=2000+00 AK

The proposed vertical alignment will correct nonstandard curves. The locations of the profile corrections are from about 700 m south of the Redwood Landfill OC to about 1000 m north of the OC, from about 200 m south of San Antonio Creek to Ganbini Road and from about S. Kastania Rd to the Petaluma River Bridge. Thru these areas the proposed profile will shift the new roadway up to 8.5 m (28 ft) above or up to 7.3 m (24 ft) below the existing roadway.

Between south of the Lakeville Highway/SR 116 Interchange and north of the Corona Road Overcrossing (Segment C) the existing 4-lane freeway will widened to provide an additional 3.6 m (12 ft) lane in each direction separated by a concrete barrier and 3.0 m (10 ft) inside shoulders. The majority of the widening will be in the median, with some outside widening. The roadway will be reconstructed at the approaches to the North Petaluma OH to correct the existing nonstandard vertical alignment. The proposed profile will new roadway up to 5.2 m (17 ft) above the existing roadway.

Frontage roads with Class II Bikeways and Class I Bikeways will be constructed through Segment B to provide access to the proposed freeway and thru the corridor. Depending on the access option, portions of the existing expressway will be utilized as frontage roads or bikeways.

Correcting the numerous nonstandard vertical and horizontal curves thru the rolling terrain of Segment B require significant excavations and embankments, up to 63 m (200 ft) high excavations and up to 40 m (130 ft) high embankments. Maximum slopes of 1:2 (V:H) were used, with 1:4 slopes used when the height of the cut/fill was less than 3 m (10 ft). The geotechnical report indicated that the soils in the area are not highly erodible and that the erosion potential of the proposed excavations and embankments can be mitigated with standard erosion control devices.

Retaining walls are proposed to minimize right-of-way acquisition and accommodate grade changes along proposed sound walls. In Segments A & C, retaining walls are proposed in six locations, four for sound walls and the other two are along the W37-S101 connector ramp and along the SB Lakeville Highway/SR 116 on-ramp. These walls vary in height from 1.2 m to 2.1 m (4 ft to 7 ft). Retaining walls are proposed in Segment B at two locations: on the left side at the Redwood Landfill OC (Access Option 12b only) and on the right side between US 101 and the proposed frontage road, south of the Petaluma Blvd South IC. Wall heights vary from 1.2 m to 4.5 m (4 ft to 15 ft).

A Preliminary Drainage Report was prepared documenting the hydraulic and hydrologic characteristics of the project area and identifying proposed drainage improvements. Generally the existing culverts and drainage features function adequately. Most of the existing drainage systems in Segments A & C can be retained with minor modifications. Most of the drainage systems in Segment B will be replaced due to the realignment or deteriorated materials. Cross culverts were sized to pass design-year flows with a minimum diameter of 0.6 m (24 in) for maintenance.

Preliminary Typical Sections and Layout Sheets for both build alternatives are included as Attachment D. Profile Sheets are included as Attachment D and are the same for both build alternatives. Advance Planning Studies (APSs) for the Fixed HOV Lane Alternative are also included as Attachment D. The structure work for the Reversible HOV Lane Alternative is the same for Segments A & C and the proposed overcrossing in Segment B would have the center bent shifted. The proposed improvements for each segment are summarized in Table 5-3 below. These improvements are the same for both build alternatives.

Table 5-3. Proposed Project Features

Locations					Ramps			Freeway				Access			Misc.			
	Station to Station			Area	Ramp Metering	HOV bypass	CHP Enforcement	Median Widening	Outside Widening	Rehabilitation	Realignment	New Interchanges	New Frontage Rd's	Bike/Ped Paths	Median Barrier	Noise Barriers	Retaining Walls	Drainage Upgrades
Southern	299+80	to	320+00	SR 37	x	x	x	x		x					x	x	x	x
	320+00	to	335+00	Rowland	x	x	x	x		x					x	x(3)		x
	335+00	to	350+00	DeLong	x	x(1)	x	x		x					x	x(3)		x
	350+00	to	367+80	Atherton	x	x	x	x		x					x	x(3)		x
Central Segment	1367+80	to	1400+00	Olompali							x		x	x	x			x
	1400+00	to	1415+00	Landfill	x(2)	x(2)	x(2)				x	x(2)	x(2)	x(2)	x		x(3)	x
	1415+00	to	1421+00	Dairy							x		x(2)	x(2)	x			x
	1421+00	to	1435+00	San Antonio Rd.	x(2)	x(2)	x(2)		x	x		x(2)	x(2)	x(2)	x			x
	1435+00	to	2010+00	San Antonio Crk.							x		x(2)	x(2)	x			x
	2010+00	to	2027+00	Gunn Way							x		x(2)	x(2)	x			x
	2027+00	to	2038+00	Kastania					x	x			x	x	x			x
	2038+00	to	2052+00	Petaluma Blvd. S.	x	x	x				x	x	x	x	x		x	x
	2052+00	to	2058+00	Petaluma River						x	x				x		x	x
Northern	2058+00	to	2070+00	SR116/Lakeville	x	x	x	x	x	x					x	x(3)	x	x
	2070+00	to	2084+00	East Washington IC	x	x	x	x	x	x					x	x	x	x
	2084+00	to	2086+00	Lynch Creek				x	x	x					x	x		x
	2086+00	to	2103+00	N. Petaluma OH							x				x			x
	2103+00	to	2116+00	Corona OC				x	x	x					x	x(3)		x

Notes: (1) The northbound Delong on-ramp already has sufficient width for a bypass lane
(2) Interchange, frontage roads and bike path locations vary by Access Option
(3) Potential retaining wall is specific to Access Option
(4) Estimated cost of wall exceeds reasonable cost allowance

- Nonstandard Mandatory and Advisory Design Features: The improvements proposed with this project would correct the majority of the existing nonstandard features. However, there are nonstandard features included with the proposed improvements as well as existing nonstandard features that are proposed to remain. Fact Sheets for these nonstandard features have been approved. A summary of the nonstandard features requiring mandatory or advisory design exceptions is shown in Table 5-4. The spacing between two existing interchanges in Segment A does not meet current standards for an urban condition. The proposed interchange spacing with Access Option 4b likewise does not meet current standards for a rural condition.

Table 5-4. Exceptions to Mandatory and Advisory Design Standards

Nonstandard Feature	Type	Existing to Remain	Proposed
Spacing Between Ramp and Local Street Intersections	Mandatory		X
Interchange Spacing	Mandatory	X	X
Shoulder Width	Mandatory		X*
Decision Sight Distance (DSD)	Advisory	X	
Superelevation Transition	Advisory	X	
Minimum Grade	Advisory	X	
Side Slope	Advisory		X
Median Width	Advisory		X
DSD at Ramp Intersection	Advisory		X
Outer Separation	Advisory		X

* point restriction due to OC column

- Direct Access HOV Ramps: Preliminary studies for direct HOV ramps were undertaken and local transit authorities were consulted, as discussed in Section 4.2.5 above. The future need for these ramps to connect to park and ride facilities and transit hubs was identified, but fell outside the scope of the MSN Project. Schematic site layouts were completed to ensure that the MSN project would not preclude any future study and development of these direct connectors.

- Ramp Metering: Ramp metering is proposed for all of the on-ramps throughout the project limits. This document, however, does not authorize activating the ramp meters. All of these ramps, except the northbound Delong on-ramp, will be widened to provide an HOV bypass lane; The Delong NB on-ramp already has a two-lane section that will be restriped for a bypass lane.

  Other Intelligent Transportation System (ITS) elements are proposed to monitor freeway operations and relay real-time information on incidents and travel times to motorists. These ITS elements include closed circuit television cameras (a minimum of 17), changeable message signs (a minimum of four), traffic monitoring stations (a minimum of 33 in each direction) and highway advisory radio system (a minimum of three).

- CHP Enforcement Areas: CHP enforcement areas are proposed at the on-ramps with ramp metering described above. Median enforcement areas are not proposed.

- Park & Ride Facilities: No new Park and Ride facilities or improvements to existing facilities are proposed with the MSN Project. Although the original

scoping documents for this project do not directly address Park & Ride facilities, preliminary studies were undertaken to include them. A twofold approach was used: 1) Examine existing Park & Ride facilities, both formal and informal, to check their capacity and placement (see "Park and Ride" discussion in Section 3.3.3 above), and 2) Meet with the local transit authorities.

Although communication with the local transit authorities showed that there would be a mutual benefit between each potential Direct Access HOV Ramp location and its associated Park & Ride facility, these facilities fell outside the scope of the current MSN Project. However, the sites were recorded in schematic site layouts for future study and development.

- Utility Involvement: Utility location mapping has been completed, utility verification is under way and preliminary conflicts have been identified. A single necessary relocation has been identified within the existing freeway segments (Segments A & C) of the project.

  The proposed freeway upgrade through Segment B will require a significant number of intricate utility relocations. The exact location and condition of the existing facilities will not be determined until a preferred access option has been selected and positive location (potholing) work has been completed. As the designs of these relocations proceed, the remaining service life of the existing individual facilities will be calculated and a cost/benefit analysis will be performed to determine the feasibility of their retention. If retention appears to be the preferred alternative, encroachment exceptions will be requested on a case-by-case basis.

  If retention of the existing facilities is determined unfeasible, their relocation can be accommodated within the limits of environmental clearance proposed by the Draft EIR/EIS. These facilities will be relocated along the frontage road/bike path system, outside of the ultimate State R/W. No longitudinal encroachments within state R/W are anticipated.

- Other Owner Involvement: Water rights are an issue for several parcels within the limits of Segment B, because they currently are provided with water by springs with deeded rights within the State R/W, or by wells that are partially fed by highway drainage that would be eliminated by the project.

- Railroad Involvement: The SMART/NWP rail line, which is currently inactive, generally parallels US 101 throughout the project limits. Although no new crossings are being proposed; the majority of the existing structures will require work. This work, summarized in the Proposed Structure Work table (Table5-6), was coordinated with SMART representatives who had no issue with the proposed plans. A revised Construction and Maintenance Agreement will be

required for work within the SMART/NWP R/W. For further information regarding SMART please see Section 4.2.5 above.

- Highway Planting: Highway planting for this project will be completed under a separate contract(s) as per Caltrans policy. The total costs for highway planting and revegetation ranges from $7.5 million to $7.9 million, depending on which Access Option is selected. A breakdown of highway planting costs and related design for safety items is shown in the project cost estimates.

  Revegatation within Segment B is required to mitigate the large number of trees proposed to be removed. The replacement plantings will consist of oaks and other locally native species and be concentrated in areas between mainline US 101 and the proposed frontage roads.

  Highway planting and revegetation will be completed to current Caltrans Design Standards up to the maximum allowable cost per hectare. For construction fiscal year 2009/10, the maximum cost for highway planting with one year of plant establishment is be $91,200 per hectare and $117,800 with three years of plant establishment, excluding mulch areas, water meters, and Design for Safety elements. Three percent per fiscal year is used for cost escalation.

  Segments A & C of the project will include standard replacement highway planting and restoration, with a three-year plant establishment period. Replacement highway planting and restoration will be developed with local community input to ensure context sensitivity and enhancement of the surrounding areas along US 101.

  Revegetation through Segment B will consist mainly of a seeded mix of native grasses and shrubs in combination with informal stands of California native plants, including oak tree liners, seedling or acorns. This revegetation will have a maximum one-year plant establishment and should emphasize intermittent, randomly mixed groupings of native shrubs and trees to accentuate the natural state of the corridor. The density of revegetation along proposed bike trails should include more woody plant material to provide both a physical buffer and visual screen between the proposed bike trial and highway. Planting should be timed so that it will occur in the fall, prior to the start of the rainy season, as no irrigation will be provided. Revegetation within the limits of San Antonio Creek and other natural waterways will include plant materials that are conducive to a Riparian habitat.

  All areas of highway planting and revegetation will be reviewed to see if possible biological mitigation that can be accommodated onsite within the project corridor.

Regional or interregional transportation enhancement funds should be investigated as a source for improving the landscape and roadside elements of the project, including bicycle and non-motorized transportation facilities.

- Erosion Control: Erosion Control Type D will be utilized for temporary disturbed areas and permanent slopes. In addition to Erosion Control Type D, other temporary Best Management Practices (BMPs) will be utilized to minimize the potential for sediment entering adjacent water bodies. The proposed BMPs are described in the Storm Water Data Report (SWDR).

- Noise Barriers: There are no existing State-owned sound walls within the project limits; private sound walls exist at several locations adjacent to the state right of way. A Traffic Noise Impact Report was prepared to document existing noise levels, project future levels and evaluate attenuation measures. The report recommended eight locations where sound walls would provide attenuation, four in the city of Novato and four in the city of Petaluma. The locations are shown on the preliminary plans included as Attachment D, as well as listed in Table 5-5 below.

  As noted in the comment column of Table 5-5 the estimated cost for five of the eight sound walls exceeds the reasonable cost allowance for the specific wall. The costs for these sound walls are not included in project cost estimates. However these sound walls are shown on the Layout sheets included in Attachment D. The final determination on whether these walls will be included in the project will be made after public comment on the draft EIR/EIS, prior to approval of the Project Report.

  There were locations within the project limits where predicted noise levels were less than 67 dBA and abatement was not considered. These locations include the residential area between Novato Boulevard and the south end of Redwood Boulevard (existing developer wall) and between Cherry Street and Orange Avenue (earthberms).

  There was an area where the predicted noise levels exceeded 67 dBA and sound walls were not proposed. The residences at 5381 Redwood Hwy and 4747 Redwood Hwy are single family homes with predicted noise levels of 69 dBA and 72 dBA, respectively. The Noise Impact Report concluded that it was not feasible to construct sound walls and achieve 5 dBA of attenuation.

Table 5-5. Proposed Sound Walls

	Approximate Location	Length	Height	Comment
	City of Novato			
1.	Right, Manuel Dr to Davidson St (south of Delong)	200 m (660 ft)	3.7 m (12 ft)	Along ES on barrier and on OH, estimated cost exceeds reasonable allowance
2.	Right, Cherry St to Atherton	480 m (1570 ft)	4.3 m (14 ft)	Along edge of shoulder on barrier, estimated cost exceeds reasonable allowance
3.	Left, Harkle Rd to Delong	500 m* (1640 ft)	3.7 m (12 ft)	Along ES and on OH, estimated cost exceeds reasonable allowance
4.	Left, along Redwood Blvd (south of Rowland)	270 m* (900 ft)	4.3 m (14 ft)	Along R/W and on retaining wall
	City of Petaluma			
5.	Right, Ponderosa Dr to E. Washington	1760 m* (5770 ft)	3.7 m (12 ft)	Along edge of shoulder on barrier, estimated cost exceeds reasonable allowance
6.	Right, North of Lynch Creek	230 m (750 ft)	4.3 m (14 ft)	Along edge of shoulder on barrier
7.	Right, Napa Dr to Corona Rd	920 m (3020 ft)	4.3 m (14 ft)	Along edge of shoulder on barrier, estimated cost exceeds reasonable allowance
8.	Left, E. Washington to n/o Lynch Cr	820 m* (2690 ft)	3.7 m (12 ft)	Along edge of shoulder on barrier

* portion of sound wall is on retaining wall

Noise barriers and other wall features will include aesthetic treatments developed with local community input to ensure context sensitivity. This input will better ensure a design that is aesthetically accepted by the local communities while maintaining an aesthetic integrity of the US 101 corridor.

- Non-Motorized and Pedestrian Features: Segments A & C comprise existing freeway facilities that prohibit non-motorized travel. This project does not propose to change this restriction. Parallel routes on local streets are available for bicyclists and pedestrians. The existing overcrossings accommodate bicycles and pedestrians. Existing curb ramps not meeting the Americans with Disabilities Act (ADA) standards will be replaced. New curb ramps will be constructed at intersections where they currently do not exist.

  Segment B is an existing expressway that currently acts as the non-motorized route between the cities of Novato and Petaluma. Since this alternative proposes to convert the expressway to an access-controlled freeway, thus eliminating the non-motorized route, a replacement route was included in this study. The proposed replacement comprises a series of Class I and II Bikeways that will

place the non-motorized facilities outside the ultimate state right of way, while still allowing a continuous route through the corridor. The specific location and type of non-motorized facility varies depending on the Access Option. These locations are shown on the Overview of Access Options included as Attachment C, the Layout Sheets included as Attachment D, and listed above in Table 5-1.

As part of their EIR, SMART proposes to construct a bike/pedestrian path along the railroad tracks. The path is proposed to be constructed both within and adjacent to the railroad right-of-way. Existing at-grade crossings and local streets are being utilized to shift the path from one side of the tracks to the other. The proposed path crosses US 101 at several locations within Segments A & C. The proposed path is roughly parallel with US 101 thru Segment B, with rolling hills separating the railroad and bike/pedestrian path from the highway.

The Kenilworth School Pedestrian Overcrossing (POC) is an existing structure in Segment C. The school on the west side of the POC has closed and the property is being developed as retail stores. The POC does not meet ADA standards and is currently closed. No work on the POC is proposed with the MSN project.

- Needed Roadway Rehabilitation and Upgrading: According to the MSN Preliminary Materials Recommendation Report, the analysis of the deflection levels shows no need for an asphalt concrete (AC) overlay for structural integrity or to alleviate roughness. However, 135 mm (0.44 ft) of AC, 60 mm (0.20 ft) of gap-graded rubberized AC (RAC-G) and 30 mm (0.1 ft) of open-graded rubberized AC (RAC-O) is recommended to extend the service life of the existing pavement 20 years, control reflective cracking, provide a friction course, and improve wet weather driving conditions. The RAC-G will be placed from edge of pavement to edge of pavement. The RAC-O will be placed from 0.3 m (1 ft) past edge of traveled way to 0.3 m (1 ft) past edge of traveled way. Replacement of deteriorated sections of pavement (digouts) is also proposed and included in the cost estimate.

  Proposed pavement structural sections have been developed and coordinated with the District Pavement Strategy Review Committee. The approved checklist is included as Attachment F. The proposed structural sections for the median and outside widening, and roadway reconstruction are listed in the checklist and shown in the Typical Sections included as Attachment D. The same structural section will be used for the traveled way and shoulders for ease of construction and future expansion. For the reconstructed section of Segment B, a thicker structural section will be used for the outside two lanes and shoulder than for the inside lane and shoulder, as trucks are restricted to the two outside lanes.

  The structural sections for the widening and reconstruction are based on a 20-year design. Recently Caltrans adopted a policy to evaluate a 40-yr pavement life for projects. A structural section with a 40-yr design life isn't appropriate for the

widening proposed in Segments A & C, as the adjacent pavement has significantly less than a 40-yr life remaining. Thru these segments, a 20-year rehabilitation is proposed. Projected traffic volumes in Segment B, where significant roadway reconstruction is proposed, are not high enough to trigger a 40-yr pavement life. Instead it is recommended to analyze the life cycle costs of both a 20-yr and 40-yr pavement design life. Through this segment, portions of the existing roadway will be widened and other portions reconstructed, sometimes on a new alignment. A 40-yr design for the reconstructed portions would result in a checkerboard of sections with 40-yr pavement followed by 20-yr pavement.

A 10-year rehabilitation was also considered. A life cycle cost analysis (LCCA) will be conducted prior to the Project Report. A 20-year rehab is proposed. The cost analysis will include both a 10- and 20- year rehab as well as alternate structural sections for the widening and reconstruction.

The existing roadway through the Rowland Boulevard Interchange is experiencing pavement distress due to poor subgrade soils. It is proposed to reconstruct approximately 150 m (500 ft) of pavement. The subgrade would be excavated to a depth of 3.6 m (12 ft) and backfilled with lightweight fill.

Maintenance vehicle pullouts will be constructed at various locations throughout the project limits. The specific locations will be determined in final design in coordination with Maintenance and Traffic Operations.

- Needed Structure Rehabilitation and Upgrading: The structure work to accommodate the proposed improvements is shown in Table 5-6 below. Advance Planning Studies (APSs) have been completed for proposed structure work and are included as Attachment D. Several structure types were considered for the replacement of the Petaluma River Bridge, with the precast concrete bulb T type the most economical.

  The scope of work for the proposed Petaluma Blvd South OC has been changed since the APS was prepared. The structure width was increased to accommodate four lanes for operational reasons. The cost estimate has been increased accordingly.

  Traditional widening of the Olive Ave UC does not provide adequate falsework clearance. In lieu of closing Olive Ave to vehicle traffic during construction, it is proposed to construct the widening of the single-span structure on raised falsework to provide the required vertical clearance. After construction and falsework removal, the newly constructed portion would be lowered to final grade. This work is not shown on the APS, but the additional cost has been included in current cost estimates.

All of the work identified on the STRAIN report for those structures within the project limits has been included with the structure work proposed with the project except at Corona Rd OC. The STRAIN included upgrading the rails and replacing the deck treatment at the overcrossing. This work has not been included with the project since no other work was proposed for the overcrossing. The cost of the STRAIN work at the OC was minor and could be added during the final design phase.

Table 5-6. Proposed Structure Work

Bridge No.	Bridge Name	KP	Type of Work
27 0081H	Ignacio Separation/OH	30.5	Deck treatment with Methacylate
27 0081F	W37-N101 Connector OH	30.5	Deck treatment with Methacylate
27 0086K	South Novato Blvd. OC	30.5	Earthquake retrofit of columns and footings
27 0089L/R	Novato Creek	R33.0	Widen in median, replace outside rails
27 0090L/R	Franklin Ave OH	R33.7	Widen in median and outsides, sound wall both sides
27 0092L/R	Olive Ave UC	R34.5	Widen in median, add sound walls on both side Build on raised falsework due to poor clearance
27 0094L/R	North Novato OH	35.9	Widen in median, replace outside rails
27 0115	Redwood Landfill OC	40.8	Widen on left (north) side with options 4b & 12b
TBD	San Antonio OC	42.6	New Overcrossing with options 4b, 14b and 14d
27 C0051	S. San Antonio Creek	N/A	Minor maintenance
TBD	S. San Antonio Creek	N/A	New Bridge for frontage road
20 0019L/R	San Antonio Creek	44.5/0	Remove left Bridge, replace joint seals on right Bridge
TBD	San Antonio Creek	44.5/0	New Bridge for US 101 on new alignment
TBD	Petaluma Blvd S. OC	5.1	New OC with all Access Options
20 0156L/R	South Petaluma UC	5.6	Remove
20 0154L/R	Petaluma River	5.3	Replace on new vertical alignment
20 0155L/R	Route 101/116 SOH	5.8	Widen left Bridge, replace right Bridge
20 0245	Caulfield Lane OC	6.4	Deck treatment with Methacylate
20 0246	East Washington St OC	7.7	Deck treatment with Methacylate
20 0163L/R	Washington Creek	7.7	Widen in median and on left & right sides
20 0162L/R	Lynch Creek	8.3	Widen in median and on left & right sides
20 0158L/R	North Petaluma OH	9.3	Replace OH on new vertical alignment

- Cost Estimate: Preliminary cost estimates have been developed for both of the build alternatives under study as well as the four Access Options. The current year construction costs for the various alternatives and options are shown in Table 5-7 and do not include support costs. The six-page estimates for the Fixed HOV Lane Alternative and Access Options are included as Attachment G. Since the difference between the two build alternatives involves barrier quantities and the reversible ingress/egress features in Segment B, six-page estimates for the Reversible HOV Lane Alternative are not included. Total escalated project costs are shown in Section 8.

  Total construction costs were estimated in June 2007 and range from $447.0 million to $457.6 million for the Fixed HOV Lane Alternative, depending on

access option. Total construction costs for the Reversible HOV Lane are estimated to be $2.4 million more.

Table 5-7. Estimated Project Construction Costs
(millions)

Alternative	Roadway Construction	Structure Construction	Right-of-Way*	Total
Fixed HOV Lane Alternative				
Segment A	$71.5	$11.9	$3.8	$87.2
Segment B – Access Option 4B	$185.5	$41.5	$37.7	$264.7
Segment B – Access Option 12B	$181.1	$39.7	$36.3	$257.1
Segment B – Access Option 14B	$175.9	$40.8	$37.4	$254.1
Segment B – Access Option 14D	$180.0	$40.4	$37.8	$258.2
Segment C	$81.4	$22.0	$2.3	$105.7
Total				**$447.0 to $457.6**
Reversible HOV Lane Alternative				
Segment A	$71.5	$11.9	$3.8	$89.0
Segment B – Access Option 4B	$187.9	$41.5	$37.7	$271.0
Segment B – Access Option 12B	$183.5	$39.7	$36.3	$263.5
Segment B – Access Option 14B	$178.3	$40.8	$37.4	$261.0
Segment B – Access Option 14D	$182.4	$40.4	$37.8	$265.5
Segment C	$81.4	$22.0	$2.3	$115.9
Total				**$449.4 to $460.0**

* Includes railroad and utility relocation costs, and environmental mitigation

- Right of Way Data: A Right of Way Data Sheet has been prepared for the proposed improvements. The Data Sheet, included as Attachment H, shows the costs to purchase all currently identified needs, including temporary rights, permanent rights, utility relocations, and mitigation land or bank credits. The costs shown in the Data Sheets are the same for both build alternatives.

5.2 - Rejected Alternatives

Several alternatives were considered and rejected during the PID and PA&ED phases. These alternatives were proposed in the original PSR's, developed during the course of study or identified through community interaction. They have been evaluated during the design studies that accompanied the environmental studies, and, with the concurrence of the PDT, have been set aside from further study. A brief description of each and the reason it was rejected is provided below.

5.2.1 - Transportation Systems Management (TSM):

The objective of Transportation Systems Management is to reduce congestion without significant new infrastructure. This alternative would implement strategies focused on reducing peak hour travel demand using measures such as express buses traveling in HOV lanes, electronic metering and information systems, new and expanded Park and Ride facilities, enhanced rideshare matching services, measures such as flex time and alternative work schedules, and satellite telecommuting centers.

This alternative was considered as a "stand alone" solution to the project's need and purpose but was found to be only partially effective without the construction of HOV lanes. However, since the build alternatives include HOV lanes, many TSM features were included. The TSM Alternative was rejected because it did not fully meet the project need and purpose.

5.2.2 - Reversible HOV Lane in Southern and Northern Segments:

A Reversible HOV Lane, similar to that proposed for Segment B under a viable build alternative, was considered for Segments A & C as a way to minimize the construction footprint of the build alternative.

Early traffic studies showed that the urbanized areas in these segments require multiple ingress/egress openings, creating weaving locations that retard the through movement of HOV vehicles. In addition, the existing overcrossing structures throughout these segments have column bents along the US 101 centerline, requiring the reversible lane and one direction of the mixed flow lanes to be shifted to avoid the columns. This alternative was rejected due to operational deficiencies.

5.2.3 - High Occupancy Vehicle Toll (HOT) Lane:

A High Occupancy Toll (HOT) Lane alternative would provide a barrier-separated HOV lane in each direction. Ingress and egress locations would be included along the corridor. HOT lanes are accessible to HOV users without payment while SOV users pay a toll, which is calculated depending upon the traffic congestion in the adjacent mixed flow lanes. In addition to the added width required for the barrier separation, significant infrastructure is required to inform potential SOV users of the current toll and to implement the fast-pass detection system. Currently, there are no HOT Lanes in northern California; however, several studies are under way. Legislation would be required to implement this alternative.

Two variable-priced toll (aka HOT) lane studies have been conducted on the US 101 corridor through Marin and Sonoma counties. The first, completed in January 1999, studied toll lanes between Petaluma and Windsor, in Sonoma County. The second, completed in January 2000, evaluated toll lane options between SR 37 and Petaluma. Caltrans and MTC concluded that the studies indicate that there would be very little difference in corridor performance between the HOV and HOT lane options. Time

savings for users of the HOV or HOT lanes would range from 4 to 8 minutes over the entire length of the project. Although toll lane revenues might be sufficient to cover ongoing operating and maintenance costs (estimated to be about $1.5 million per year), revenues would not be sufficient to finance their construction. However, HOT lanes may be more fiscally feasible on a corridor-wide basis than a shorter portion such as the MSN Project.

Caltrans and MTC are funding an independent study to consider HOT lanes for the Bay Area region. The Regional High Occupancy Toll (HOT) Lane Network Feasibility Study began in December 2006 and is expected to be completed in mid 2007. Although the regional HOT lane study may benefit projects like MSN in the future, for now MSN is moving forward without this alternative.

5.2.4 - Access Options in Segment B:

As discussed previously, a weighted matrix was prepared to screen the 26 Access Options developed. Four of the 26 were selected for further study. The Access Options not selected did not rank well due to high costs, more significant visual, wetland, biological and historical impacts, and a higher potential for inducing growth. A listing of the various options rejected and the weighted matrix scoring, please see the Draft EIR/EIS.

5.2.5 – Realign West Washington Interchange Ramps:

A study was conducted to evaluate realigning the existing NB off- and on-ramps at the East Washington Interchange in the City of Petaluma. The ramp terminus would be shifted to the west, towards US 101. This would provide more storage on eastbound East Washington Street between the ramps and McDowell Boulevard. Heavy eastbound to northbound movement occurs at the E. Washington/McDowell intersection, frequently backing up past the existing ramp intersection.

Realigning the ramps was not included in the project due to design standards, safety and operational issues. Shifting the ramp terminus to the west requires reversing horizontal curves along the off-ramp resulting in nonstandard superelevation transition and unexpected geometry for drivers. Also, realigning the off-ramp would reduce the available storage, leading to the potential for ramp traffic to backup onto mainline during peak periods. These issues could be resolved with additional right of way. Several adjacent residents would need to be acquired to move the off-ramp gore point further upstream to improve the ramp geometrics.

The East Washington Interchange Project proposes to widen the northbound off-ramp terminus to provide dual right and left turn movements. This, along with synchronizing the ramp signal with the McDowell Boulevard signal, is expected to improve circulation between the two intersections.

SECTION 6 - CONSIDERATIONS REQUIRING DISCUSSION

6.1 - Hazardous Waste

During the Record Search phase of the February 2006 Hazardous Waste Preliminary Site Investigation, more than 70 sites that are located within or adjacent to the proposed project footprint were identified as known or potential areas of contamination. Twenty-three of these sites are considered to have a medium probability, and two sites are considered to have a high probability that if the site is contaminated with hazardous wastes, those contaminants would be encountered during construction of the project..

One of the high probability sites is the Gas N Shop located at the intersection of US 101 and Kastinia Rd. The State leaking underground storage tank (LUST) database indicates that the aquifer beneath the site is contaminated with MTBE. The groundwater at the site is approximately 2.4 m (8 ft) below the existing ground and flows eastward underneath US 101. Site investigation reports indicate that the groundwater beneath the site, as well as US 101 is contaminated with benzene and MTBE.

The other high probability site is the Novato Disposal Services located on Petaluma Boulevard South. The property is listed as an active LUST site, although documents indicate that the Sonoma County Environmental Health Division and the Regional Water Quality Control Board recommend closing the case.

It is anticipated that any impacts with either of the build alternatives can be mitigated and the report recommends that a Phase I Environmental Site Assessment be conducted for each parcel that requires a partial, or full, right-of-way take.

Although naturally occurring asbestos is not known to be present at the project site, the potential for its existence in the sediments of Novato Creek and San Antonio Creek should be evaluated due to the upstream proximity of ultramafic rocks. In addition, due to the age of the man-made structures throughout the project limits, industrial asbestos could be present and tests should be performed to ascertain its presence prior to any bridge demolition.

Aerially deposited lead (ADL) is known to exist in the surface soils adjacent to the edge of pavement within the project limits. Soil excavated from along the shoulders or median of existing US 101 with either of the build alternatives has the potential to be characterized as a California hazardous waste and a detailed site investigation should be completed to determine the concentration of lead in that soil. Based on similar testing on adjacent projects, it is assumed that the levels of lead concentration, once determined, will allow this material to be encapsulated on-site within the proposed roadway embankments. The cost estimates include $17.2 million for Type Y excavation and $2.9 million for Type Z excavation for handling the material to be encapsulated.

Normally now required of consultants

Lead-containing traffic markings that are typically characterized as a California hazardous waste were found within the project limits. Any waste material generated by the removal of these yellow thermoplastic and painted traffic stripes is addressed during construction by

incorporation of standard special provisions. A cost for handling and disposing of this waste is included in project costs.

6.2 - Value Analysis

A formal Value Analysis (VA) was conducted in September 2006. The Value Analysis Report validated the techniques that were utilized throughout the development and winnowing of alternatives by the PDT. In addition, the VA found:

- The project would benefit from coordinating future utility upgrade projects.
- Eliminating the RAC-O on the shoulders would save costs. The RAC-O would extend 0.3 m (1 ft) past the edge of traveled way.
- The project will be phased to allow greater flexibility in funding. Early phases of construction should focus on Segment B.
- Numerous Design Suggestions were developed including using a longer bridge at the Petaluma River instead of having to surcharge an embankment, lowering mainline profile at the Redwood Landfill OC, lightweight sound wall on bridges, and lime treating the subgrade.

An implementation meeting was held on January 31, 2007. Comments and decisions from the meting were incorporated into the final VA Report. Eliminating the RAC-O on the shoulders and using the longer structure at the Petaluma River Bridge were implemented and incorporated into the preliminary design and cost estimates. Coordinating future utility upgrades is on-going. Construction of the proposed improvements will be phased based on available funding. Development of the first phase scope of work will be negotiated between Caltrans, MTC, CTC, TAM and SCTA once a Preferred Alternative is identified.

6.3 - Resource Conservation

The scope of the MSN Project is to reduce recurring congestion through a multi-modal approach and improve traffic safety and vehicular access with the freeway upgrade of the existing expressway. These improvements in operational efficiency would allow the most effective use of limited resources.

The freeway upgrade of Segment B will require a significant amount of new alignment and structural section to be built. However, wherever possible, the existing highway is being utilized as part of the new freeway, frontage road and bikeway system. In addition, ADL-laden soil excavated from along the shoulders or median of existing US 101 has been identified for encapsulation within the proposed roadway embankments. Asphalt grindings will be recycled as aggregate and shoulder backing and rubberized asphalt will be used in the proposed structural section.

6.4 - Right of Way

General – Right of Way Data Sheets were prepared based on the scope of work described and on maps provided by Design. Estimated cost information is contained in the Right of Way Data Sheets, included as Attachment H. The costs shown in the Data Sheets are the same for both build alternatives.

The majority of work identified within Segments A & C, the existing freeway portions of the project, generally require only temporary rights from the adjacent property owners and local entities for work such as sound walls and pavement conforms on local streets.

The freeway upgrade of Segment B would require the purchase of a significant amount of right of way to provide for the combination of interchanges and frontage roads required to maintain access to intersecting roadways and adjacent parcels, as well as to replace the current bicycle and pedestrian access. In addition ingress/egress rights are needed at two parcels to avoid land-locking a parcel.

Depending on Access Option between 71 ha and 84 ha (176 ac and 208 ac) of new right-of-way is required from 62 or 63 parcels. In addition between 4 ha and 8 ha (10 ac and 19 ac) of temporary construction easements (TCEs) are required from an additional 108 parcels. The approximate amount of new right-of-way and temporary easements required for each Segment and the Access Options within Segment B are shown in Table 6-1 below. These areas are the same for both build alternatives.

In Segment A, new right of way is required for the proposed Rowland Ave NB on-ramp widening. Temporary construction easements are needed for sound wall and structure construction. Encroachment permits will be required for sound wall construction and pavement conforms.

In Segment B, new right of way is required for the proposed freeway and frontage roads. Right-of-way for the frontage roads will be relinquished to the respective county after construction. Temporary construction easements are needed for conforming private roads and driveways.

In Segment C new right-of-way is required along the northbound SR 116 on-ramp for a sound wall and along the southern approach to the North Petaluma OH for embankment slopes. Temporary construction easements are needed for sound wall and structure construction. Encroachment permits will be required for sound wall construction and pavement conforms.

Table 6-1. Proposed R/W Acquisition and Easements

Segment	Fee		TCE	
	hectares	acres	hectares	acres
Segment A	0.25	0.63	1.18	2.92
Segment B – Access Option 4b	79.45	196.32	2.88	7.12
Segment B – Access Option 12b	70.76	174.85	2.88	7.12
Segment B – Access Option 14b	80.81	199.69	1.36	3.37
Segment B – Access Option 14d	83.71	206.84	4.89	12.10
Segment C	0.12	0.30	1.53	3.79

The Relocation Impact Memo determined that there is no significant impact to owners, tenants, businesses or persons in possession of real property to be acquired who would qualify for relocation assistance benefits or entitlements under the Uniform Relocation Assistance and Real Property Act of 1970. One residential unit would be required to relocate as a result of this project. The proposed R/W acquisition will not result in any severed or bisected parcels.

The PDT determined that the proposed project is in an area of high land values, having a potential for future airspace leases, though Marin and Sonoma counties have shown a past tendency for deterring this type of use through County Plans and the purchase of property rights. If this local inclination changes in the future, then Segments A & C will not have changed the existing conditions, while Segment B proposes to create a County-owned frontage road and bikeway system that will parallel the freeway and could accommodate future airspace leases.

A portion of the Park and Ride lot at the Rowland Blvd Interchange is leased as airspace on weekends. Potential impacts to the airspace lease will be coordinated with R/W Airspace during Final Design so as to allow proper notification times for any tenants.

The right-of-way to be acquired for the frontage roads and bike paths will be relinquished to the respective county. Initial discussions regarding relinquishments have been held with the counties. Concurrence from the counties is anticipated prior to PA&ED.

Railroad – Improvements are proposed for within SMART/NWP right of way. SMART's consultant verbally notified the Department on November 27, 2006 that the clearances for the overhead work near SMART's tracks are adequate.

Utilities – Utility relocations, primarily in Segment B, are required with the proposed improvements. The facilities in Segment B will be relocated along the frontage road/bike path system, outside of the ultimate State R/W. No longitudinal encroachments within state R/W are anticipated for either of the build alternatives. Utility easements will be established along the frontage road right-of-way for installation and maintenance of the utilities. Although the final "Determination of Liability" will occur on a case-by-case basis as the

relocation plans are finalized, preliminary indications show that cost sharing should be on a 50%-50% split with most of the major utility companies.

6.5 - Environmental Issues

The Draft EIS/EIR has been prepared in accordance with Caltrans' environmental procedures, as well as State and Federal environmental regulations and is the appropriate document for the proposal. The Draft EIR/EIS has been bound separately, but the approval page and Summary Section have been included as Attachment A.

There are jurisdictional wetlands within the project limits. Wetland impacts in Segments A & C are minor and occur within the Route 101/37 Interchange, the Rowland Blvd Interchange, the Lakeville Highway/SR 116 Interchange, and along Washington and Lynch creeks. There are also wetlands in Segment B. Preliminary wetland delineations have been done; concurrence by the Environmental Protection Agency and the US Army Corps of Engineers is pending. This area, on the east side of US 101 across from Olompali SHP, is a large wetland complex and is where the project's wetland impacts primarily occur. Significantly smaller impacts occur near San Antonio Creek and along the small unnamed creeks and drainages thru the segment. The wetland impacts, based on the preliminary delineation, vary between 2.4 ha (6 ac) and 2.8 ha (7 ac) depending on Access Option and are the same for both of the build alternatives.

There are several FEMA-designated flood zones within or adjacent to the project limits. No longitudinal encroachments into the existing floodplain are anticipated; revisions to FEMA maps will not be required as a result of the proposed improvements. Confirm in scope

This project will replace some existing impervious areas as well as create new impervious areas. The proposed improvements will comply with Caltrans' Statewide National Pollutant Discharge Elimination System (NPDES) permit. A Storm Water Data Report (SWDR) was prepared summarizing the proposed actions for compliance with the permit. The approval page of the SWDR is included as Attachment E. Treatment BMP are proposed including biofiltration strips and swales, and infiltration and detention devices. Dewatering will be required for foundation work around bridges and culverts. The groundwater encountered will be tested for contamination and properly disposed of if necessary.

The environmental issues identified in the Draft EIR/EIS include farmland conversion, riparian and tree removal and visual impacts in the Central Segment, avoidance of bats and nesting birds, and temporary and permanent loss of habitat for threatened and endangered species (steelhead and Chinook salmon, red-legged frog, and salt marsh harvest mouse).

There are five archeological sites meeting criteria for determination of eligibility that would be impacted by the proposed improvements. A MOU is being prepared to provide a mechanism to recover significant data. Archeological monitoring would be implemented during construction.

A range of mitigation measures have been identified including mitigation planting; on- and off-site wetland restoration or existing bank; surveying and excluding bats and protected birds from nesting on bridges where work is proposed; pickleweed restoration; storm water treatment; and aesthetic treatments on structures and walls. The costs for these mitigation measures have been included in project cost estimates.

6.6 - Air Quality Conformity

This project conforms to regional air quality standards. Each of the project alternatives is fully compatible with the design concept and scope described in the current Regional Transportation Plan (RTP) as well as the current Federal Regional Transportation Improvement Program (FRTIP). The Congestion Management Agency, TAM and SCTA have determined that it conforms to the State Implementation Plan (SIP) for air quality.

The December 2005 Air Quality Impact Report analysis utilizes a protocol jointly developed by Caltrans and the University of California-Davis Institute of Transportation, and approved by the Environmental Protection Agency for use in the Bay Area.

6.7 - Title VI Considerations

The provisions for low-mobility and minority groups will be incorporated into the project. These features will include:

- A series of Class I and II Bikeways will replace the current non-motorized route along the shoulder of the existing expressway between the cities of Novato and Petaluma.
- Curb ramps will be provided at intersections within the State R/W where they currently don't exist and where new sidewalk is being added, or where existing curb ramps don't conform to ADA standards.
- Where sidewalks are being added, a minimum 1.2 m clearance will be provided to obstacles such as electroliers, signal standards, fire hydrants, etc.

The above proposed improvements were designed in accordance with Design Information Bulletin 82-03 "Pedestrian Accessibility Guidelines for Highway projects." These improvements will bring the corridor into conformance with ADA standards.

SECTION 7 - OTHER CONSIDERATIONS

7.1 - Public Hearing Process

Recommend that a public hearing, in the "open house" format, be scheduled presenting the developed viable alternatives for public comment.

7.2 - Route Matters

The majority of work identified within Segments A & C will only require widening of the existing facilities that will not change the existing freeway agreements. However, the freeway upgrade of the existing expressway in Segment B proposed with both of the build alternatives will require new agreements.

7.2.1 - Freeway Agreements and New Connections:

There are existing freeway agreements covering the MSN project limits. Within Marin County, the agreements cover freeways adopted on April 20, 1944, July 17, 1946 and November 27, 1962. The agreement within the City of Novato was executed on January 24, 1998 and covers from the south city limits to the north city limits. The agreements with Marin County were executed on September 24, 1974 covering from the Novato north city limits to Airport Rd and on July 24, 1944 covering from Airport Rd to the county line.

Within Sonoma County the freeway agreements cover freeways adopted on April 20, 1944 and March 23, 1950. The agreements with Sonoma County were executed on June 8, 1944 covering from the south county line to south of the Petaluma Boulevard South Interchange, and on February 16, 1954 covering from south of the Petaluma Boulevard South Interchange to south of the Lakeville Highway/SR 116 Interchange. The agreement with the City of Petaluma was executed on December 21, 1966 and covers from south of the Lakeville Highway/SR 116 Interchange to north of the Old Redwood Highway Interchange.

Revisions to the existing Freeway Agreements will be required with Marin County, Sonoma County and the Department of State Parks for Segment B as part of the expressway-to-freeway upgrade, once a preferred access alternative has been selected. These agreements will provide for the relinquishment of the local roads and bicycle facilities that are constructed as part of the project.

Approval from the California Transportation Commission will be required for the "Connection as Part of the Initial Construction of Freeway" for the interchanges in Segment B that would be included as part of the freeway construction.

7.2.2 - Route Adoptions:

A Route Adoption is not required for Segment B since the right of way required for the new alignment is substantially contiguous to the existing expressway. In addition, the right of way to be relinquished will contain new frontage roads, not the existing highway.

7.2.3 - Relinquishments:

The freeway agreement required for Segment B will identify for relocation those local roads constructed as part of the expressway-to-freeway upgrade, once a preferred access alternative has been selected.

7.3 - Permits

A Streambed Alteration Agreement (1602 permit) is required from the Department of Fish and Game for the proposed bridge and box culvert work. An Individual Section 404 permit is required from the US Army Corps of Engineers for fill material in wetland areas. A Section 401 Water Quality Certification is required from the Regional Water Quality Control Board.

The proposed replacement of the Petaluma River Bridge requires a new lease agreement from the State Lands Commission as well as Section 9 approval from the US Coast Guard.

7.4 - Cooperative Agreements

A Memorandum of Understanding (MOU) is in development among TAM, SCTA and Caltrans to outline the individual roles/responsibilities for each of the partners, as this project completes the environmental process and proceeds into design and construction. Due to the very large scope of the MSN Project, it is anticipated that design and construction will occur in smaller elements that will allow for easier funding. As these elements are identified, individual cooperative agreements for funding and staff responsibilities will be negotiated utilizing the terms of the completed MOU. The most recent draft MOU is included as Attachment I. Recent CMIA funding is currently being addressed and the draft MOU will be revised accordingly.

7.5 - Other Agreements

There are existing freeway maintenance agreements with the MSN Project limits. The existing agreements are listed in Table 7-1 below. No changes to the existing agreements within the cities of Novato and Petaluma are anticipated.

Table 7-1. Existing Freeway Maintenance Agreements

Entity	Date Approved
Marin County	June 16, 1983
City of Novato	July 1, 1980
City of Petaluma	March 12, 1980
Sonoma County	January 12, 1990
City of Novato – Electrical Facilities	March 30, 1993
Golden Gate Bridge, Highway and Transportation District - Electrical Facilities	May 14, 2003
Sonoma County – Traffic Signals and Intersection Lighting	March 11, 1974
Golden Gate Bridge, Highway and Transportation District – Bus Shelters	March 12, 2004

Revised Freeway Maintenance Agreements are anticipated with Marin County, Sonoma County and Department of State Parks to outline their roles/responsibilities with respect to the overcrossings, frontage roads and bike paths required for the freeway upgrade of Segment

B. Preliminary meetings have been held with each of these entities. Once a preferred alternative has been identified, formal agreements will be pursued.

A Section 134 "long clause" will be required, as well as an Amended Construction and Maintenance Agreement from SMART/NWP Railroad is required for the proposed widening of the Franklin Ave OH, North Novato OH, Route 101/116 SOH (Lt structure) and the replacement of the Route 101/116 SOH (right structure) and the North Petaluma OH.

7.6 - Involvement with Navigable Waterways

Consultations with the US Coast Guard and the California State Lands Commission have determined that the Petaluma River is the only navigable waterway within the project limits. This project proposes to replace the existing Petaluma River Bridge. The US Coast Guard has been intrinsically involved with the preliminary bridge design, has agreed to both temporary and permanent preliminary clearances, and is working to ascertain any "special needs" of the local mariners. In a letter from the California State Lands Commission, staff identified additional possible jurisdiction at Lakeville Road and Washington Street, which will be resolved as the design details are developed.

7.7 - Transportation Management Plan

A Transportation Management Plan (TMP) will be required for this project. The TMP is a special program that will be implemented during construction to minimize and prevent delay and inconvenience to the traveling public. The proposed construction and improvements may include roadwork requiring lane closures or detouring.

The TMP for the project will be developed and refined during the PS&E and final design phases, supported by detailed traffic studies to evaluate traffic operations. The need for necessary lane closures during off-peak hours or at night, or short-term detour routes will be identified, as required. The TMP will include press releases to notify and inform motorists, business, community groups, local entities, emergency services, and politicians of upcoming closures or detours. Various TMP elements such as portable Changeable Message Signs and CHP Construction Zone Enhanced Enforcement Program (COZEEP) may be utilized to alleviate and minimize delay to the traveling public.

A Transportation Management Plan (TMP) Data Sheet has been prepared to identify the significant TMP elements and ensure all anticipated costs are included in this report. The TMP Data Sheet is included as Attachment J.

7.8 - Stage Construction

Due to the high-traffic volumes and existing delays, any construction activity on US 101 requires that stage construction be considered to minimize impacts to the traveling public. Preliminary Stage Construction designs have been completed for all major elements of the proposed MSN Project. Through a multi-stage approach, the existing number of lanes will be maintained throughout construction.

The median widening, primarily in Segments A & C, is proposed to be done in three stages. Stage 1 and 2 would widen a 1.8 to 3.6 m (6 to 12 ft) strip adjacent to the existing number 1 lane (Stage 1 NB, Stage 2 SB). This work would be done at night and on weekends using lane closures. During periods of nonwork the excavation adjacent to the number 1 lane would be backfilled with aggregate base at a 1:4 slope. A row of channelizers would delineate the edge of traveled way, but no inside shoulder would be provided. Clauses in the contract special provisions would limit the amount of widening under construction at any given time. At the end of each stage, k-rail would be placed to provide a minimum 0.6 m (2 ft) shoulder. Stage 3 would complete the median widening. This stage would be constructed during the day, with restrictions during peak periods on construction vehicles entering and exiting the work zone.

Shifting traffic to the outside so that all the median work could be done behind k-rail was considered. As the outside shoulder isn't structurally adequate for heavy traffic loads, extensive rebuilding (digouts) of the shoulder would be anticipated. This work would require lane closures and would be difficult to anticipate accurate quantities for contract plans. There is also the risk that the shoulder could deteriorate faster than workers could make repairs. Due to the cost to rebuild the outside shoulder and losing use of the shoulder for breakdowns and emergency vehicles during construction, this staging concept was rejected.

Significant portions of the Segment B will be reconstructed. Some of this work can be constructed in two stages. Alignments have been developed to allow buildings portions of the roadway on either side of the existing roadway. One direction of traffic would then be shifted onto the recently build roadway. Other portions of the reconstruction, where the existing alignment is being maintained, will require a three stage construction. The median would be constructed during the first stage, then used alternately for each direction of traffic while that side is being reconstructed. All of this work would be done behind k-rail, with minimum 0.6 m (2 ft) inside and 3.0 m (10 ft) outside shoulders provided. Temporary retaining walls are required thru some portions where profile correction is proposed.

Work along the outside shoulder thru portions of Segment A is needed for sound wall construction. This work will be done behind k-rail with shoulder closures after the median widening is completed. Outside widening is also required in Segment C. This work will be done behind k-rail with traffic shifted to the median to provide an outside shoulder.

The Petaluma River Bridge and North Petaluma OH will be replaced on the existing horizontal alignment but with a raised vertical alignment. Three stages will be utilized; the first stage would use temporary retaining walls to construct the middle portion within the existing median. One direction of traffic would then be routed to the new section, and the outside portion of that direction constructed. Inside and outside shoulder width for traffic on the new section would be 0.6 m (2 ft).

The Petaluma Boulevard South Interchange will be reconstructed from a slip ramp type to a spread diamond type interchange. Also, mainline US 101 is shifting to the west thru the

existing interchange. Extensive staging is required to maintain access for the southbound ramps.

The final stage of construction will place the RAC-G and RAC-O overlay. The placement of this material is temperature sensitive and will be placed during daylight, most likely on weekends, under lane closure. Since only a thin overlay is proposed (60 mm, 0.2 ft of RAC-G and 30 mm, 0.1 ft of RAC-O), this work will proceed quickly.

The existing traveled way thru the Rowland Boulevard Interchange will be reconstructed to remove poor subgrade soils. The median in the area would be widened first, then traffic shifted to the median and the reconstruction done behind k-rail.

There is insufficient falsework vertical clearance for widening the Olive Ave OC. Instead it is proposed to construct the widening for this single-span, cast-in-place box girder on raised falsework, and then lower into place. This additional work was not included in the APS. The estimated cost has been increased to reflect the additional work. An alternative that could be evaluated during the final design phase is to close the roadway at the overcrossing.

All existing and operational Traffic Operational System (TOS) elements will be maintained throughout the construction phase. Any TOS elements that may be affected by temporary or permanent construction will be relocated, modified or replaced as necessary.

Once a fundable portion of the MSN Project has been identified for design, stage construction plans for that project will be finalized. These plans will include the work within the project limits, as well as the interaction with other on-going projects, including traffic handling and materials balancing.

7.9 - Accommodation of Oversize Loads

Upon completion of the MSN Project, all structures within the project limits will meet the minimum clearance for new construction. Existing vertical clearances have been checked throughout the project limits and all of the existing structures meet these minimum clearances, with the exception of the South Novato Boulevard OC, which is planned for a profile correction, and the South Petaluma UC, which is slated for removal as part of this project.

7.10 - Graffiti Control

Vines are proposed for sound walls to discourage graffiti. Anti-graffiti coatings were considered, but due to maintenance and storm water issues, were rejected. Maintenance prefers to paint the surfaces to cover graffiti.

7.11 – Risk Management Plan

A Risk Management Plan (RMP) has been prepared for the project. The plan has been maintained and updated by the PDT at the regularly schedule PDT meetings. The Draft Risk Management Plan is included as Attachment K.

The major risks included in the RMP concern impacts to the project schedule due to timing of environmental surveys, concurrence from regulatory agencies and the large number of R/W parcels; impacts to project costs due to additional traffic handling requirements, volatile material prices, contaminated groundwater and aerially deposited lead; and uncertainties regarding the scope of work for the first fundable phase of construction.

SECTION 8 - PROGRAMMING

8.1 - Programming

This project is a partially funded STIP project with current programmed funding for portions of the PA&ED Support, PS&E Support, R/W Support, Construction Support, R/W Capital and Construction Capital Components. This current funding comprises multiple programs as shown in Section 8.2 below

Future programming is required for the PS&E Support, R/W Support, Construction Support, R/W Capital and Construction Capital Components of the project. Caltrans has given US 101 priority for the programming of ITIP funds as a High Emphasis Focus Route. Once a preferred alternative is selected phased construction components will be programmed to match available funding.

Total project costs include construction, right-of-way, off-site environmental mitigation, and support costs. For programming purposes, the Fixed HOV Lane Alternative with Access Option 4b was used as the basis for cost estimates. That option includes 3 new interchanges while the other access options include two. Project construction costs were escalated 5.5 years to the year 2012, the anticipated mid-year of construction, at a rate of 5% per year. R/W capital costs were escalated 3.5 years at a rate of 5%. PA&ED support costs were estimated at 4% of capital costs. PS&E support and construction support costs were estimated at 10% and 13% of construction capital costs, respectively. R/W support costs were estimated at 10% of R/W and off-site environmental mitigation capital costs. The total project costs are shown in Table 8-1 below.

Table 8-1. Total Project Costs
(dollars in millions and escalated)

	Capital				Support				
Segment	Roadway	Bridge	R/W	Env	PA&ED	PS&E	R/W	Con	Total
A	$93.5	$15.6	$3.0	$1.5	$4.5	$10.9	$0.4	$14.2	$143.6
	$109.1		$4.5		$30.0				
B	$242.6	$54.3	$21.5	$23.2	$13.7	$29.7	$4.5	$38.6	$428.1
	$296.9		$44.7		$86.5				
C	$106.5	$28.8	$1.8	$0.9	$5.5	$13.5	$0.3	$17.6	$174.9
	$135.3		$2.7		$36.9				
Total	$442.6	$98.7	$26.3	$25.6	$23.7	$54.1	$5.2	$70.4	$746.6
	$541.3		$51.9		$153.4				

The proposed project schedule is shown in Table 8.2 below. The schedule is based on starting final design work after selection of the preferred alternative but prior to PA&ED.

Table 8-2. Proposed Project Schedule

Milestone	Date
PA&ED	July 2008
R/W Maps	July 2008
PS&E	July 2010
RTL	December 2010
CCA	December 2014

The estimated capital support required for the MSN Project is shown in table 8-3 below.

Table 8-3. Proposed Project Support in PYs

	Prior	06/07	07/08	08/09	09/10	10/11	11/12	Future	Total
Transportation Planning	22	15	10	6	6	6	4	3	72
District Design	40	10	24	46	50	47	20	10	247
Right-of-Way	15	4	4	6	8	6			43
District Construction								350	350
59-DES Design	21	3	2	25	25	30	15	5	126
59-DES Construction								64	64
Total PYs	98	32	40	83	89	89	39	432	902

8.2 - Funding

As mentioned above, the MSN Project is currently partially funded. The current funding sources as well as additional funding needs are shown below in Table 8-4. Funding sources include TCRP, IIP, RIP, Local Measure M, SAFETEA-LU and TEA 21 Demonstration. The project funding sources including an unfunded future need are shown in Table 8-4 below.

Table 8-4. Project Funding Sources
(dollars in thousands and escalated)

	Component						
Funding Source	PA&ED	PS&E	R/W Sup	Con Sup	R/W	Con	Total
CMIA				$10,500		$71,900	$82,400
TCRP	$5,600	$10,900					$16,500
ITIP-IIP	$12,800					$3,800	$16,600
RIP Marin		$2,200					$2,200
RIP Sonoma						$2,200	$2,200
STIP – RIP new Marin	$1,300	$5,000	$1,300	$2,000	$13,420	$11,980	$35,000
STIP – RIP new Sonoma			$700	$4,980	$7,020	$4,300	$17,000
SAFETEA-LU HPP Marin						$11,322	$11,322
SAFETEA-LU 3763 Marin						$425	$425
SAFETEA-LU 3763 Sonoma						$425	$425
Demo – Tea 21	$3,100					$5,650	$8,750
Measure M Sonoma						$5,677	$5,677
ITIP – IIP Augmentation						$4,300	$4,300
Future	$900	$36,000	$3,200	$52,920	$31,460	$419,321	$453,801
Total	$23,700	$54,100	$5,200	$70,400	$51,900	$541,300	$746,600

The current Funding Plan is shown in Table 8-5 below. This available funding will be the basis of the first phase of design and construction for the MSN Project. Once a preferred alternative is selected, Caltrans, TAM, SCTA, and MTC will select portions of the project to fit available funding, while providing congestion relief and safety and operational benefits. Most likely portions of Segments A & B will be part of the first phase. The CMIA funding was approved for Segment A while improvements to Segment B benefit both Marin and Sonoma counties. Caltrans and its partner agencies continue to seek additional funding sources for this project.

Table 8-5. Project Funding Plan – First Phase
(dollars in thousands and escalated)

	Prior	07/08	08/09	09/10	10/11	11/12	12/13	Total
PA&ED	$21,500	$1,300						$22,800
PS&E		$15,900	$2,200					$18,100
R/W Support			$2,000					$2,000
Con Support					$17,480			$17,480
R/W			$7,020	$13,420				$20,440
Construction					$121,979			$121,979
Total	$21,500	$17,200	$11,020	$13,420	$139,459			$202,799

SECTION 9 - REVIEWS

This project has been reviewed by several FHWA engineers during the development of the proposed improvements. This project is eligible for federal-aid funding and is considered to be State-Authorized under the current FHWA/Caltrans Stewardship Agreement.

FHWA was included in the distribution for the review of this Draft Project Report in March 2007. No comments were received. By letter dated October 13, 2006, Gene K. Fong, FHWA Division Administrator, concurred with the project's Purpose and Need and Project Alternatives.

Headquarters personnel have reviewed the project during the development of the proposed features for each alternative and access option. They concur with the proposed improvements. FHWA reviewed the proposed improvements and concurred with the preliminary design.

A constructability review occurred in March, 2007. No comments were received. Future constructability and management reviews will occur at the 65% plans and 95% Draft PS&E stages.

FHWA	Leland Dong
HQ Project Development Coordinator	Mike Thomas
HQ Geometric Reviewers	Gordon Brown Rebecca Mowry J.D. Bamfield
HQ Traffic Reviewer	Phil Jang
Marin County Public Works	Art Brook Kevin McGowan
Sonoma County Public Works	Steve Urbanek Dave Robertson
SMART R/R Engineer	Michael Strider
United States Coast Guard	Jerry Olmes
State Park Superintendent - Olompali SHP	Roy McNamee Tina WIlliams

SECTION 10 - PROJECT PERSONNEL

Project Manager	Jit Pandher	Calnet 541 or (510) 286-6425
Design Branch Chief	John Martin, P.E.	Calnet 442 or (530) 225-3476
Design Project Engineer	Robert Nixon, P.E.	Calnet 442 or (530) 225-2787
Environmental Office Chief	Melanie Brent	Calnet 541 or (510) 286-5231
Environmental Branch Chief	Yolanda Rivas	Calnet 542 or (510) 622-1705
Right of Way Branch Chief	Dave Keba	Calnet 541 or (510) 286-5497

SECTION 11 – ATTACHMENTS

Attachment A	Draft EIR/EIS approval page and Summary Section
Attachment B	Location Map
Attachment C	Access Option Overview
Attachment D	Preliminary Project Plans
Attachment E	Draft PA&ED Storm Water Data Report Cover Sheet
Attachment F	Pavement Strategy Review Committee Checklist
Attachment G	Cost Estimates
Attachment H	Right of Way Data Sheets
Attachment I	Draft MOU
Attachment J	TMP Data Sheets
Attachment K	Draft Risk Management Plan

STATE OF CALIFORNIA EDMUND G. BROWN, JR., Governor

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT
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July 21, 2014

California Department of Transportation
Geotechnical Services – MS#16
111 Grand Avenue
Oakland, CA 94612

Attention: Rifaat Nashed

Subject: Project: 15001 - San Antonio Creek Bridge, Marin County
Classification: Potentially Gassy With Special Conditions
Number Attached: 2 (A & B)

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, Underground Classifications of "Potentially Gassy With Special Conditions" have been assigned to the tunnels identified on your submittal. Please retain the original Classifications for your records and deliver a true and correct copy of each Classification to the tunnel contractor for posting at the job site.

When the contractor who will be performing the work is selected, please advise them to notify this office to schedule the mandated Pre-Job Conference with the Division prior to commencing any activity associated with boring of the tunnels. A Pre-Job Request Form is enclosed.

Should you have another bore under construction that is not required to have an Underground Classification (i.e.: less than 30 inches in diameter), please contact the Mining and Tunneling Unit prior to any employee entry of such a space.

If you have any questions on this subject, please contact this office at your earliest convenience.

Sincerely,

Douglas Patterson
Senior Engineer

enc: Classifications
Pre-Job Request Form

cc: rifaat.nashed@dot.ca.gov
rbrockman@dir.ca.gov

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

15001A041CT **CALIFORNIA DEPARTMENT OF TRANSPORTATION**

of **111 GRAND AVENUE, MS#16; OAKLAND, CA 94612**

at **SAN ANTONIO CREEK BRIDGE**

has been classified as ***** POTENTIALLY GASSY WITH SPECIAL CONDITIONS *****

as required by the California Labor Code § 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

*****SPECIAL CONDITIONS*****

1. **A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.**
2. **Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.**
3. **The Division shall be notified immediately if any Flammable Gas or Petroleum Vapor exceeds 5% of the Lower Explosive Limit.**
4. **All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.**

The nine 78-inch-diameter 79-to-127-foot-deep drilled shafts in & on the banks of San Antonio Creek located approximately 1,000 feet south of the northernmost San Antonio Road & Route 101 intersection in Petaluma, Marin County

This classification shall be conspicuously posted at the place of employment.

Douglas Patterson, Senior Engineer

July 17, 2014

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

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3. **The Division shall be notified immediately if any Flammable Gas or Petroleum Vapor exceeds 5% of the Lower Explosive Limit.**
4. **All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.**

The two 30-inch-diameter 22-to-25-foot-deep drilled shafts on the east shoulder of the northbound lane of Route 101 located at the southernmost San Antonio Road & Route 101 intersection in Petaluma, Marin County

This classification shall be conspicuously posted at the place of employment.

Douglas Patterson, Senior Engineer

July 17, 2014

State of California
Department of Industrial Relations
Division of Occupational Safety & Health

REQUEST FOR PRE-JOB (TUNNEL)

ATTACH COPY OF CLASSIFICATION AND DIESEL PERMIT

Company Name: _____

Phone _____ FAX: _____

DATE FAXED: _____

PLEASE NOTE: THE BORING CONTRACTOR SHOULD SCHEDULE THE PREJOB AS FAR IN ADVANCE AS POSSIBLE – AT LEAST 3-4 DAYS IN ADVANCE. THE DIVISION REQUIRES THE JOB TO BE SET UP WHEN THE FIELD ENGINEER ARRIVES FOR THE PREJOB. THIS MEANS THAT THE BORE PIT HAS BEEN DUG AND PROPERLY GUARDED, THE CRANE IS IN PLACE AND READY TO LIFT, THE BORING MACHINE IS IN THE PIT AND READY TO GO, AND THE CREW IS READY TO BEGIN BORING THE TUNNEL. IF THERE IS A DELAY IN SETTING UP THE JOB, THE BORING CONTRACTOR SHOULD CONTACT THE DIVISION IMMEDIATELY.

PRE-JOB REQUEST DATE & TIME: _____

ON-SITE SUPERVISOR & CELL NO.: _____

CLASSIFICATION #: _____ **DIESEL PERMIT #:** _____

BORE DIAMETER AND LENGTH: _____ _____
(Diameter) (Length)

IS BORE ENTRY ANTICIPATED? YES NO
(Circle One)

You MUST contact the Division if entry is planned, REGARDLESS of the bore diameter.

MANNER OF EXCAVATION: _____

_____

JOB-SITE LOCATION AND DIRECTIONS: _____

_____

_____

GENERAL CONTRACTOR: _____

SUBMITTED BY: _____

REVIEWED BY: _____ **DATE:** _____

☐ *Mining & Tunneling Unit, District 1*
2424 Arden Way, Suite 125
Sacramento, California 95825-2400
(916) 574-2540; ***FAX: (916) 574-2542***

☐ *Mining & Tunneling Unit, District 2*
6150 Van Nuys Blvd., Suite 310
Van Nuys, California 91401-3333
(818) 901-5420; ***FAX: (818) 901-5579***

☐ *Mining & Tunneling Unit, District 3*
464 West Fourth Street, Suite 354
San Bernardino, California 92401-1442
(909) 383-6782; ***FAX: (909) 388-7132***

NORTH MARIN
WATER DISTRICT

999 Rush Creek Place
P.O. Box 146
Novato, CA 94948

PHONE
415.897.4133

FAX
415.892.8043

EMAIL
info@nmwd.com

WEB
www.nmwd.com

September 9, 2014

Tom Connell
Mark Thomas & Company
3000 Oak Road, Suite 650
Walnut Creek, CA 94597

RE: Caltrans MSN B3 –RW Use for Construction Water
NMWD File: 1 7118

Dear Mr. Connell:

Due to the long term drought, any North Marin Water District (NMWD) construction water for the MSN B3 project shall be recycled water not potable water. The closest recycled water hydrant is on Redwood Blvd and Woodhollow.

If you have any questions please contact me at 415-761-8912.

Sincerely,

Drew McIntyre
Chief Engineer

DM:edb
R:\Folders by Job No\7000 jobs\7118\7118 tr re using RW for const 9-9-14.docx

DIRECTORS: JACK BAKER • RICK FRAITES • STEPHEN PETTERLE • DENNIS RODONI • JOHN C. SCHOONOVER
OFFICERS: CHRIS DEGABRIELE, General Manager • KATIE YOUNG, Secretary • DAVID L. BENTLEY, Auditor-Controller • DREW MCINTYRE, Chief Engineer

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

San Antonio Creek

San Antonio Creek Curve Correction - MSN
Bridge No. 27 0119
04 - MRN - 101
EA 04-264091

Prepared by:

Anthony Nedwick, PE
Structure Hydraulics and Hydrology
February 10, 2011

REGISTERED PROFESSIONAL ENGINEER
ANTHONY NEDWICK
No. C60368
Exp. 06/30/12
CIVIL
STATE OF CALIFORNIA

General:

The new San Antonio Creek Bridge is proposed as a safety and operational improvement on Route 101 in Marin and Sonoma Counties. The proposed bridge will be a 510 foot long, 4 span, cast-in place prestressed box girder on a new roadway alignment. Span lengths of 100 feet are proposed for Spans 1 and 4, and 155 feet for Spans 2 and 3. Piers 2, 3 and 4 all are similar in design, consisting of three 6' diameter pile extensions per bent founded on 42'-10.5" centers. The overall width of the structure is 122'–6", while the structural depth is 6'-3". The proposed structure will cross the channel with a hydraulic skew of approximately 70°. All substructure elements will be founded perpendicular to the roadway alignment, which is based on a 4,265' radius.

This report is based on the plans and information provided by Structure Design, as well as various other sources including previous Caltrans reports, USGS information and survey data from Preliminary Investigations and other consultants. All elevations indicated in this report are based on Vertical Datum NAVD 1988.

Basin:

At the bridge site, the watershed for the stream encompasses approximately 30 square miles with an estimated mean yearly precipitation of 39 inches. The stream originates to the west of the site, and flows in an easterly direction through a narrow valley. Several hundred feet above the site, the valley breaks out into a large flood plain. Land use is mostly native vegetation with annual grasslands, Manzanita and oak woodlands with rural residential and agricultural land scattered around the watershed. The floodplains immediately upstream of the structure are used as farmland.

Discharges and Water Surface Elevations:

For San Antonio Creek, the discharges were estimated using USGS regional regression formulas for the area as well as being correlated to other watersheds in the area. In the vicinity of the bridge site, the 50-year and 100-year peak discharges are 5,600 cfs and 6,220 cfs, respectively. The 50-year water surface elevation upstream from the proposed structure is estimated at 23.8 feet, while the 100-year water surface elevation is estimated at 24.1 feet.

For this structure, there should be 2 feet of freeboard over the 50-year Design flow. Therefore the minimum soffit elevation should be 25.8 feet.

For this project, discharges for the 2-year, 10-year and 25-year were also estimated. These discharges along with their corresponding water surface elevations at the upstream side of the proposed structure are provided in the Hydrologic/Hydraulic Summary Table on the following page.

Hydraulic Analysis:

The channel hydraulics were modeled using the Army Corps of Engineers HEC-RAS modeling program, version 4.0 utilizing survey data provided by Caltrans Preliminary Investigations-North. HEC-RAS was used to determine the water surface elevations and velocities throughout the project reach. Manning's roughness coefficients varied and were estimated using USGS guides as well as data and photos gathered during site investigations.

Modeling for the proposed structure included adding areas of obstructed flow to account for new roadway fill, as well as the removal of the existing southbound Route 101 structure. The existing northbound structure is to remain for use as a local access road.

The existing northbound structure, 20-0019R, has been identified as being scour critical. It is proposed that the scour be mitigated and the structure relinquished to the Sonoma County. A Scour Plan of Action was created and revised on 1/27/2009. Two mitigation alternatives were suggested.

Alternative 1 involves the placement of Rock Slope Protection (RSP) along the entire length of the Abutment 4 footing and wingwall. The RSP sizing corresponds with Light Class RSP, per Caltrans Standard Specifications. The Placement should extend beyond the footing at least 3 feet and be a minimum of 2 feet thick. With the historical aggradation noted at this site, and the periodic sediment removal that might be necessary to retain adequate hydraulic conveyance, the RSP might be in jeopardy of inadvertent removal or damage during the sediment removal process.

Alternative 2 proposes a 5-foot deep, reinforced concrete cut off wall to be placed along the entire face on the Abutment 4 footing and wingwall to keep future scour from undermining the footing.

Streambed:

Based on a site investigation, the bed material is considered susceptible to scour, erosion and lateral migration of the thalweg. Bed material in the channel was mostly small gravel and sand, while the banks and floodplain were comprised of more clay-like, cohesive soil.

Scour Analysis:

Historical channel cross-sections at the existing structure were used to determine channel degradation rates. While the channel appears to have lost material, the overall invert elevation has not dropped significantly. Based on the historical reports, the district has periodically excavated sediment from under the bridge to increase the flow capacity which may account for the loss of material recorded in the historical cross-sections. This indicates that the channel is likely aggrading at this location. Future channel degradation is considered negligible.

HEC-RAS was used to calculate the scour at the structure. Local pier scour depths were calculated as 8.65 ft for all piers, but channel migration is considered likely. Therefore, the pier scour elevations were based upon the lowest current channel elevation at the location of the proposed structure to account for anticipated migration, an elevation of 12.6 feet based on RS 5798.427 in the HEC-RAS model. The Local Pier Scour elevation for all columns including the effects of channel migration is 3.95 feet. While the average velocity in the channel is about 3.8 fps, velocity at the piers is about 4.2 fps.

Based on HEC-RAS analysis, contraction scour is negligible at the new structure despite the large floodplain upstream from the proposed structure.

While the abutments are not expected to experience direct localized scour, there are concerns about channel migration affecting the abutments. Both abutments should be designed for scour elevations of 14.0 feet.

The District may want to consider placement of RSP along the embankment at the upstream side of Abutment 1 to protect against potential channel migration toward the abutment fill.

Summary & Recommendations:

Below is a summary of key design parameters based on the hydrology and hydraulic analysis performed for these structures.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations-North, using the NAVD 88 vertical datum.

Hydrologic/Hydraulic Summary **San Antonio Creek** **Br. No. 27 0119** Drainage Area = 30 mi^2 Proposed Bridge Minimum Soffit Elevation for Hydraulics = 25.8 ft					
				Design Flood	**Base Flood**
Frequency	2-yr	10-yr	25-yr	50-yr	100-yr
Discharge	1,960 cfs	3,740 cfs	4,610 cfs	5,600 cfs	6,220 cfs
Average Velocity					3.8 fps
Water Surface Elevation (WSEL) at Upstream side of Bridge	16.3 ft	22.6 ft	23.2 ft	23.8 ft	24.1 ft
Elevations are based on Vertical Datum NAVD 88					
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.					

LongTerm Scour Depths		
Support No.	Degradation Scour Depth (ft)	Contraction Scour Depth (ft)
All Supports	0	0

Scour Data (Elevation and Depth)		
Support No.	Long term Scour Elevation (ft)	Short Term (Local) Scour Elevation (ft)*
Abutment 1	0	14.0
Pier 2	0	4.0
Pier 3	0	4.0
Pier 4	0	4.0
Abutment 5	0	14.0

*Assumes channel migration.

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

ADDENDUM
to the
FINAL HYDRAULIC REPORT

San Antonio Creek

San Antonio Creek Curve Correction - MSN
Bridge No. 27 0119
04 - MRN - 101
EA 04-264091

Prepared by:

Anthony Nedwick, PE
Structure Hydraulics and Hydrology

Original: February 10, 2011
Revised: March 9, 2011

REGISTERED PROFESSIONAL ENGINEER
ANTHONY NEDWICK
No. C60368
Exp. 06/30/12
CIVIL
STATE OF CALIFORNIA

This is an Addendum to the original Final Hydraulic Report dated February 10, 2011. The "Long Term Scour Elevation" values in the final table shown below (Scour Data) were changed to "N/A" to avoid confusion.

Summary & Recommendations:

Below is a summary of key design parameters based on the hydrology and hydraulic analysis performed for these structures.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations-North, using the NAVD 88 vertical datum.

Hydrologic/Hydraulic Summary **San Antonio Creek** **Br. No. 27 0119** Drainage Area = 30 mi^2 Proposed Bridge Minimum Soffit Elevation for Hydraulics = 25.8 ft					
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Elevations are based on Vertical Datum NAVD 88					
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.					

LongTerm Scour Depths		
Support No.	Degradation Scour Depth (ft)	Contraction Scour Depth (ft)
All Supports	0	0

Scour Data (Elevation and Depth)		
Support No.	Long term Scour Elevation (ft)	Short Term (Local) Scour Elevation (ft)*
Abutment 1	N/A	14.0
Pier 2	N/A	4.0
Pier 3	N/A	4.0
Pier 4	N/A	4.0
Abutment 5	N/A	14.0

*Assumes channel migration.

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.

CONTRACT DOCUMENTS - VOLUME 2

IMPROVEMENT PLANS

FOR

NORTH MARIN WATER DISTRICT

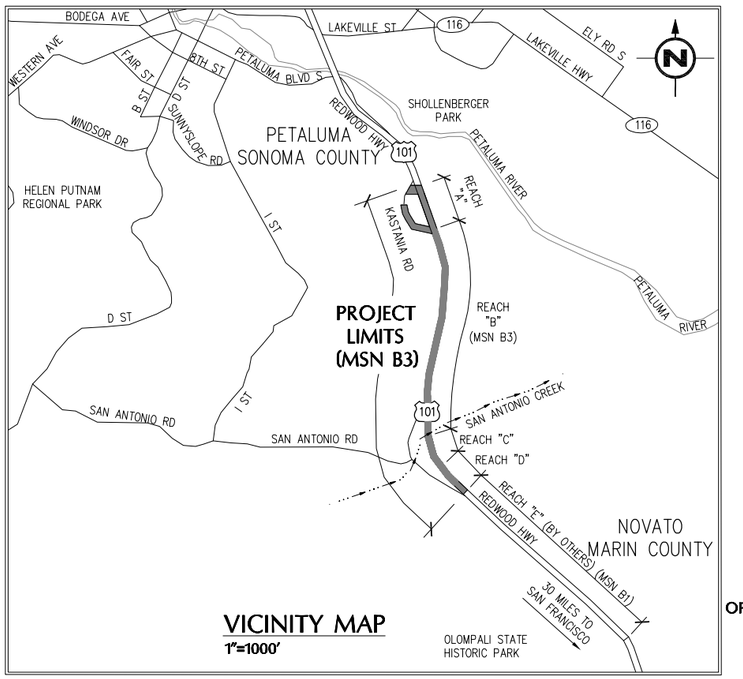
NORTH MARIN AQUEDUCT RELOCATION

AQUEDUCT ENERGY EFFICIENCY PROJECT - REACHES A, B, C, AND D / MSN B3 (2014)

ASSOCIATED WITH

STATE HIGHWAY 101 CURVE CORRECTION PROJECT (MARIN - SONOMA NARROWS, SEGMENT B-3) FROM 1.5 MILE NORTH OF REDWOOD SANITARY LANDFILL RD OC TO 0.5 MILE SOUTH OF PETALUMA BLVD SOUTH OC

CALTRANS PROJECT I.D. 0400000735 (CONTRACT NO. 04-264091)



VICINITY MAP
1"=1000'

PREPARED FOR:

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA
999 RUSH CREEK PLACE POST OFFICE BOX 146
NOVATO, CALIFORNIA 94948
PHONE: (415) 897-4133

DISTRICT BOARD OF DIRECTORS

JACK BAKER
RICK FRAITES
STEPHEN PETTERLE
DENNIS RODONI
JOHN C. SCHOONOVER

REVIEWED BY:

CONSTRUCTION _____ D. Moore DATE

OPERATIONS / MAINTENANCE SUPERINTENDENT _____ R. Clark DATE

WATER QUALITY _____ P. Ramudo DATE

ENGINEERING _____ D. McIntyre DATE

BASIS OF TOPOGRAPHY

AERIAL SURVEY BY RADMAN AERIAL SURVEYS, INC DATED 11/09

BENCHMARK

(NOTE BENCHMARK IS IN METRIC UNITS , DRAWING BASED OFF ENGLISH UNITS)

2-1/4" BRASS DISK, DESIGNATED SON 65
N 694,411.435
E 1,1814,725.986
EL 15.98

CONFORM SET 2-24-2014

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, CA 94949
tel: 415.883.9850
fax: 415.883.9835

Civil & Structural Engineers Surveying & Mapping Environmental Planning
Land Planning Construction Management Landscape Architecture

© 2012

Prepared Under the Direction of:
REGISTERED PROFESSIONAL ENGINEER
Al G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
TITLE SHEET

DES	DR	CH	SCALE		
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	01 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	G-001

REDUCED SIZE: NOT TO SCALE

Feb 26, 2014 – 5:51pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\G01.dwg User: BARCJ

SHEET INDEX

SHEET NO.	DWG NO.	SHEET TITLE
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03	G-003	ABBREVIATIONS, LEGEND, AND NOTES
04	G-004	PROPOSED AQUEDUCT KEY MAP AND PROFILE
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07	G-007	LEAD COMPLIANCE PLAN
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09	C-002	PLAN AND PROFILE STA 6532+00 TO STA 6541+50
10	C-003	PLAN AND PROFILE STA 6541+50 TO STA 6551+50
11	C-004	PLAN AND PROFILE STA 6551+50 TO STA 6561+00
12	C-005	PLAN AND PROFILE STA 6561+00 TO STA 6571+00
13	C-006	PLAN AND PROFILE STA 6571+00 TO STA 6581+00
14	C-007	PLAN AND PROFILE STA 6581+00 TO STA 6591+00
15	C-008	PLAN AND PROFILE STA 6591+00 TO STA 6597+00
16	C-009	PLAN AND PROFILE STA 6597+00 TO STA 6607+00
17	C-010	PLAN AND PROFILE STA 6607+00 TO STA 6617+00
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20	C-013	PLAN AND PROFILE STA 6630+50 TO STA 6640+00
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64	E-010	21 GUNN LANE PUMP STATION DETAIL ELECTRICAL - CONTROL PANELS
–	GR-001	(NOT USED)
–	GR-002	(NOT USED)
–	GR-003	(NOT USED)
–	GR-004	(NOT USED)
65	GR-005	GRADING PLAN STA 6565+75 TO STA 6571+00
66	GR-006	GRADING PLAN STA 6571+00 TO STA 6581+00
67	GR-007	GRADING PLAN - STA 6581+00 TO STA 6591+00
68	GR-008	GRADING PLAN - STA 6591+00 TO STA 6597+00
69	GR-009	GRADING PLAN - STA 6597+00 TO STA 6607+00
70	GR-010	GRADING PLAN - STA 6607+00 TO STA 6617+00
71	GR-011	GRADING PLAN - STA 6617+00 TO STA 6625+00
72	GR-012	GRADING PLAN -STA 6625+00 TO STA 6630+50
73	GR-013	GRADING PLAN -STA 6630+50 TO STA 6641+00
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91	D-016	JACK & BORE PITS
92	DM-001	DEMOLITION STA 6523+07 TO STA 6532+00
93	DM-002	DEMOLITION STA 6532+00 TO STA 6541+50
94	DM-003	DEMOLITION STA 6541+50 TO STA 6551+50
95	DM-004	DEMOLITION STA 6551+50 TO STA 6561+00
96	DM-005	DEMOLITION STA 6561+00 TO STA 6571+00
97	DM-006	DEMOLITION STA 6571+00 TO STA 6581+00
98	DM-007	DEMOLITION STA 6581+00 TO STA 6591+00
99	DM-008	DEMOLITION STA 6591+00 TO STA 6597+00
100	DM-009	DEMOLITION STA 6597+00 TO STA 6607+00
101	DM-010	DEMOLITION STA 6607+00 TO STA 6617+00
102	DM-011	DEMOLITION STA 6617+00 TO STA 6625+00
103	DM-012	DEMOLITION STA 6625+00 TO STA 6630+50
104	DM-013	DEMOLITION STA 6630+50 TO STA 6640+00
105	DM-014	DEMOLITION STA 6640+00 TO STA 6650+00
106	DM-015	DEMOLITION STA 6650+00 TO STA 6658+00
107	DM-016	DEMOLITION KASTANIA RD
108	DM-017	DEMOLITION KASTANIA RD
109	DM-018	DEMOLITION KASTANIA RD
110	DM-019	DEMOLITION KASTANIA RD
111	DM-020	DEMOLITION STA 6658+00 TO STA 6668+00
112	DM-021	DEMOLITION STA 6668+00 TO STA 6677+00
113	DM-022	DEMOLITION STA 6677+00 TO STA 6680+00±
114	CP-001	CATHODIC PROTECTION - DETAIL
115	CP-002	CATHODIC PROTECTION - DETAIL
116	CP-003	CATHODIC PROTECTION - DETAIL
117	CP-004	CATHODIC PROTECTION - DETAIL
118	CP-005	CATHODIC PROTECTION - DETAIL
119	CP-006	CATHODIC PROTECTION - DETAIL
120	CP-007	CATHODIC PROTECTION - DETAIL
121	T-1	TRAFFIC HANDLING PLAN (STAGE 1)
122	T-2	TRAFFIC HANDLING PLAN (STAGE 1)
123	T-3	TRAFFIC HANDLING PLAN (STAGE 1)
124	T-4	TRAFFIC HANDLING PLAN (STAGE 1)
125	T-5	TRAFFIC HANDLING PLAN (STAGE 1)
126	T-6	TRAFFIC HANDLING PLAN (STAGE 1)
127	T-7	TRAFFIC HANDLING PLAN (STAGE 2)
128	T-8	TRAFFIC HANDLING PLAN (STAGE 2)
129	T-9	TRAFFIC HANDLING PLAN (STAGE 2)
130	T-10	TRAFFIC HANDLING PLAN (STAGE 2)
131	T-11	TRAFFIC HANDLING PLAN (STAGE 2)
132	T-12	TRAFFIC HANDLING PLAN (STAGE 2)
133	T-13	TRAFFIC HANDLING PLAN (STAGE 2)
134	T-14	TRAFFIC HANDLING PLAN (STAGE 2)
135	T-15	TRAFFIC HANDLING PLAN (STAGE 2)
136	T-16	TRAFFIC HANDLING PLAN (STAGE 2)
137	T-17	TRAFFIC HANDLING PLAN (STAGE 3A)
138	T-18	TRAFFIC HANDLING PLAN (STAGE 3A)
139	T-19	TRAFFIC HANDLING PLAN (STAGE 3A)
140	T-20	TRAFFIC HANDLING PLAN (STAGE 3A)
141	T-21	TRAFFIC HANDLING PLAN (STAGE 3A)
142	T-22	TRAFFIC HANDLING PLAN (STAGE 3B)
143	T-23	TRAFFIC HANDLING PLAN (STAGE 3B)
144	T-24	TRAFFIC HANDLING PLAN (STAGE 3B)
145	T-25	TRAFFIC HANDLING PLAN (STAGE 3B)
146	T-26	TRAFFIC HANDLING PLAN (STAGE 3B)
147	T-27	TRAFFIC HANDLING PLAN (STAGE 3B)
148	T-28	BIKE DETOUR
149	T-29	CONSTRUCTION AREA SIGN

APPENDIX

SHEET NO.	DWG NO.	
A1	NMWD DWG C-4	(WINDHAVEN, LOTS 2, 3 & 4)
A2	NMWD DWG 001	(LOWER 2" WATER AT WINDHAVEN-GUNN DR.)
A3	NMWD DWG C-5	(WINDHAVEN PUMP STATION-DETAILS)

ALTERNATE SHEET INDEX

(SEE ATTACHED YELLOW SHEETS)

SHEET NO.	DWG NO.	
1	G-002A	SHEET INDEX AND NOTES
2	G-004A	PROPOSED AQUEDUCT KEY MAP AND PROFILE
3	G-005A	EXISTING WATER: PLAN AND PROFILE
4	C-003A	PLAN AND PROFILE STA 6541+50 TO STA 6551+50
5	C-004A	PLAN AND PROFILE STA 6551+50 TO STA 6561+00
6	C-005A	PLAN AND PROFILE STA 6561+00 TO STA 6571+00
7	C-006A	PLAN AND PROFILE STA 6571+00 TO STA 6581+00
8	C-007A	PLAN AND PROFILE STA 6581+00 TO STA 6591+00
9	C-008A	PLAN AND PROFILE STA 6591+00 TO STA 6597+00
10	C-009A	PLAN AND PROFILE STA 6597+00 TO STA 6607+00
11	C-010A	PLAN AND PROFILE STA 6607+00 TO STA 6617+00
12	C-011A	PLAN AND PROFILE STA 6617+00 TO STA 6625+00
13	C-012A	PLAN AND PROFILE STA 6625+00 TO STA 6630+50
14	C-013A	PLAN AND PROFILE STA 6630+50 TO STA 6640+00
15	C-014A	PLAN AND PROFILE STA 6640+00 TO STA 6650+00
16	C-015A	PLAN AND PROFILE STA 6650+00 TO STA 6658+00
17	C-018A	PLAN AND PROFILE STA 6658+00 TO STA 6669+00
18	C-021A	PLAN & PROFILE DISTRIBUTION LINE D1 - "W-42" 6584+02.90
19	C-022A	PLAN DISTRIBUTION LINE D3 - "W-42" 6640+68.50
20	C-023A	PROFILE DISTRIBUTION LINE D3 - "W-42" 6640+68.50
21	C-024A	PLAN & PROFILE DISTRIBUTION LINE D4 - "W-42" 6652+69.90
22	C-025A	PLAN & PROFILE DISTRIBUTION LINE D2 - "W-42" 6622+50
23	C-026A	WINDHAVEN AND 21 GUNN LANE PUMP STATION - SITE PLAN
24	C-033A	SECTIONS
25	C-034A	SECTIONS
26	C-035A	SECTIONS
27	C-036A	SECTIONS
28	C-047A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
29	C-048A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
30	C-049A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
31	C-050A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
32	C-051A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
33	C-052A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
34	C-053A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
35	C-054A	PLAN - APPURTENANCES, PLAN ENLARGEMENT
36	C-056A	PLAN - APPURTENANCES, RELOCATED METERS
37	D-001A	STANDARD DETAILS
38	D-002A	STANDARD DETAILS
39	D-006A	STANDARD DETAILS
40	D-007A	STANDARD DETAILS
41	D-008A	STANDARD DETAILS
42	D-012A	MIDDLE CONNECTION, PHASE 2
43	D-013A	MIDDLE CONNECTION, PHASE 3
44	D-015A	NORTH CONNECTION, PHASE 2 & 3
45	D-016A	JACK & BORE PITS

N.I.C.

REDUCED SIZE:
NOT TO SCALE

NOTES

1. THE ABBREVIATIONS, LEGENDS, AND NOTES ON G-002 & G-003 APPLY TO ALL SHEETS.
2. ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE PLOTTED FROM RECORD DRAWINGS OF VARIOUS SOURCES. CONTRACTOR SHALL POTHOLE AND VERIFY THE EXACT LOCATION, SIZE, TYPE, AND ELEVATION OF ALL UTILITIES AND UTILITY CROSSINGS EXCEPT STORM DRAIN CULVERTS WITH IN 30 DAYS AFTER NOTICE TO PROCEED IN ORDER TO VERIFY CLEARANCE FOR THE PROPOSED PIPELINE. REPORT ANY CONFLICTS TO THE ENGINEER IMMEDIATELY. THIS INFORMATION SHALL ALSO BE SUBMITTED TO PIPE MANUFACTURER FOR PREPARATION OF LAYOUT DWGS. AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT AT 1-800-642-2444 FOR MARK OUT OF EXISTING UTILITIES.
3. NOTIFY ENGINEER AND NMWD NO LESS THAN 3 WORKING DAYS IN ADVANCE OF ANY WORK, INCLUDING POTHOLING, INVOLVING THE EXISTING WATER SYSTEM.
4. ALL PIPE FITTINGS SHALL HAVE WELDED JOINTS UNLESS OTHERWISE SHOWN ON PLANS.
5. EXACT LOCATIONS OF CORROSION PROTECTION FACILITIES TO BE DETERMINED IN THE FIELD AS DIRECTED BY THE ENGINEER. FOR DETAILS OF CORROSION PROTECTION FACILITIES, SEE CP DRAWINGS.
6. WATER FOR FLUSHING AND DISINFECTING NEW PIPELINE WILL BE SUPPLIED DIRECTLY FROM AQUEDUCT. NMWD CREWS ONLY WILL OPERATE WATER VALVES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DISPOSAL OF WATER AND DECHLORINATION.
7. PROJECT PLANS SHOW EXISTING CONDITIONS AS WELL AS LOCATION OF FUTURE ROADS, DISTINGUISHED BY A DARKER PAVEMENT HATCH AND IDENTIFYING TEXT. CONSTRUCTION OF KASTANIA ROAD IS ANTICIPATED TO OCCUR IN ADVANCE OR CONCURRENTLY WITH AQUEDUCT RELOCATION WORK. CONSTRUCTION OF HIGHWAY 101 WILL NOT BEGIN UNTIL AQUEDUCT RELOCATION PROJECT IS COMPLETE. IT IS ANTICIPATED THAT THE NEW JOINT POLE SHOWN ON THE DRAWINGS WILL BE CONSTRUCTED PRIOR TO THE START OF THE AQUEDUCT WORK AND THE OLD ELECTRIC POLE WILL BE REMOVED BY PG&E. TO BE COMPREHENSIVE, BOTH FACILITIES ARE SHOWN ON THE PLANS.
8. FOR MORE INFO ON MARIN-SONOMA NARROWS HIGHWAY PROJECT. SEE PLANS PREPARED BY MARK THOMAS COMPANY DATED AUG. 2, 2013 HIGHWAY WORK SHOWN FOR INFORMATIONAL PURPOSES ONLY. UNLESS OTHERWISE NOTED, WORK RELATED TO ROAD AND STORM DRAINAGE IS BY OTHERS.
9. VERTICAL UTILITY CONFLICTS WILL BE RESOLVED BY THE LOCATION OF THE AFFECTED UTILITY UNDER THE TRANSMISSION MAIN PER THE STANDARD DETAIL. MINIMUM VERTICAL SEPARATION CRITERIA PER CALIFORNIA DEPARTMENT OF PUBLIC HEALTH SHALL BE MAINTAINED.
10. CULVERTS CUT TO FACILITATE PIPE CONSTRUCTION SHALL BE RESTORED WITH A MINIMUM OF 20 FEET OF NEW CULVERT OF THE SAME MATERIAL AS EXISTING.
11. WHERE NECESSARY TO DEFLECT PIPE JOINTS TO MAKE HORIZONTAL OR VERTICAL BENDS OR CURVES, THE MAXIMUM JOINT DEFLECTION SHALL BE LIMITED TO 75% OF THE MANUFACTURER'S RECOMMENDED MAXIMUM JOINT DEFLECTION.
12. ALL DISTURBED PUBLICLY MAINTAINED DRIVEWAY & CROSS CULVERTS SHALL BE REPLACED IN KIND AND LOCATION. NO REPLACEMENT CULVERT SHALL BE LESS THAN 18" DIAMETER. IN ADDITION, PRIVATE PROPERTY SHALL BE PROTECTED AND ANY DISTURBANCE OR DAMAGE SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
13. EXISTING GROUND/ FEATURES WITHIN EASEMENTS SHALL BE RETURNED TO AS GOOD OR BETTER CONDITION THAN EXISTED PRIOR TO WORK.
14. CONTRACTOR SHALL REPLACE IN-KIND ALL ROADWAYS/ DRIVEWAYS REMOVED OR DAMAGED BY ANY PROJECT RELATED WORK.
15. THE PIPELINE AND APPURTENANCES SHALL BE TESTED TO THE TEST PRESSURE SHOWN IN THE SPECIFICATIONS. ALL PIPELINE MATERIALS AND APPURTENANCES SHALL BE DESIGNED TO WITH STAND THE FULL TEST PRESSURES. MATERIALS SHOWN OR SPECIFIED WITH HIGHER RATING SHALL BE DESIGNED AS SUCH.
16. CONSTRUCTION ACCESS ACROSS PRIVATE PROPERTY IS LIMITED TO THOSE POINTS SHOWN ON THE DRAWINGS.
17. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL POSTAL FACILITIES INCLUDING MAILBOXES, AT ALL TIMES DEEMED NECESSARY BY THE U.S. POSTAL DEPARTMENT.
18. CONTRACTOR SHALL STAKE ALL WORK AREAS THAT EXTEND OUT SIDE OF EXISTING ROAD RIGHTS -OF -WAY PRIOR TO CONSTRUCTION. STAKES SHALL BE PLACED AT ALL ANGLE POINTS AND NO MORE THAN 200 FEET APART. CONTRACTOR SHALL FENCE PROJECT LIMITS AS SHOWN ON THE PLANS AND LIMIT CONSTRUCTION ACTIVITIES WITHIN THE EXISTING RIGHT-OF-WAY AND PERMANENT AND TEMPORARY CONSTRUCTION EASEMENTS SHOWN. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO; VEHICLE AND EQUIPMENT, LIMITS OF EXCAVATION, EXCAVATED MATERIAL AND BACK FILL MATERIAL STORAGE.
19. TEMPORARY EASEMENTS ARE FOR ADDITIONAL WORKING SPACE. THE SPACE SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DEFACEMENT OF THE PROPERTY. IF DAMAGED, CONTRACTOR TO RESTORE ALL AREAS TO PRIOR CONDITIONS.
20. UNLESS OTHERWISE NOTED, EXISTING TREES WITH IN THE GIVEN EASEMENTS SHALL BE PRESERVED, PROTECTED, OR SAVED IN ACCORDANCE WITH THE REQUIREMENTS SHOWN ON THE DRAWINGS AND IN THE SPECIFICATIONS.
21. WORK WITHIN 10 FEET OF TREES TO BE SAVED / PROTECTED REQUIRES SPECIAL SHORING AND PROTECTION MEASURES. CONTRACTOR SHALL PLACE TEMPORARY FENCING AT ALL LOCATIONS WHERE EXISTING FENCE IS REMOVED OR DAMAGED BY ANY PROJECT RELATED WORK. AFTER COMPLETION OF WORK, FINAL FENCING SHALL BE INSTALLED TO PRE-CONSTRUCTION CONDITIONS OR BETTER.
22. WORK HOURS ARE LIMITED TO MONDAY THROUGH FRIDAY 7:00 AM TO 6:00 PM UNLESS OTHER WISE SPECIFICALLY APPROVED BY THE ENGINEER.
23. NMWD AND CALTRANS HAVE OBTAINED THE FOLLOWING PERMITS:
    a. 1602
    b. 401/404
24. TOPOGRAPHIC MAPPING WAS PREPARED USING A COMBINATION OF FIELD GROUND SURVEYING AND PHOTOGRAPHIC MAPPING TECHNIQUES. FEATURES (AT GROUND LEVEL) IN THE ORTHO PHOTO IMAGERY, PLANIMETRY, AND CONTOUR LOCATIONS ARE APPROXIMATE BUT COMPLY WITH NATIONAL MAP ACCURACY STANDARD FOR THE SPECIFIED CALC AND CONTOUR INTERVAL SHOWN ON THE PLAN SHEETS .
25. EXCAVATION LIMITS SHOWN IN THE DETAILS ARE GRAPHICAL REPRESENTATIONS ONLY AND DO NOT REPRESENT ACTUAL EXCAVATION LIMITS OR SAFE TRENCH CONDITIONS NECESSARY TO COMPLETE THE WORK. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONFORMANCE WITH THE LOCAL, STATE, AND FEDERAL CODES GOVERNING SHORING, SHEETING AND BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
26. UNLESS OTHER WISE NOTED ALL ELEVATIONS SHOWN ARE TOP OF PIPE ELEVATIONS. ALL STATIONING AND DISTANCES SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS. LOCATIONS OF AIR VALVES BLOW OFF ASSEMBLIES, AND OUTLETS ARE SHOWN IN THEIR APPROXIMATE AND SCHEMATIC LOCATION. THE EXACT LOCATION MAY BE ALTERED IN THE FIELD BY THE ENGINEER. SEE DETAILS. REFER TO DRAWINGS FOR BORING & TEST PIT LOCATIONS
27. CONTRACTOR TO USE AVALIABLE SPACE BETWEEN WORK AND CT R/W AS SHOWN ON PLANS FOR CONSTRUCTION, UNLESS NOTED OTHERWISE ON PLANS.
28. EXISTING WATER SERVICE SHALL MAINTAINED AT EXISTING METER LOCATIONS. CONSTRUCTION OF REALIGNED DISTRIBUTION, SERVICE LINES, AND REPLACEMENT METERS SHALL NOT INTERRUPT EXISTING SERVICE FOR A PERIOD GREATER THAN 2 HOURS. SWITCH TO USE OF NEW METERS AND SERVICE LINES TO OCCUR AFTER NEW AQUEDUCT HAS BEEN DISINFECTED, AND APPROVED AND ACCEPTED BY NMWD.
29. ALL EXISTING, NEW AND TEMPORARY VALUES SHALL BE ACCESSIBLE AT ALL TIMES.
30. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL SURPLUS, EXCAVATION MATERIALS AND DEBRIS FROM THE SITE AT A PROPER DISPOSAL SITE AND SHALL MAINTAIN THE SITE IN A NEAT AND ORDERLY CONDITION BEFORE NOTICE OF COMPLETION IS ISSUED.
31. CONTRACTOR SHALL PERFORM A MANDREL TEST ON 2" CONDUIT AND INSTALL A 3/8" POLYPROPYLENE ROPE FOR ENTIRE LENGTH OF CONDUIT. SEE SPECIFICATIONS.
32. CONTRACTOR SHALL CCTV AND MANDREL TEST 36", 42", AND 8" WSP PRIOR TO HYDROSTATIC TESTING. SEE SPECIFICATIONS.
33. CONTRACTOR SHALL SUBMIT SHUTDOWN PLAN FOR THE EXISTING 30" AQUEDUCT THAT INCLUDES DATE AND STEP BY STEP PROCEDURE FOR NMWD APPROVAL. INTERRUPTION OF AQUEDUCT FLOW IS ONLY ALLOWED BETWEEN NOV.-MAR. SEE CONNECTION SEQUENCE NARRATIVE ON SHEET D-009 FOR ADDITIONAL INFORMATION.
34. ANY WORK CONDUCTED IN THE VICINITY OF, OR CONNECTING TO, SONOMA COUNTY WATER AGENCY PIPELINES OR FACILITIES SHALL BE COORDINATED WITH SONOMA COUNTY WATER AGENCY OPERATIONS AND MAINTENANCE DIVISION DURING CONSTRUCTION.

3

PIPE TABLE

2

LINE DESIGNATION	NOMINAL	RESTRAINED (Y/N)	O.D. (IN.)	I.D. (IN.)	LENGTH (FT)	WALL THICKNESS (IN.)
"W-36"	36" WSP	Y	38	36	1,935	¼ (STL) + ¾ (CML)
"W-42"	42" WSP	Y	44	42	13,601	¼ (STL) + ¾ (CML)
	42"X36" REDUCER	Y	N/A	N/A	1	N/A
	60" WSP CASING	Y	61.5	60	877	¾
	60" WSP CASING (SAND FOR ANNULAR RING)	Y	61.5	60	180	¾
	42"X30" REDUCER	Y	N/A	N/A	1	N/A
"W-8"	8" WSP	Y	8.63	7.98	1540	0.32
	8" PVC (C900)	Y	8.63	7.98	150	0.32
"D1"	4" PVC (C900) (FUSIBLE / CERTA-LOK) DR14	Y	4.80	4.07	340	0.343
	12" PVC (FUSIBLE) DR 18 CASING	Y	6.90	6.09	340	0.383
"D2"	2" PVC (GLUED) SCH 40	Y	2.375	2.067	439	0.154
	2" PVC (GLUED) SCH 40 (COMM)	Y	2.375	2.067	439	0.154
	4" PVC (C900) DR 14 (FUSIBLE / CERTA-LOK AND BELL & SPIGOT	Y&N	4.80	4.07	439	0.343
	12" PVC (C900) (FUSIBLE) DR 18 CASING	Y	13.20	11.65	439	0.733
"D3"	2" PVC (GLUED) SCH 40	Y	2.375	1.939	356	0.218
	6" PVC (C900) (FUSIBLE / CERTA-LOK)	Y	4.50	4.03	356	0.24
"D4"	8" PVC (C900) DR14 (FUSIBLE / CERTA-LOK)	Y	9.05	7.68	293	0.646
	16" PVC (C900) DR18 CASING (FUSIBLE)	Y	11.10	9.79	293	0.617
PUMP STATION	2" PVC (GLUED) SCH 40 (NMWD WATER)	Y	2.375	2.067	450	0.154
	2" PVC (GLUED) SCH 40 (PRIVATE WATER)	Y	2.375	2.067	520	0.154
	4" WSP SCH 40	Y	4.50	4.03	20	0.24
	5"CONDUIT ELEC (PVC SCH40) (GLUED)	Y	5.56	5.05	480	0.26
	18" RCP SD	Y	19.5	15	50	2.5
TELEMETRY	2" PVC (GLUED)	Y	2.375	2.067	16,875	0.154

3

CSW ST2

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Prepared Under the Direction of:
REGISTERED PROFESSIONAL ENGINEER
AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
3	01/23/13	ADDENDUM 3	CJB	
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
SHEET INDEX AND NOTES

DES	DR	CH	SCALE	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	02 OF 149 SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 G-002

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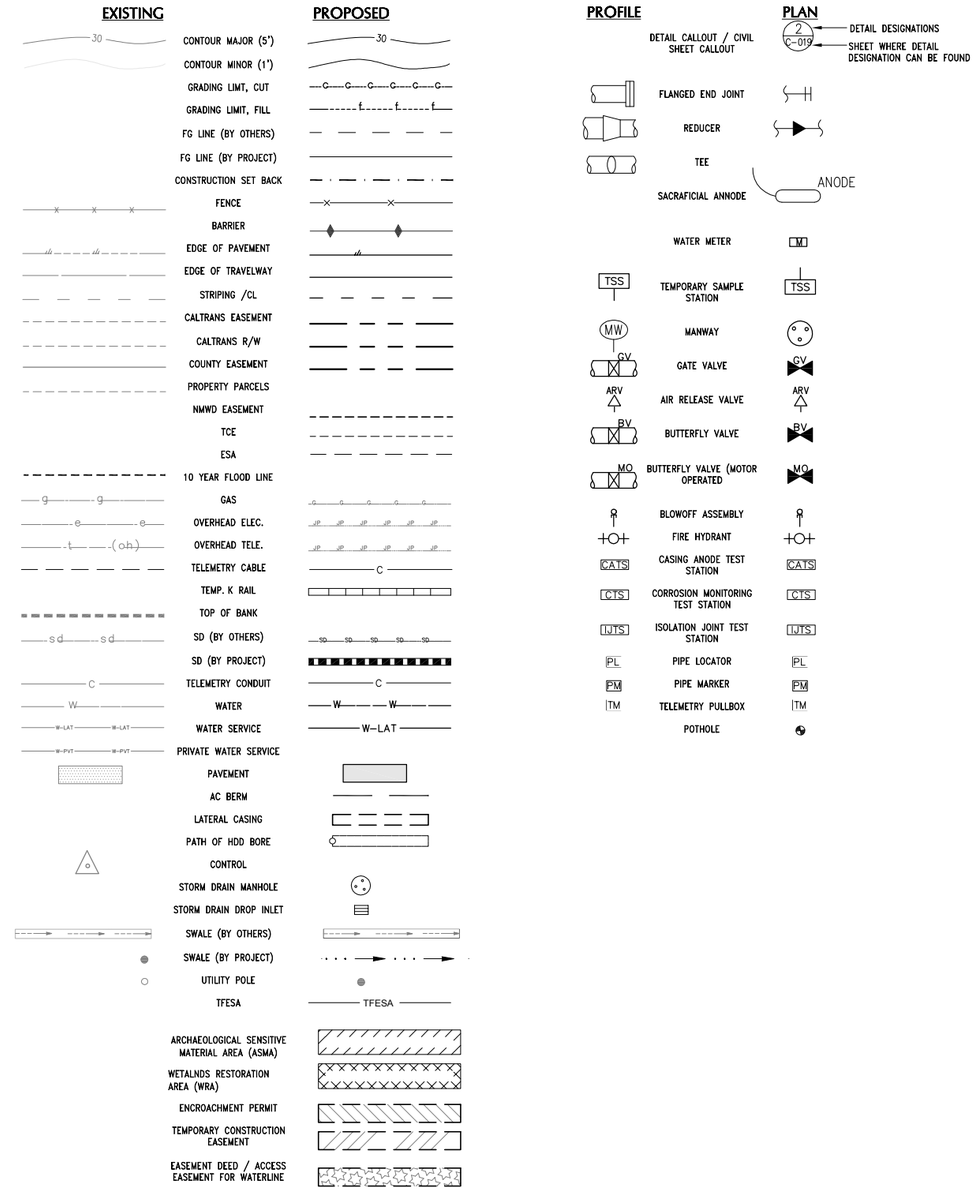
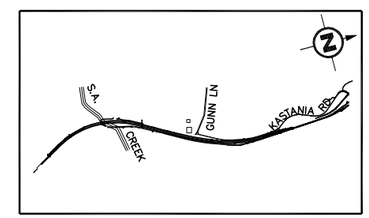
ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ACP	ASBESTOS CEMENT PIPE
ADL	AERIAL DEPOSITED LEAD SOIL
ALUM	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ANGLE POINT
ARV	AIR RELIEVE VALVE
ASMA	ARCHEOLOGICAL SENSITIVE MATERIAL AREA
AW	TELEMETRY
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BEGIN HORIZONTAL CURVE
Beg	BEGIN
"BP" LINE	BIKE PATH LINE
BF	BLIND FLANGE
BO	BLOW OFF
BV, BFV	BUTTERFLY VALVE
CAT	CATHODIC
CL	CENTERLINE
CLR	CLEARANCE
CATS	CASING ANODE TEST STATION
COM	COMMUNICATION
CONC.	CONCRETE
CONST.	CONSTRUCTION
CMP	CORRUGATED METAL PIPE
CP	CATHODIC PROTECTION
CPLG	COUPLING
CT	CALTRANS
CTS	CORROSION MONITORING TEST STATION
DEFL	DEFLECTION
DEG	DEGREE
DIA	DIAMETER
DR	DIMENSION RATIO
DWY	DRIVEWAY
(E)	EXISTING
EA	EACH
EASE.	EASEMENT
EC	END HORIZONTAL CURVE
EG	EXISTING GRADE
EL	ELEVATION
ELECT	ELECTRICAL
EP, EOP	EDGE OF PAVEMENT
ETW	EDGE OF TRAVLED WAY
FE	FLANGED END JOINT
FG	FINISH GRADE
FH	FIRE HYDRANT
FLG	FLANGED
"FR" LINE	FRONTAGE ROAD LINE
FPVC	FUSIBLE PVC
FT	FEET
GV	GATE VALVE
GTP	GALV. THREADED PIPE
HDD	HORIZONTAL DIRECTIONAL DRILL
HP	HIGH POINT
ICCP	IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM
I.D., ID	INTERNAL DIAMETER
IJTS	ISOLATION JOINT TEST STATION
IN.	INCHES
INV	INVERT
JP	JOINT POLE
LAT	LATERAL
LF	LINEAR FEET
LT.	LEFT
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
MW	MANWAY
(N)	NEW
NB	NORTH BOUND
NIC	NOT IN CONTRACT
NMWD	NORTH MARIN WATER DISTRICT
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OC	ON CENTER
O.D., OD	OUTSIDE DIAMETER
OG	ORIGINAL GRADE
OH	OVERHEAD
PE	PLAIN END JOINT
PG&E	PACIFIC GAS AND ELECTRIC
PH	POT HOLE
PL	PIPE LOCATOR
PM	PIPE MARKER
PO	PUSH ON
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RC	RELATIVE COMPACTION
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
R/W	RIGHT OF WAY
RT	RIGHT
RTU	REMOTE TERMINAL UNIT
S	SLOPE
SCH	SCHEDULE
SB	SOUTH BOUND
SD	STORM DRAIN
SDMH	STORM DRAIN MAHOLE
SO	SLIP ON
SS	SANITARY SEWER
STA	STATION
STL	STEEL
TBRBO	TO BE REMOVED BY OTHERS
TBIBO	TO BE INSTALLED BY OTHERS
TCE	TEMPORARY CONSTRUCTION EASEMENT
TELE	TELEPHONE
TEMP.	TEMPORARY
TFESA	TEMPORARY FENCING – ENVIRONMENTALLY SENSITIVE AREA
TOB	TOP OF BANK
TM	TELEMETRY PULL BOX
TRANS	TRANSPORTATION
TSS	TEMPORARY SAMPLE STATION
TYP	TYPICAL
VAC	VACUUM
W	WATER
"W" LINE	NEW WATER LINE
W/	WITH
WM	WATER METER
WSP	WELDED STEEL PIPE
Y-1	ADL SOIL

LEGEND



KEYMAP



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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
ABBREVIATIONS, LEGEND, AND NOTES

DES	DR	CH	SCALE		
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	03 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	G-003

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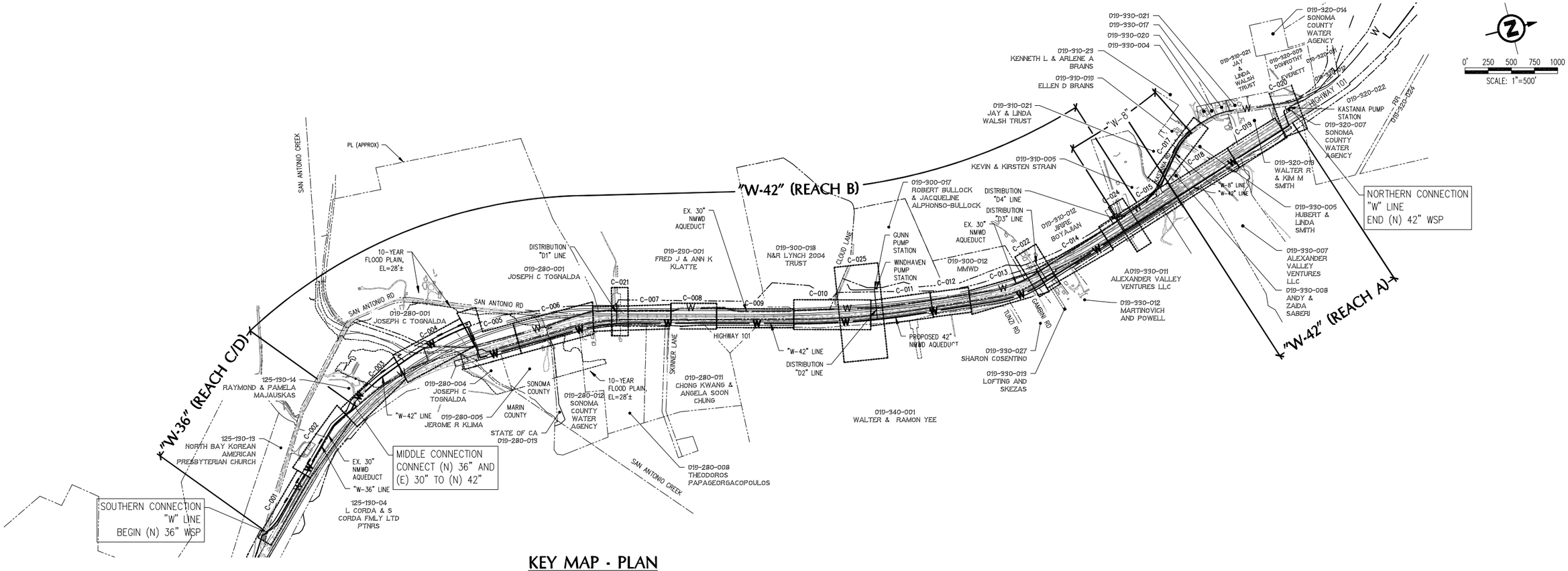
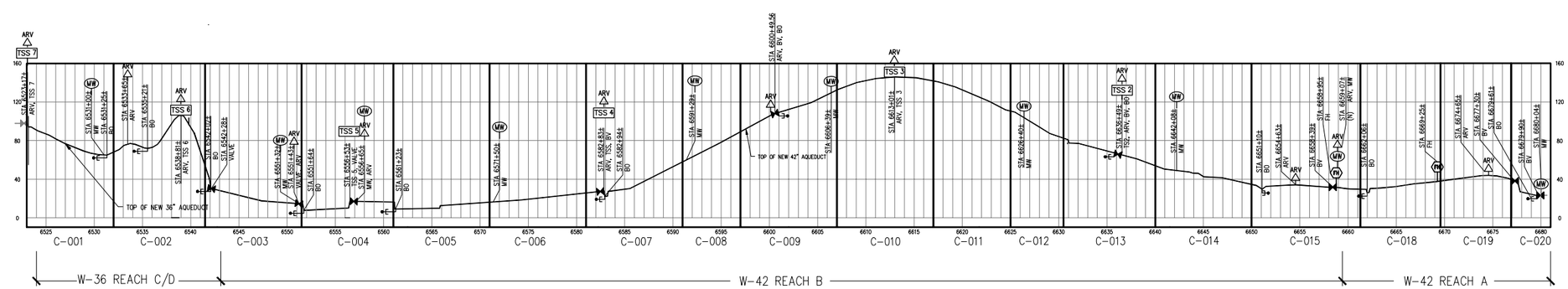


KEY MAP - PLAN

SCALE: 1"=500'



KEY MAP - PROFILE

SCALE: 1"=600' HORIZONTAL
1"=60' VERTICAL

PROFILE NOTES

1. BUTTERFLY VALVES, BLOWOFFS, MANWAYS, AIR RELEASE VALVES, AND TEMPORARY SAMPLE STATIONS ONLY SHOWN FOR CLARITY.

REDUCED SIZE:
NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

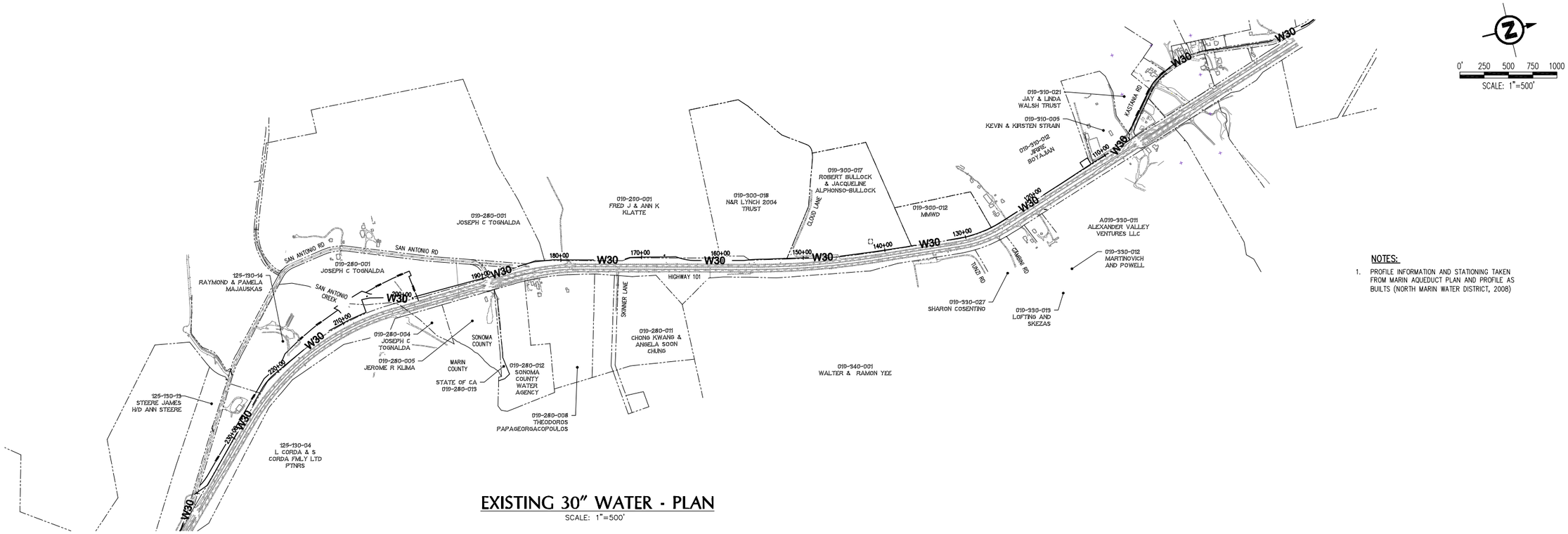
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PROPOSED AQUEDUCT KEY MAP AND PROFILE

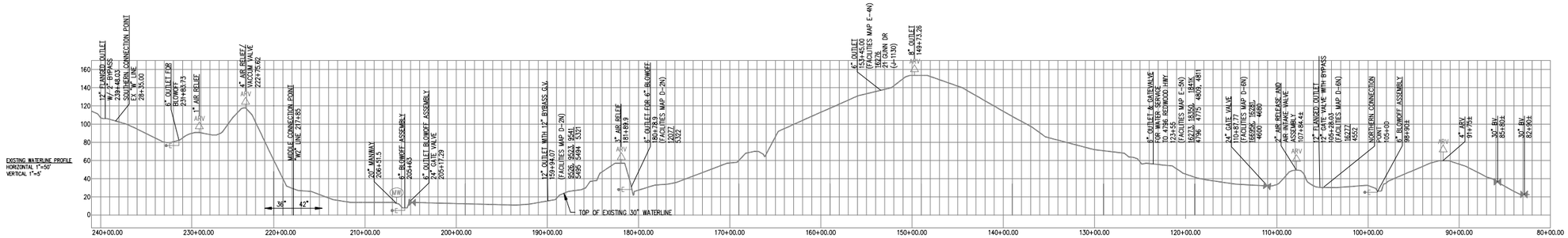
DES	DR	CH	SCALE
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 04 OF 149 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / G-004

Dec 06, 2013 - 10:06am N:\CIVIL\4\413100\Dwg\Sheet Dwgs\G04.dwg User: SHUJK



EXISTING 30" WATER - PLAN

SCALE: 1"=500'



EXISTING 30" WATER - PROFILE

SCALE: 1"=500' HORIZONTAL
1"=50' VERTICAL

NOTES:

1. PROFILE INFORMATION AND STATIONING TAKEN FROM MARIN AQUEDUCT PLAN AND PROFILE AS BUILTS (NORTH MARIN WATER DISTRICT, 2008)

REDUCED SIZE:
NOT TO SCALE

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CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
EXISTING WATER: PLAN & PROFILE

DES	DR	CH	SCALE	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	05 OF 149 SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 G-005

Dec 06, 2013 - 10:04am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\G05.dwg User: SHUJK

CONSTRUCTION SURVEY CONTROL DATA

MTCO#	NORTHING	EASTING	ELEVATION	DESCRIPTION	APPROXIMATE LOCATION
JT9612	2216785.75	5974846.96	36.69	NGS DISK SET IN CONCRETE	
JT9613	2247357.52	6001335.56	24.30	NGS DISK SET IN CONCRETE	
JT9615	2281630.40	5951662.97	20.46	NGS DISK SET IN CONCRETE	
601	2258462.45	5955513.23	63.24	REBAR AND CAP	"A" 6552+35.18 2795.81 L†
605	2261198.14	5957361.22	34.69	SURVEY SPIKE	"A" 6568+93.40 265.03 L†
607	2264066.69	5955959.31	289.51	REBAR AND CAP	"A" 6592+64.32 2103.80 L†
609	2263780.73	5958184.73	81.38	SURVEY SPIKE	"A" 6595+39.33 123.00 R†
610	2263718.95	5958936.25	235.97	REBAR AND CAP	"A" 6596+65.90 866.35 R†
612	2266567.64	5957768.38	227.57	REBAR AND CAP	"A" 6622+43.69 862.43 L†
616	2267833.22	5957909.15	113.63	REBAR AND CAP	"A" 6636+91.76 775.39 L†
620	2270362.63	5958079.67	36.45	SURVEY SPIKE	"A" 6662+28.40 52.85 R†
621	2270320.74	5958364.87	24.44	REBAR AND CAP	"A" 6660+98.61 310.23 R†

NOTE:

FOR COMPLETE PROJECT CONTROL DATA, SEE THE SURVEY RECORDS ON FILE IN THE SURVEYS DEPARTMENT AT THE DISTRICT OFFICE.

LEGEND:

▲ HORIZONTAL & VERTICAL CONTROL POINT

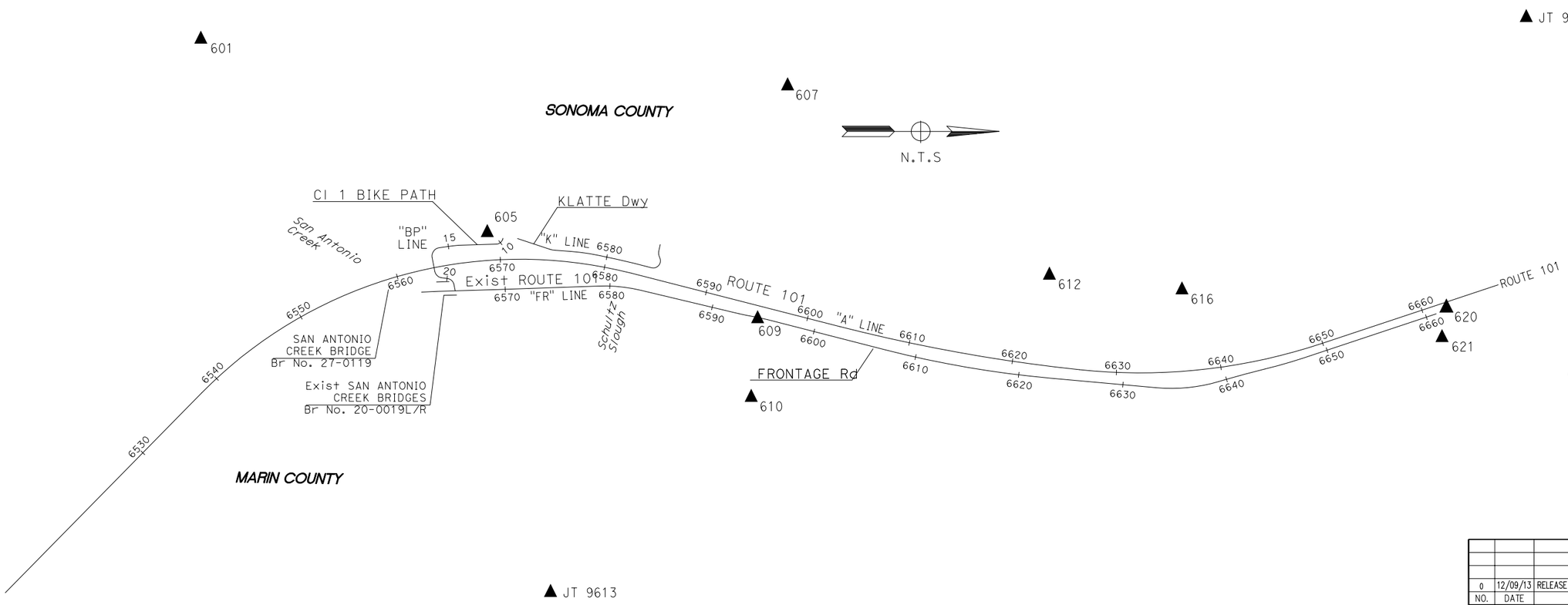
● HORIZONTAL CONTROL POINT

■ VERTICAL CONTROL POINT

DATUM:

HORIZONTAL DATUM -
THE HORIZONTAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83), CALIFORNIA HIGH PRECISION GEODETIC NETWORK (HPGN), EPOCH 1991.35. THIS SURVEY EMPLOYS GLOBAL POSITIONING SYSTEM (GPS) TECHNOLOGY ZONE 3, TO ESTABLISH THE CONTROL NETWORK FOR THE CURRENT SURVEY.

VERTICAL DATUM -
THE VERTICAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988, BASED UPON DIGITAL LEVELING TIES TO THE PROJECT VERTICAL CONTROL NETWORK ESTABLISHED BY CALTRANS.



APPROVED FOR PROJECT CONTROL INFORMATION ONLY

REDUCED SIZE:
NOT TO SCALE

CSW ST2
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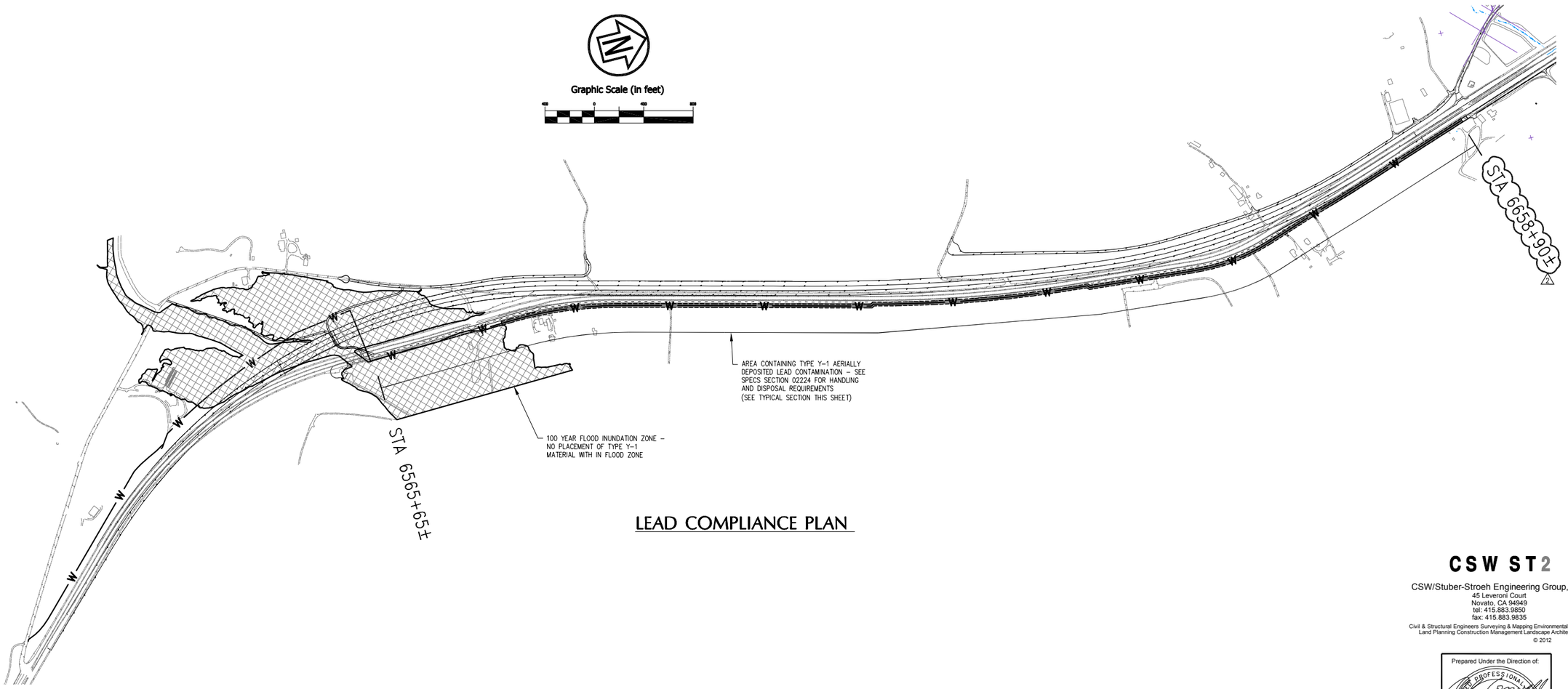
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

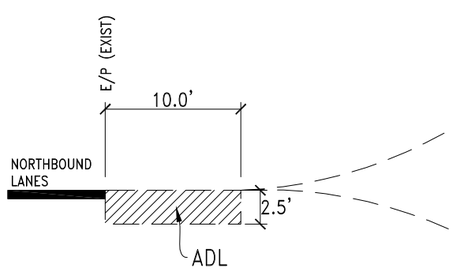
AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
PROJECT CONTROL

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	06 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	G–006

Dec 04, 2013 – 3:21pm N:\CIVIL\A\4113100\Dwg\Sheet Dwgs\G006.dwg User: SHUJK



LEAD COMPLIANCE PLAN



EXISTING AERIALLY DEPOSITED LEAD SOIL
TYPICAL SECTION
N.T.S.

NOTES

1. SOILS REMOVED FROM THE TOP 2.5' OF TRENCH WIDTH IN THE AREA OF AERIALLY DEPOSITED LEAD SHOWN ON THIS SHEET MAY ONLY BE REUSED WITH IN THE PORTION OF CONTAMINATED AREA OUTSIDE THE 100 YEAR FLOOD ZONE.
2. Y-1 SOILS MAY NOT BE REUSED ON THE WEST SIDE OF THE FUTURE HIGHWAY.
3. FOR RESTRICTIONS ON USE WITHIN TRENCH, SEE TYPICAL TRENCH SECTION.
4. ALL UNUSED CONTAMINATED SOIL SHALL BECOME THE PROPERTY OF CONTRACTOR AND DISPOSED IN A LEGAL MANNER AT THE CONTRACTOR'S EXPENSE.

REDUCED SIZE:
NOT TO SCALE

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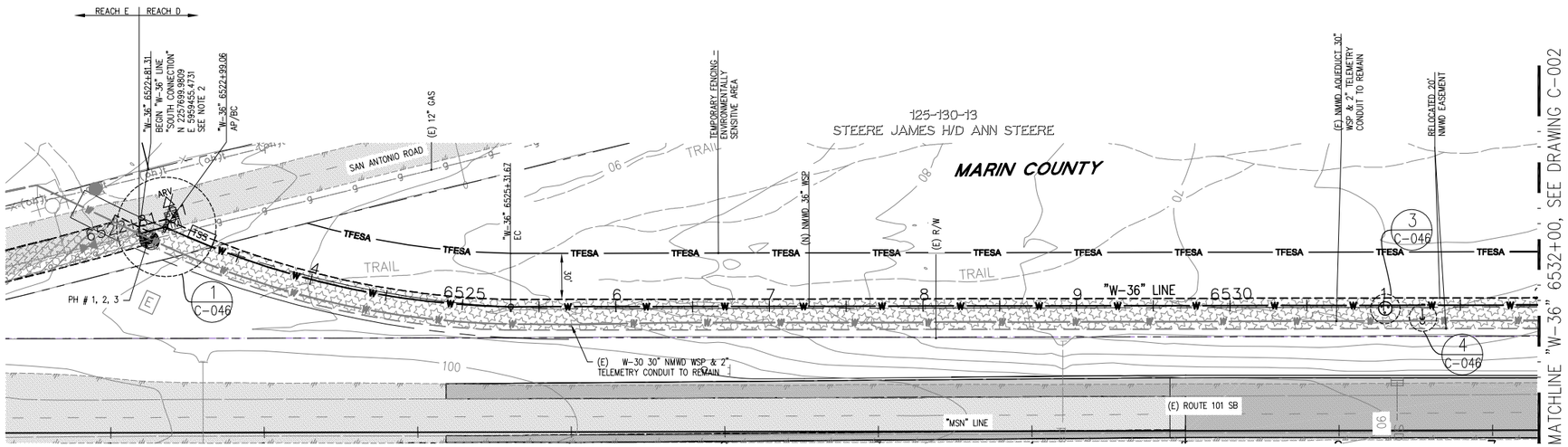
NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
LEAD COMPLIANCE PLAN

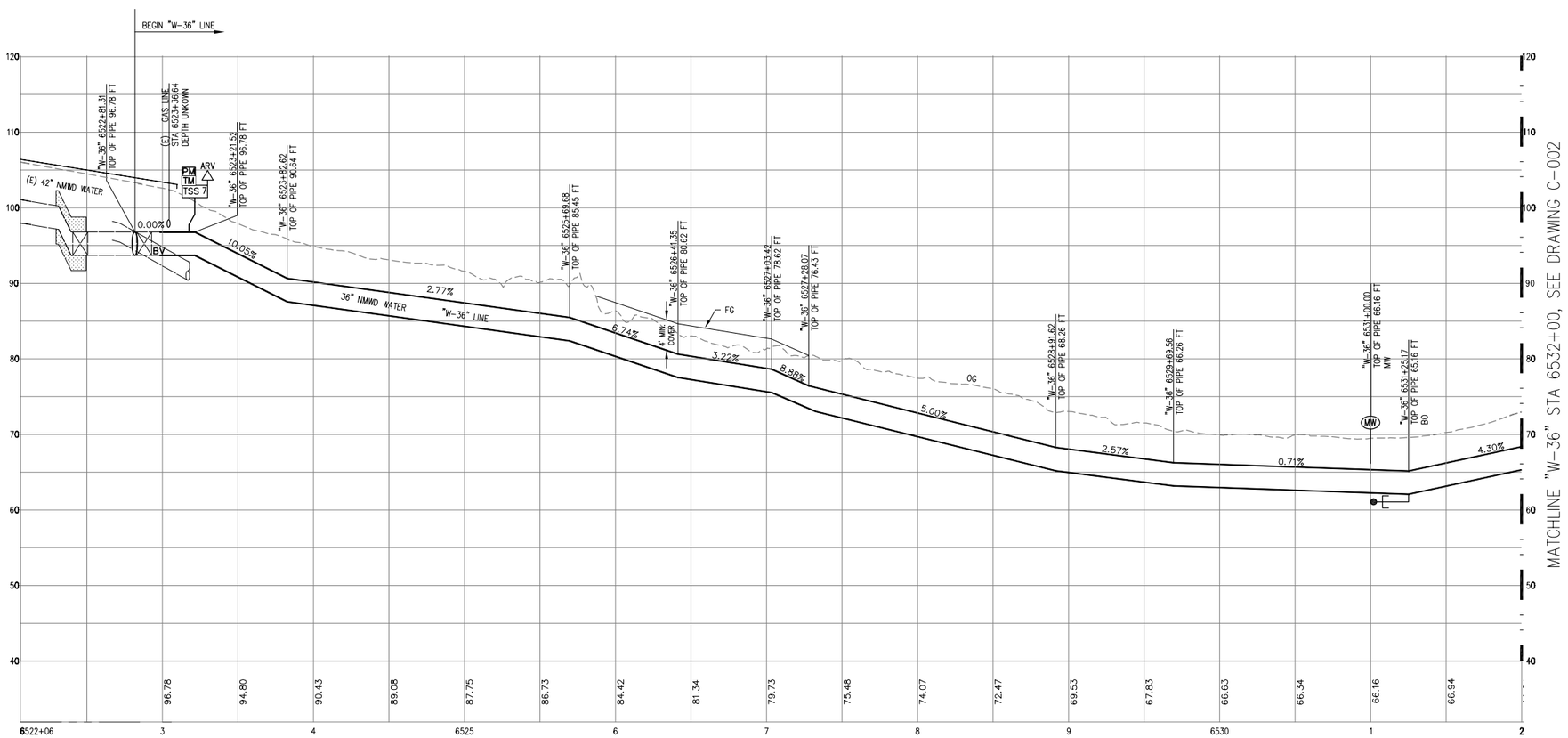
DES	DR	CH	SCALE		
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	07 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	G-007

Jan 15, 2014 - 2:07pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\G07.dwg User: SHUJK



PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
6522+81.31	6522+99.06	N59°35'12"W	17.76'				
				6522+99.06	6525+31.67	555.05'	24°00'38"
6525+31.67	6539+35.47	N45°30'12"W	1403.80'				

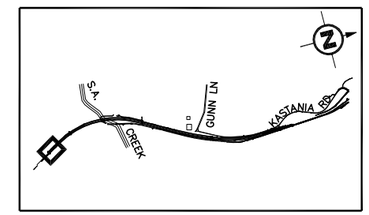
POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
1	2257696.680	5959466.100	102.76	PG&E	0'-4"
2	2257698.930	5959465.260	102.67	NMWD	7'-3"
3	2257697.846	5959464.664	102.74	NMWD	7'-3"

NOTES:

1. SEE DRAWINGS DM-001 FOR FACILITIES TO BE RELOCATED
2. SEE DRAWINGS D-009 AND D-010 FOR "SOUTH CONNECTION" DETAILS
3. FOR TYPICAL SECTIONS, SEE DRAWING C-034

KEYMAP



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STATE OF CALIFORNIA

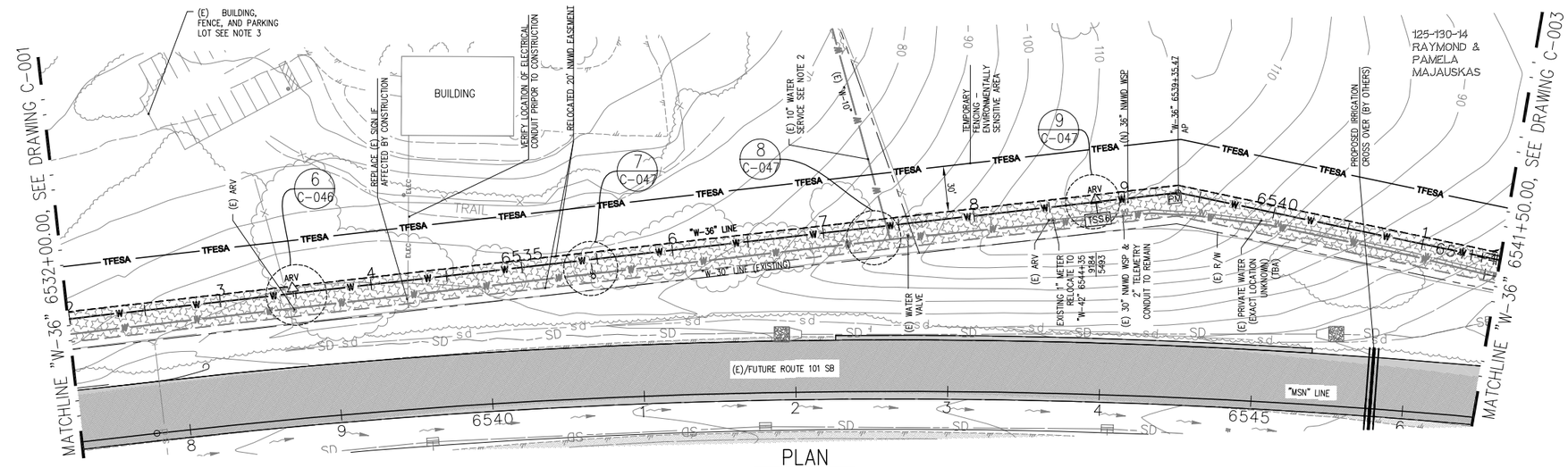
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6522+95-STA 6532+00

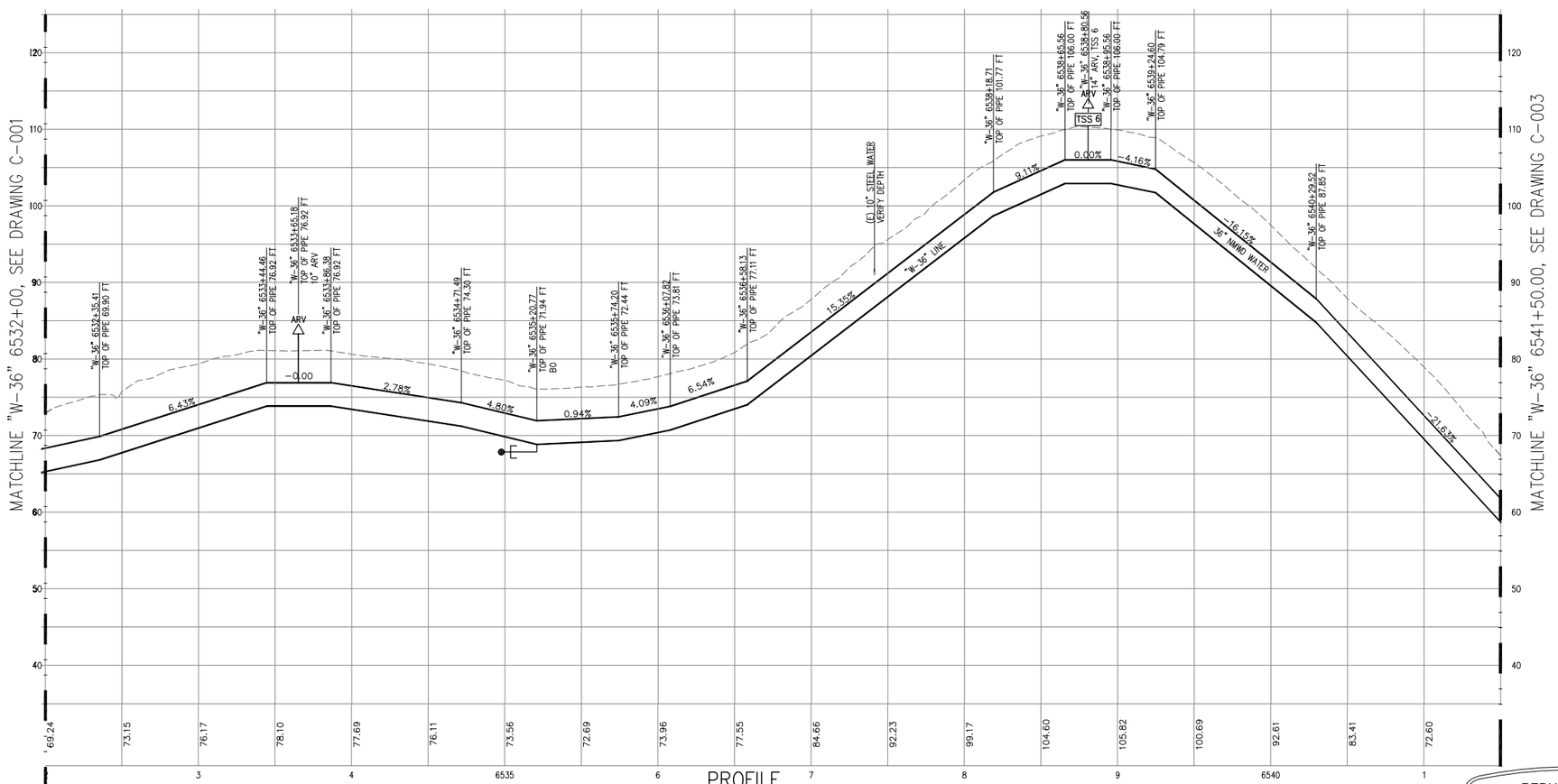
DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 8 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-001

Dec 05, 2013 - 9:29am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C001.dwg User: BARCJ



PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE: NOT TO SCALE

Graphic Scale (in feet)

1 inch = 40 ft.

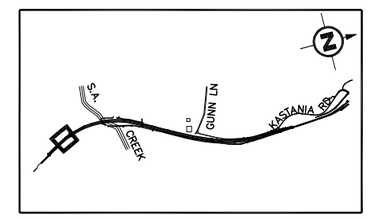
WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6539+35.47	6542+17.06	N27°07'26"W	281.59'

NOTES:

1. SEE DRAWING DM-002 FOR FACILITIES TO BE REMOVED.
2. EXISTING 10" STEEL NMWD WATERLINE AS BUILT NO. 1576-C-11.
3. EXISTING BUILDING AND FENCE SHOWN ON PLANS WAS REMOVED AND REPLACED WITH PARKING LOT PER FIELD OBSERVATION ON APRIL 13, 2011. PARKING LOT LINEWORK IS APPROXIMATE.
4. FOR TYPICAL SECTIONS, SEE DRAWING C-034.

KEYMAP



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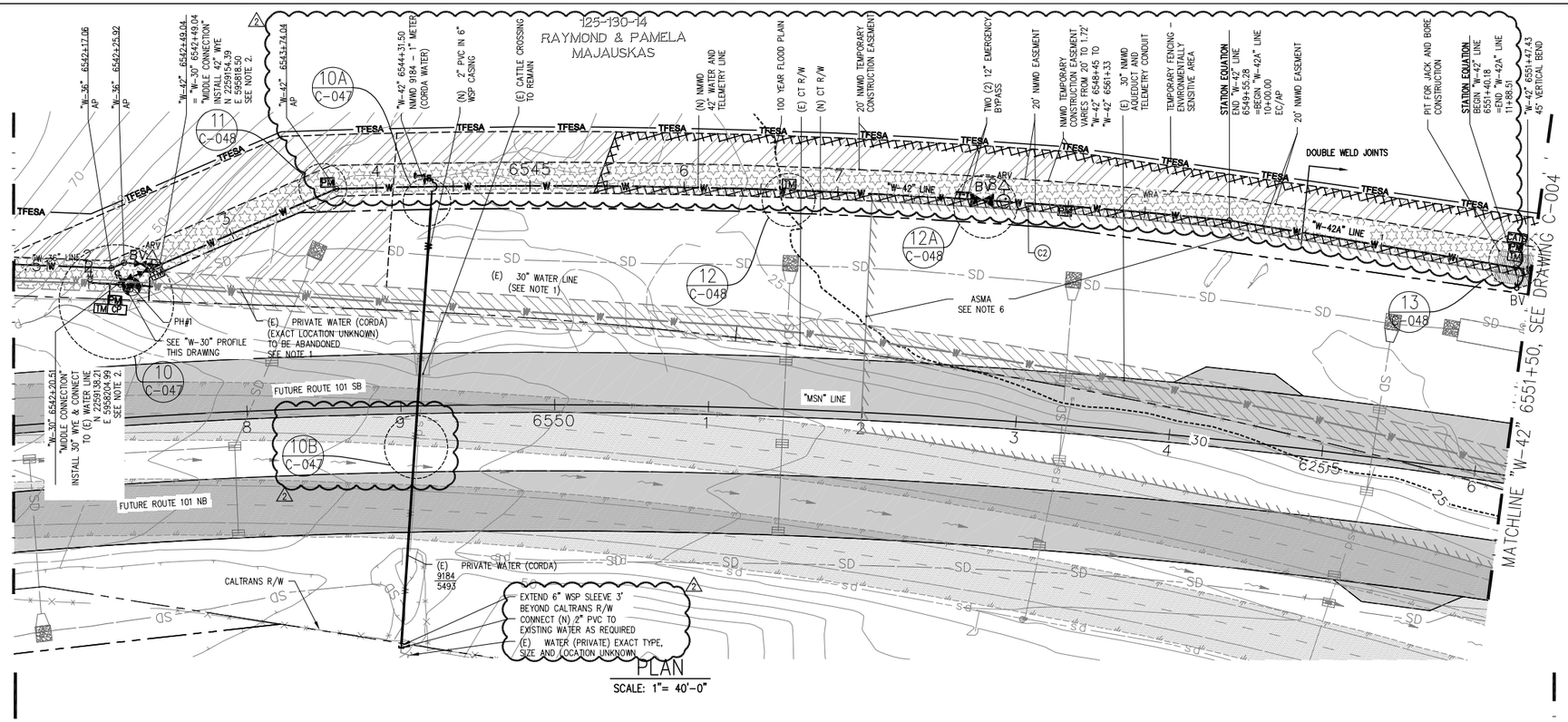
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

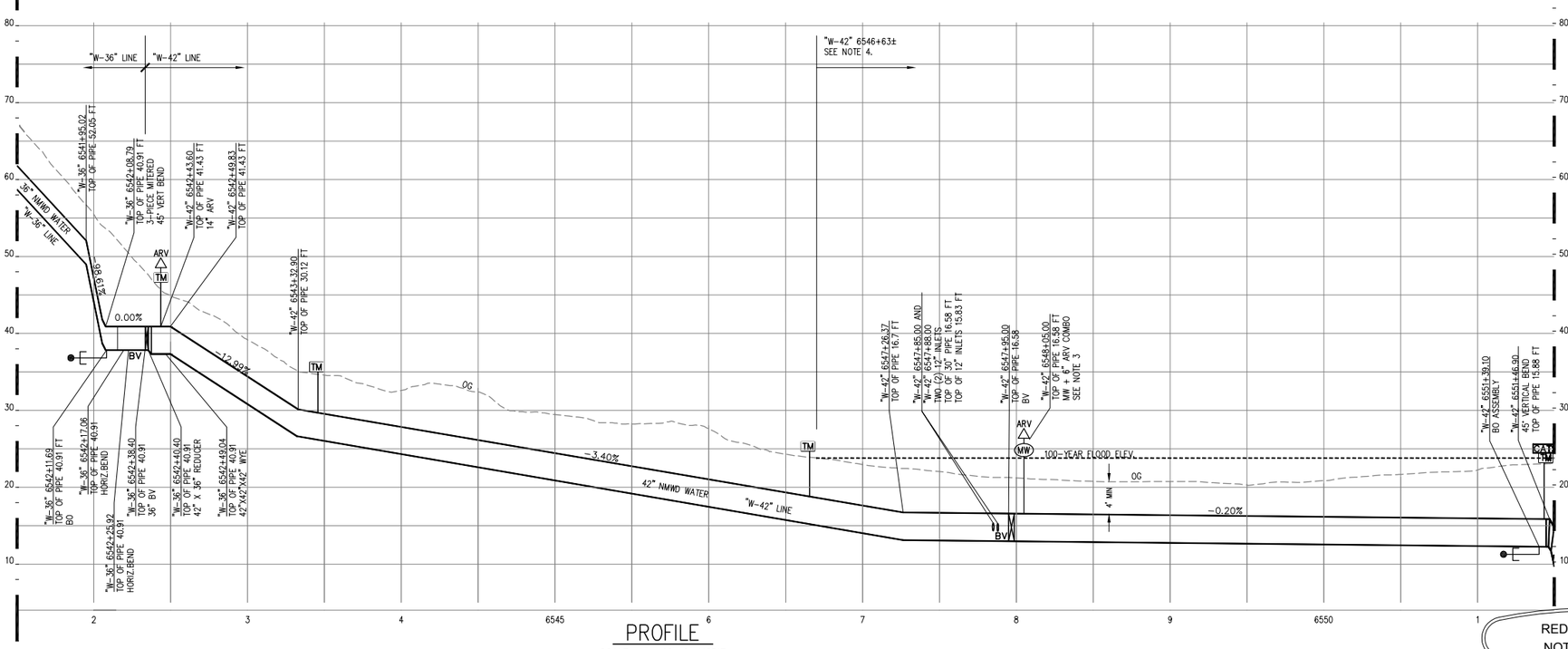
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6532+00-STA 6541+50

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 9 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-002

Dec 05, 2013 - 9:32am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C002.dwg User: BARCJ



PLAN
SCALE: 1"= 40'-0"



PROFILE
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE: NOT TO SCALE

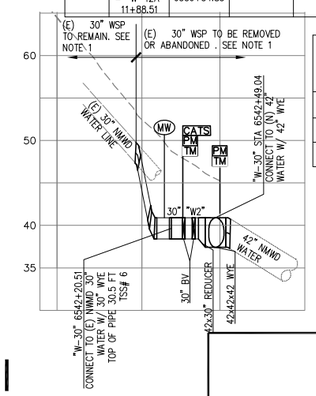
POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
1	2259145.40	5957202.64	47.07	30" WATER NMWD	3'-2"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
	6542+17.06	6542+25.92	N52°38'36"W	8.86'				
	6542+25.92	6542+49.04	N25°37'53"W	23.12'				
	6542+49.04	6543+74.04	N52°38'36"W	125.00'				
C2					6543+74.04	6549+55.28	4435.90	07°30'27"
	"W-42" 6549+55.28 = "W-42A" 10+00.00	"W-42" 6551+40.18 = "W-42A" 11+88.51	N19°56'26"W	188.51'				
	"W-42" 6551+40.18 = "W-42A" 11+88.51	"W-42" 6556+54.83	N19°56'26"W	514.65'				

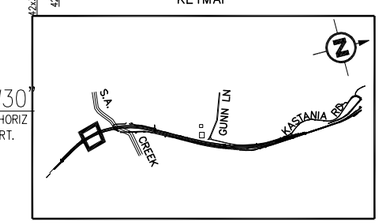


PROFILE "W30"
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

"W-30" HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6542+02.55	6542+20.51	N26°38'41"W	17.96'
6542+20.51	6542+49.04	N55°25'59"W	28.53'

KEYMAP



NOTES

1. SEE DRAWING DM-003 FOR FACILITIES TO BE REMOVED OR ABANDONED.
2. SEE DRAWING D-012 FOR CONNECTION DETAILS FOR "MIDDLE CONNECTION".
3. SET DISCHARGE OF ARV @ ELEVATION 25.0'. MOUND UP GRADING IN THIS AREA SO RIM ELEVATIONS ARE AT ELEVATION 24.5'
4. PIPE TRENCH SECTIONS TO BE CONSTRUCTED PER DETAIL 5, SHEET D-001.
5. FOR TYPICAL SECTIONS, SEE DRAWING C-034.
6. SOIL SHALL BE PLACED WITHIN 500 FEET OF EXCAVATION AND PUT BACK IN HOLE.

CSW ST2

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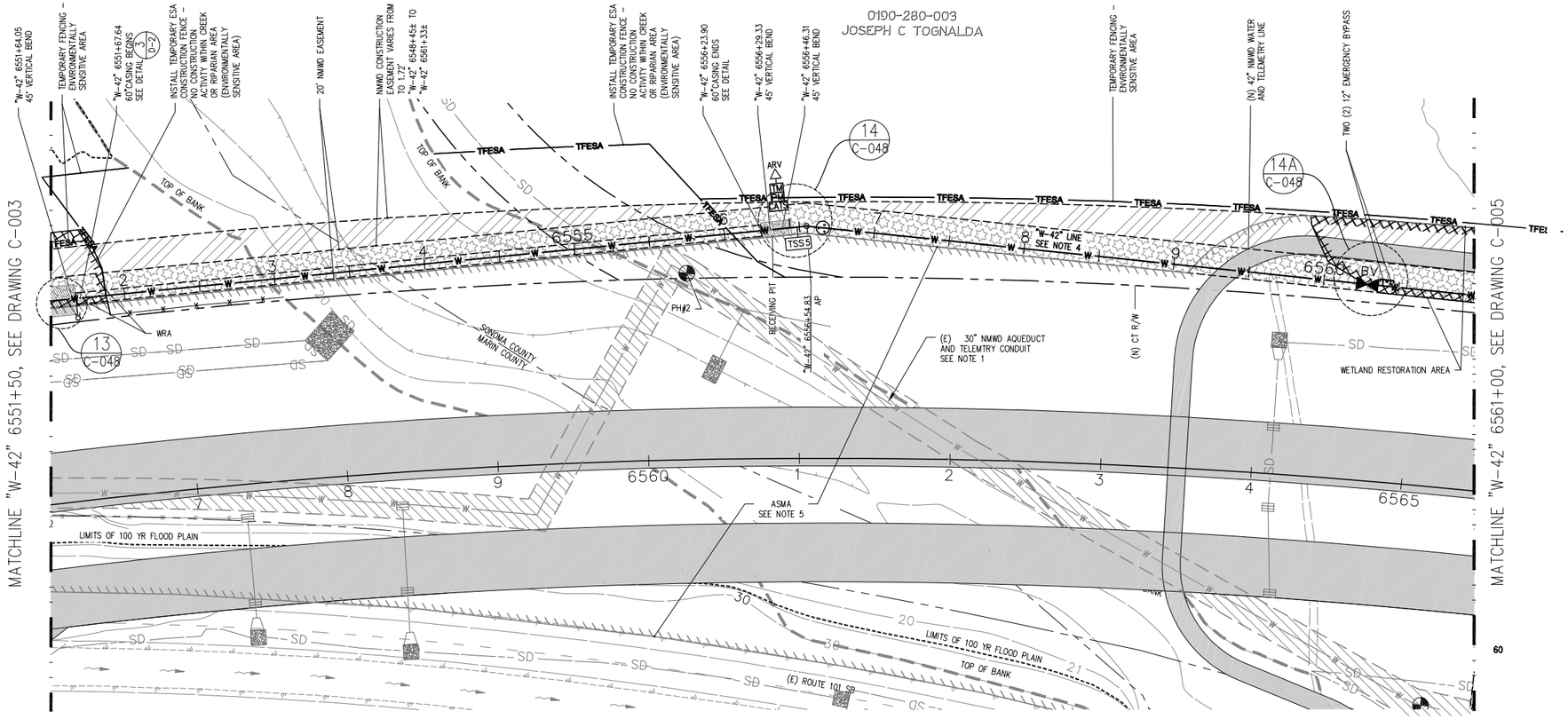
NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6541+50-STA 6551+50

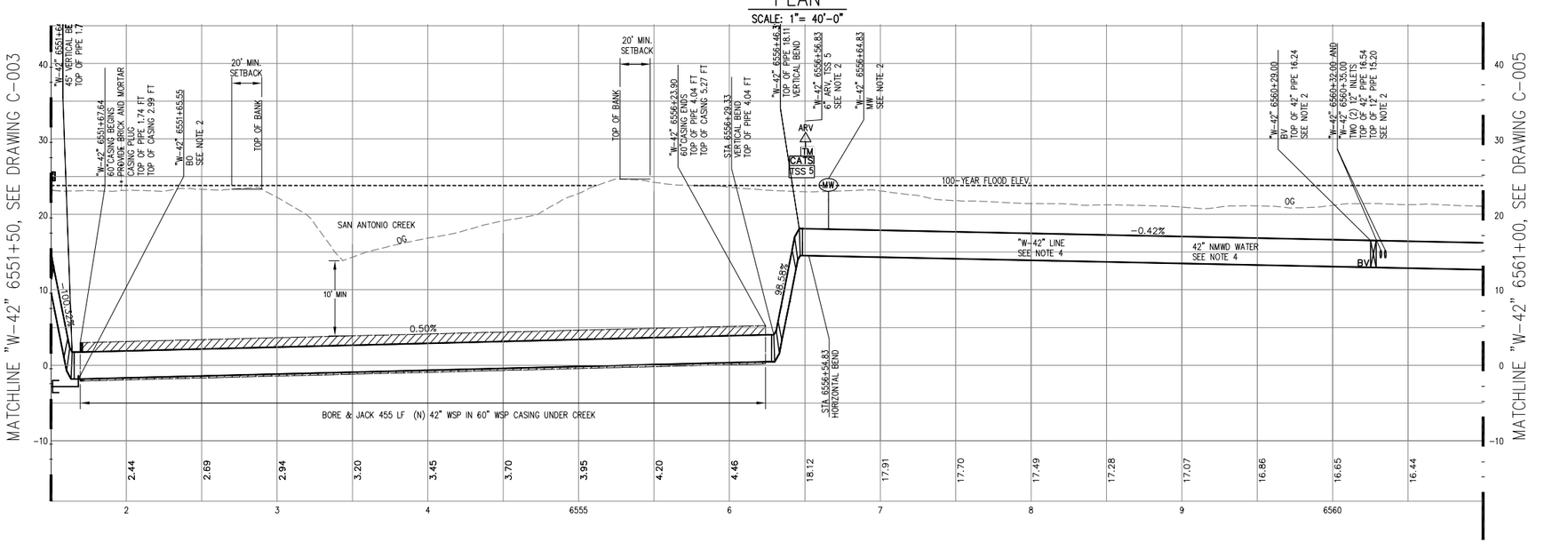
DES	DR	CH	SCALE	1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	10 OF 149 SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 C-003

Jan 15, 2014 - 10:29am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C003.dwg User: SHUJK



PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L
	6556+54.83	6561+33.55	N08°20'50"W	478.72'

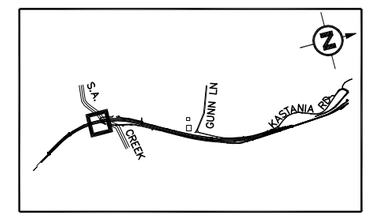
POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
2	2260338.22	5957626.15	24.11	30" WATER NMWD	9'-4"

NOTES:

1. SEE DRAWING DM-004 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SET DISCHARGE OF ARV @ ELEVATION 25.0'. MOUND UP GRADING IN THIS AREA SO RIM ELEVATIONS ARE AT ELEVATION 24.5'
3. FOR TYPICAL SECTIONS, SEE SHEET C-034
4. PIPE TRENCH SECTION TO BE CONSTRUCTED PER EITHER DETAIL 5, DRAWING D-001
5. SOIL SHALL BE PLACED WITHIN 500 FEET OF EXCAVATION AND PUT BACK IN HOLE.

KEYMAP



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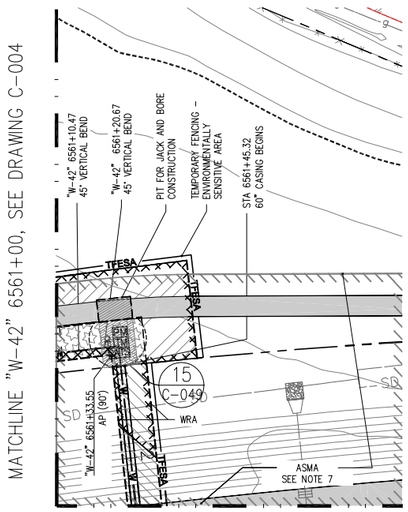
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

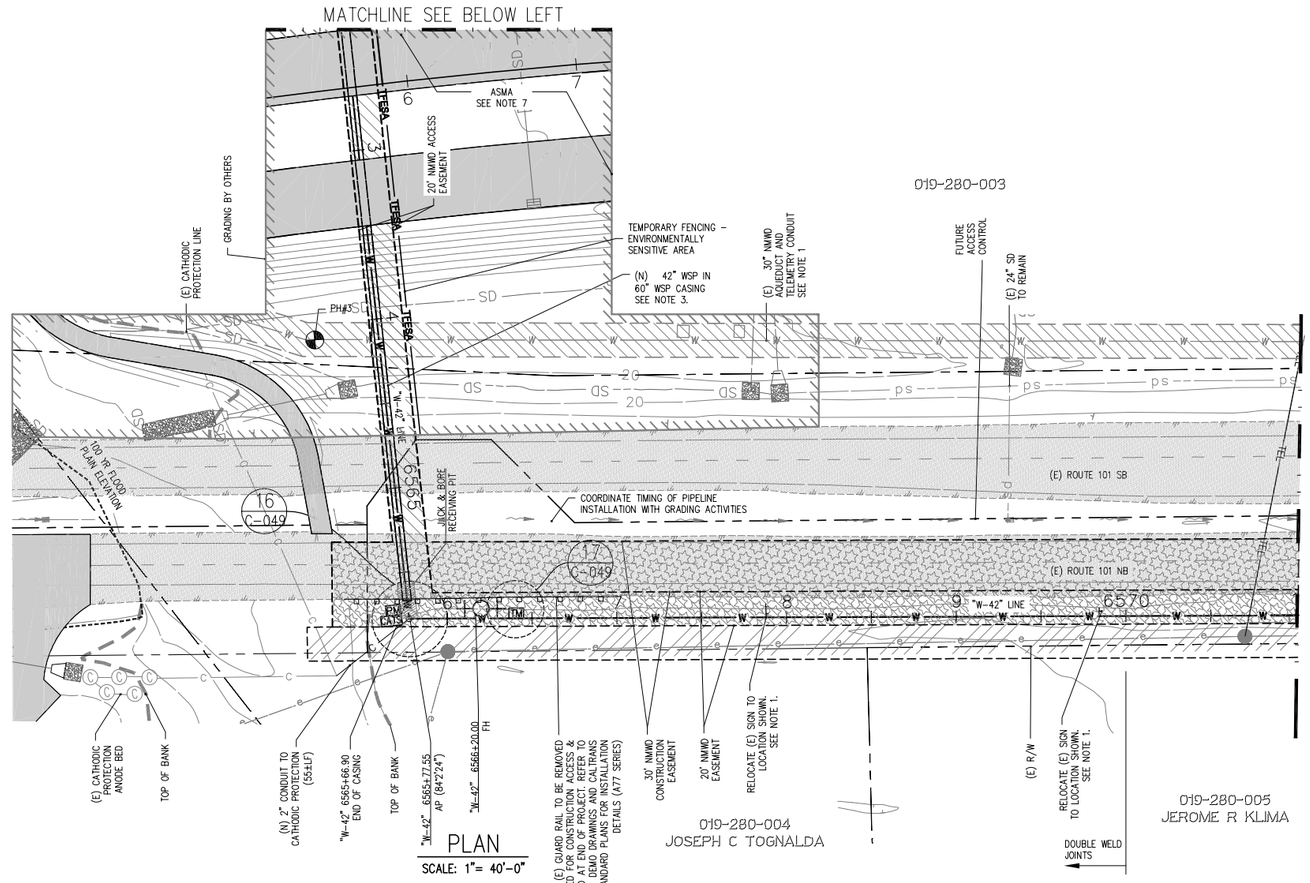
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6551+50-STA 6561+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 11 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-004

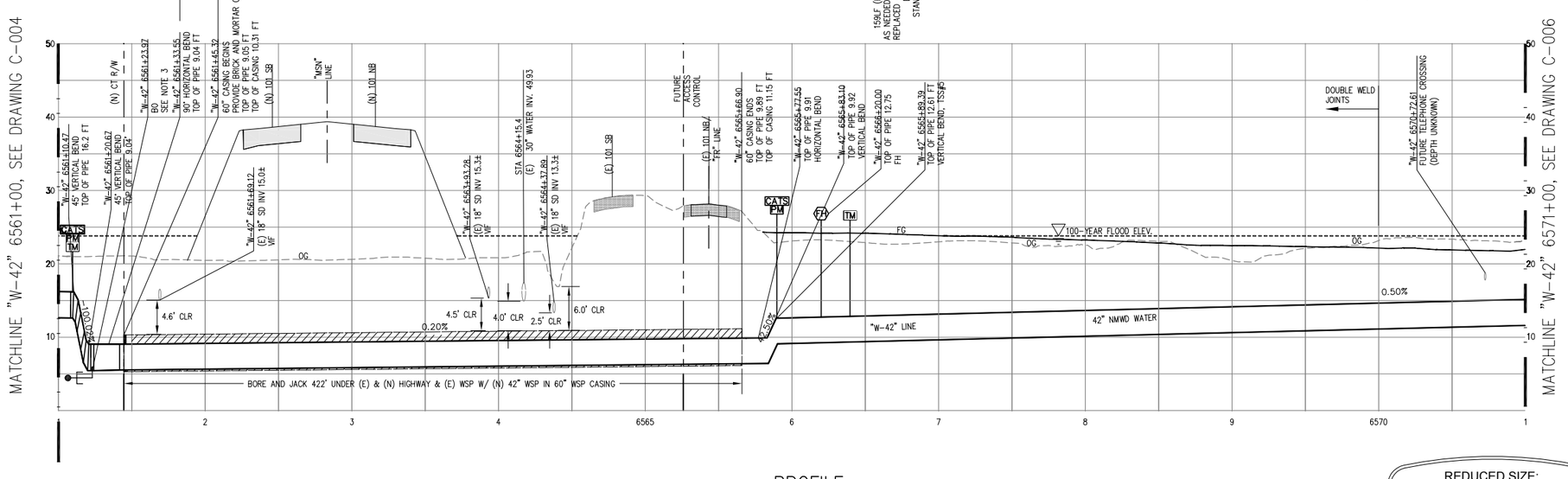
Dec 05, 2013 - 11:48am N:\CIVIL\A\4113100\Dwg\Sheet Dwgs\C004.dwg User: BARCJ





PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

Graphic Scale (in feet)

1 inch = 40 ft.

WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L
	6561+33.55	6565+77.55	N82°16'36"E	444.00'
	6565+77.55	6571+66.94	N01°45'55"W	589.39

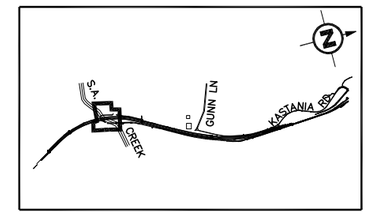
POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
3	2260880.810	5957784.07	21.72	30" WATER NMWD	7'-4"

NOTES:

1. SEE DRAWING DM-005 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-005 FOR GRADING PLAN
3. MOUND UP GRADING IN THIS AREA SO RIM ELEVATIONS ARE AT ELEVATION 24.5'
4. PIPE TRENCH SECTIONS TO BE CONSTRUCTED PER DETAIL 5, SHEET D-001.
5. PIPE TRENCH SECTIONS TO BE CONSTRUCTED PER DETAIL 4, SHEET D-001.
6. FOR TYPICAL SECTIONS, SEE DRAWING C-034.
7. SOIL SHALL BE PLACED WITHIN 500 FEET OF EXCAVATION AND PUT BACK IN HOLE

KEYMAP



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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6561+00-STA 6571+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 12 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-005

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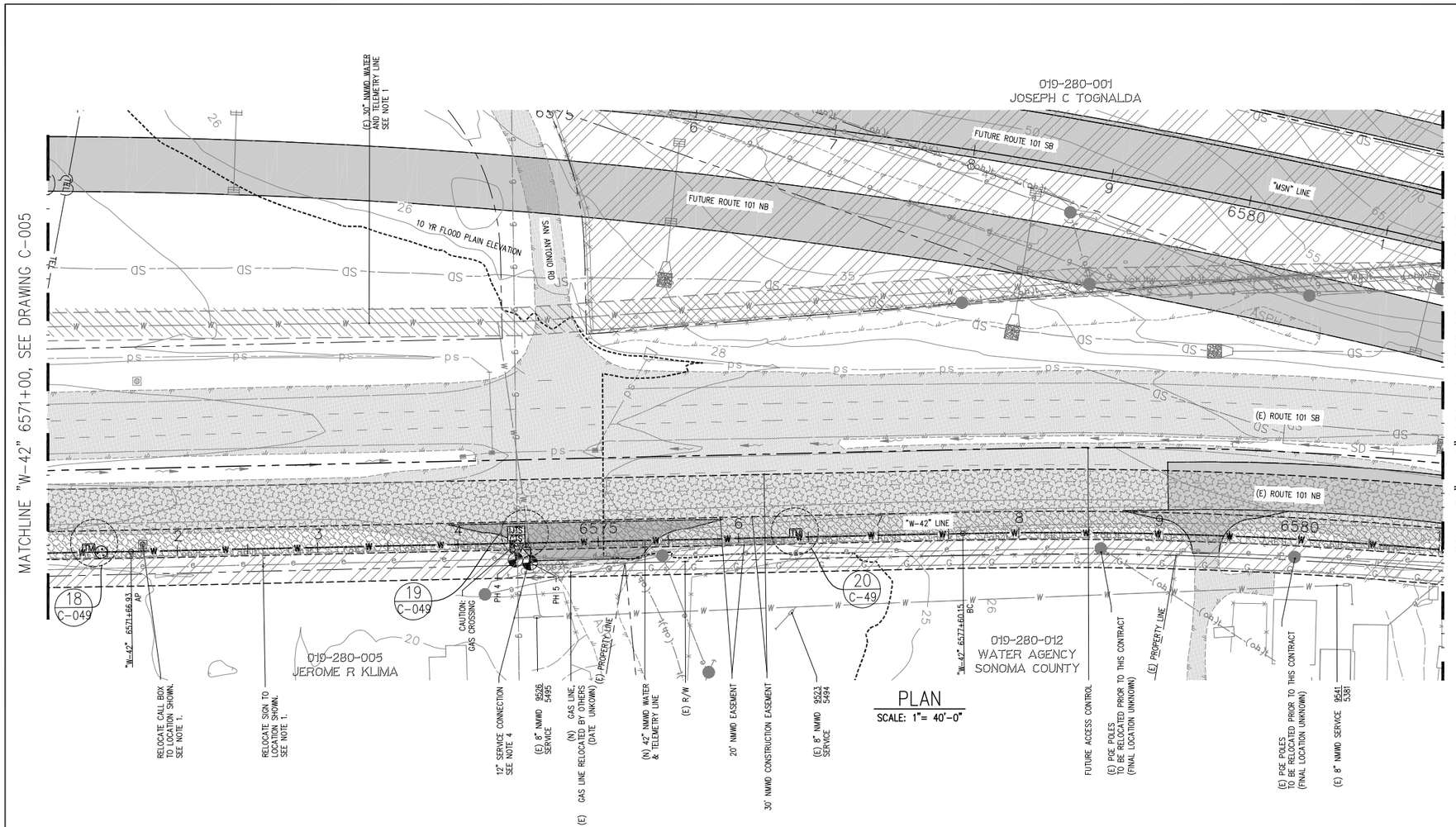
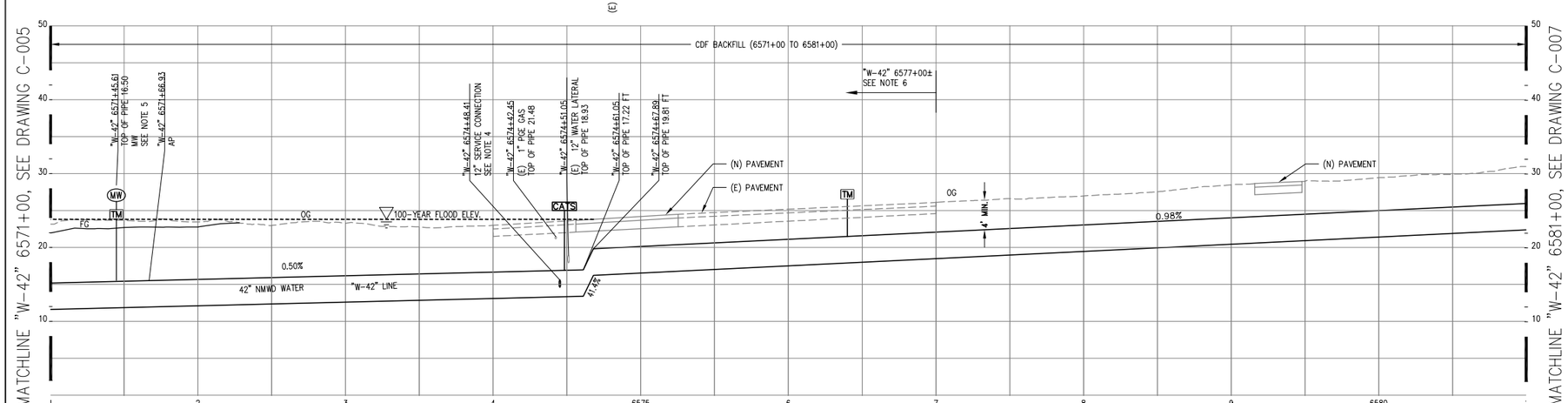


PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
4	2261804.11	5957930.58	22.66	1" GAS PG&E	2'-0"
5	2261814.49	5957932.56	22.94	12" WATER NMWD	4'-8"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

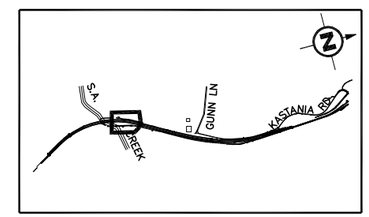
WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
	6571+66.94	6577+60.15	N02°01'43"W	593.21'				
C5				880.31	6577+60.15	6586+40.47	3090.00	16°19'23"

NOTES:

1. SEE DRAWING DM-006 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-006 FOR GRADING PLAN
3. FOR TYPICAL SECTIONS, SEE DRAWINGS C-034.
4. FOR 12" SERVICE CONNECTION, SEE DETAIL 3, DRAWING D-007
5. MOUND UP GRADING IN THIS AREA SO RIM ELEVATIONS ARE AT ELEVATION 24.5'
6. PIPE TRENCH SECTION PER DETAIL 4, DRAWING D-001

KEYMAP



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NO.	DATE	REVISION	BY	APP.
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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6571+00-STA 6581+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 13 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-006

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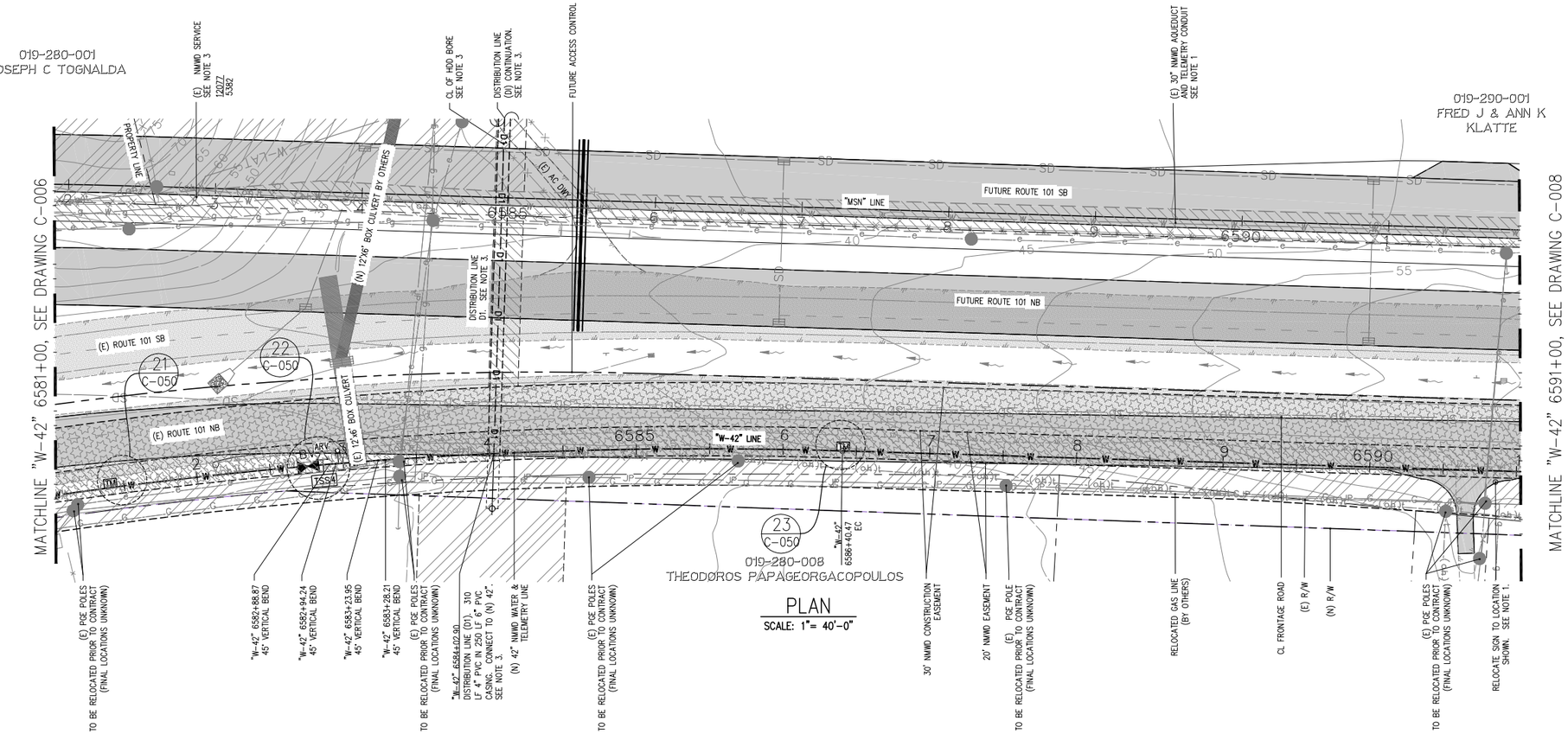
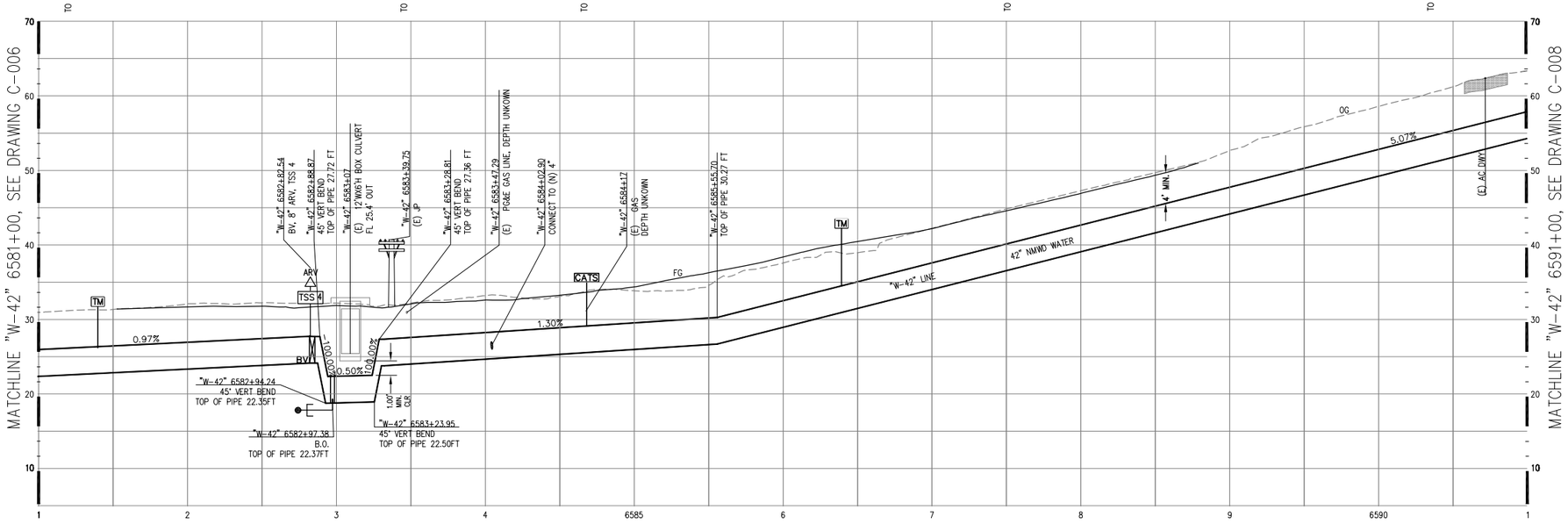


PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

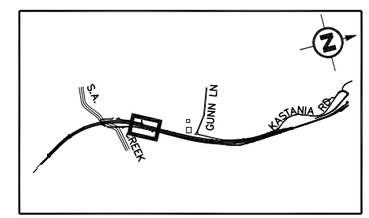
WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6586+40.47	6594+17.01	N14°17'40"E	776.55'

NOTES:

1. SEE DRAWING DM-007 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-007 FOR GRADING PLAN
3. SEE DRAWING C-021 FOR PLAN AND PROFILE OF DISTRIBUTION LINE #1
4. FOR TYPICAL SECTIONS, SEE DRAWING C-034

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6581+00-STA 6591+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 14 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-007

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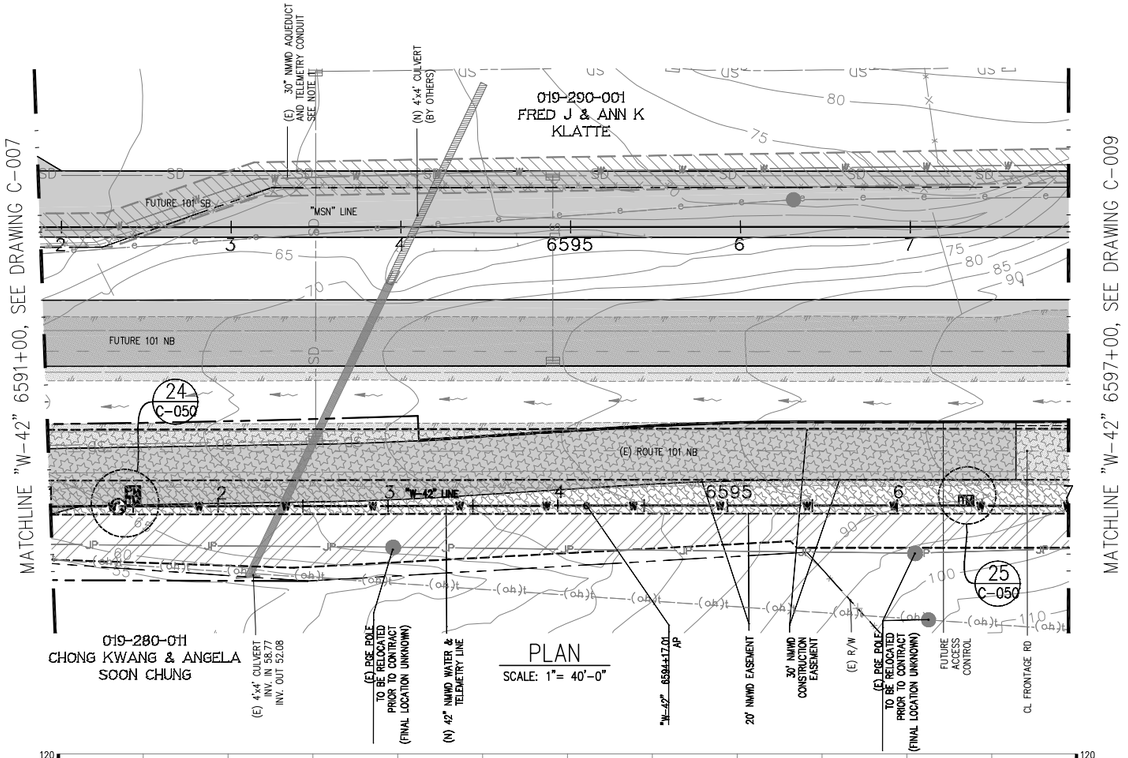
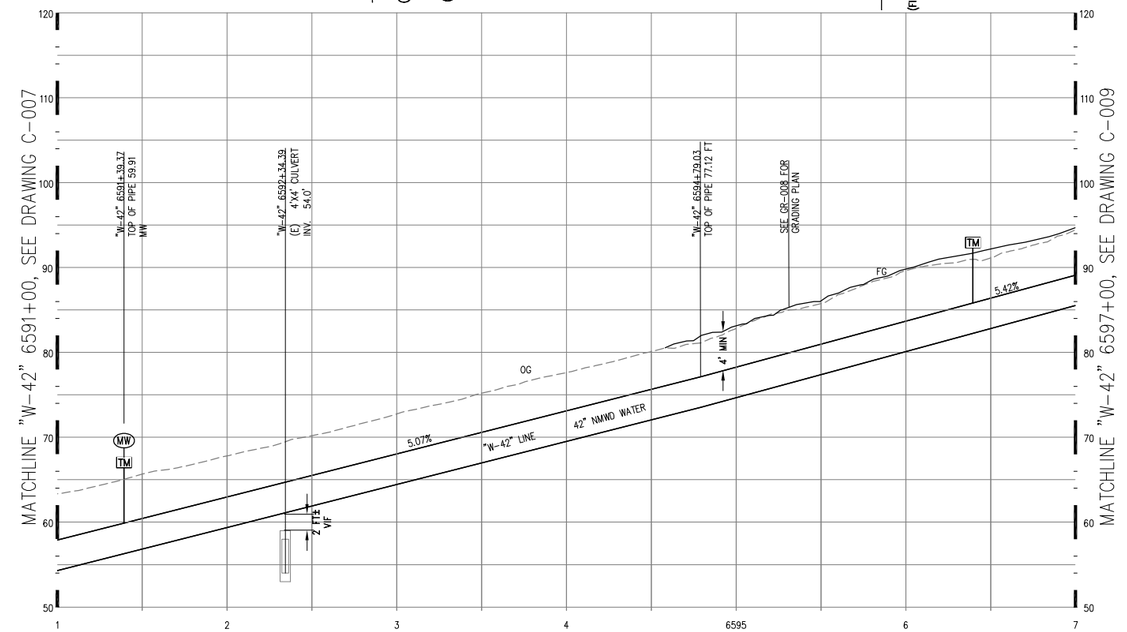


PLAN
SCALE: 1"= 40'-0"



PROFILE
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

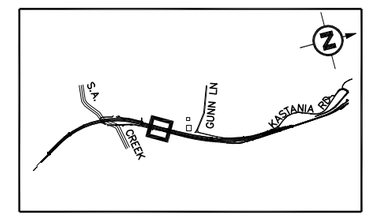
WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6594+17.01	6606+62.02	N14°23'53"E	1245.01'

NOTES:

1. SEE DRAWING DM-008 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-008 FOR GRADING PLAN
3. FOR TYPICAL SECTIONS, SEE DRAWING C-034

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6591+00-STA 6597+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 15 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-008

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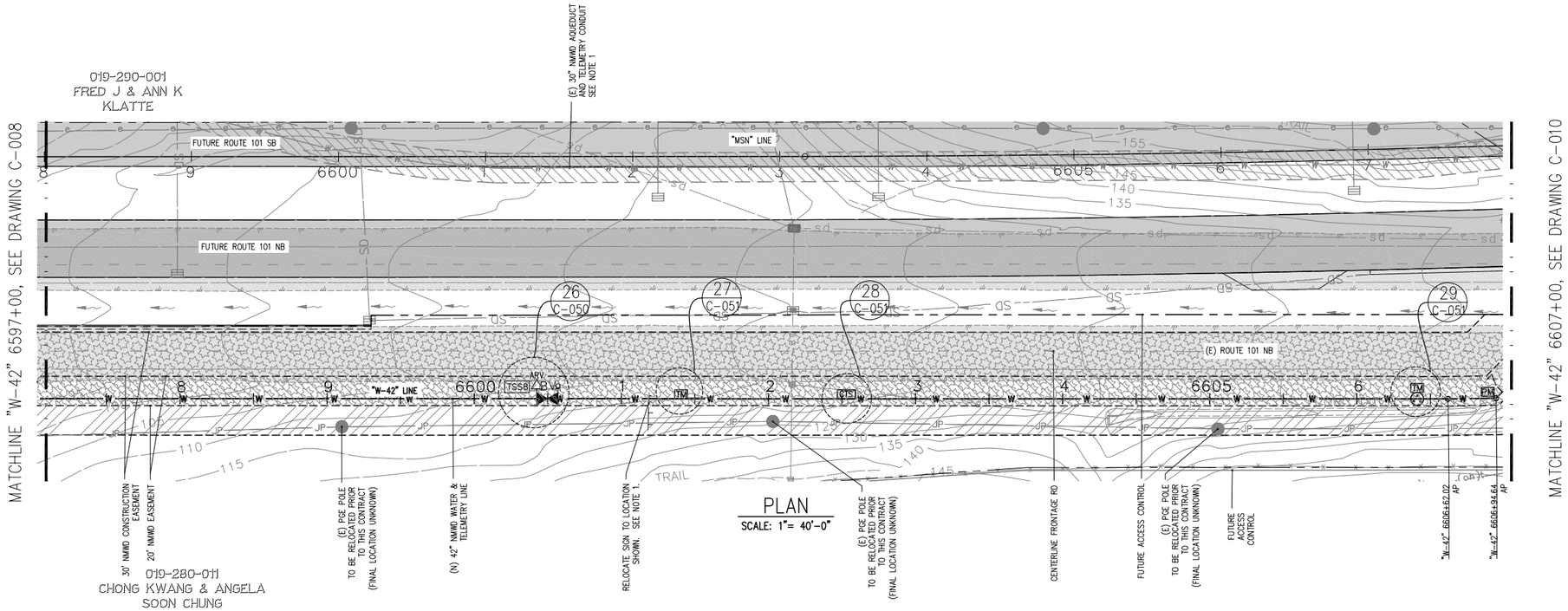
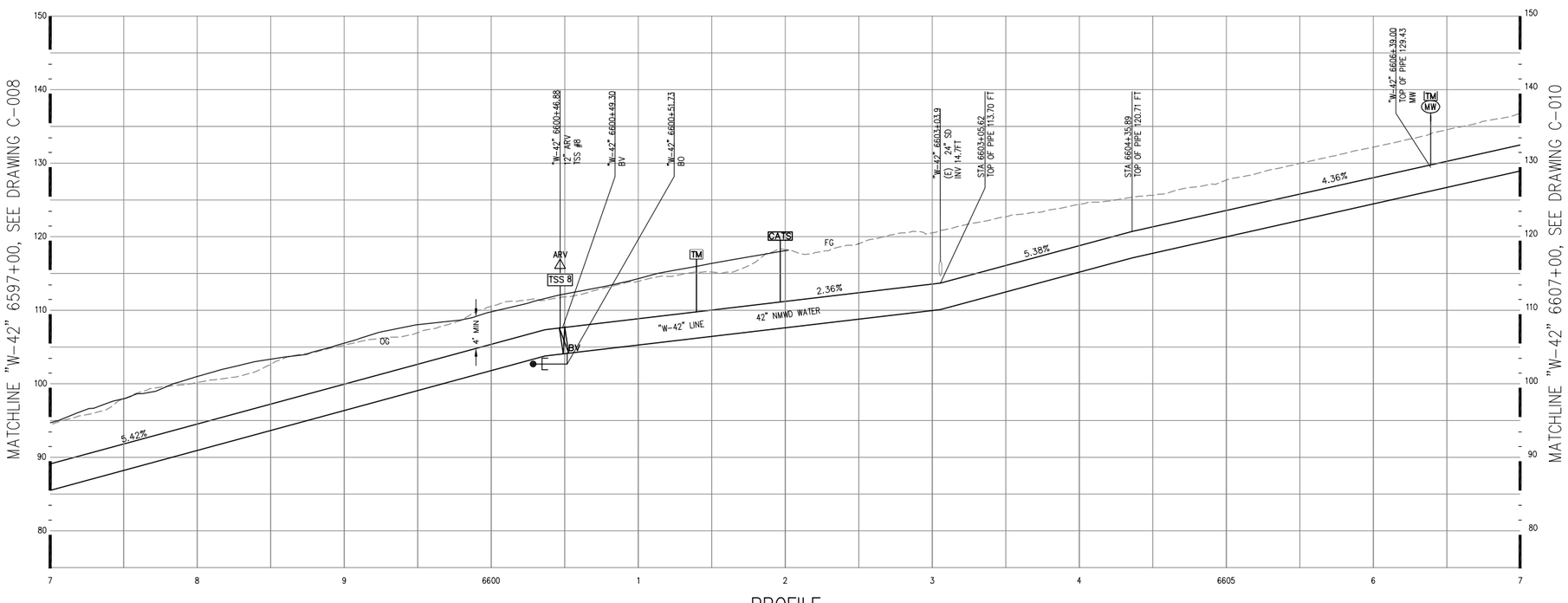


PLAN

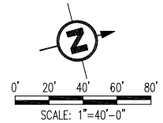
SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE



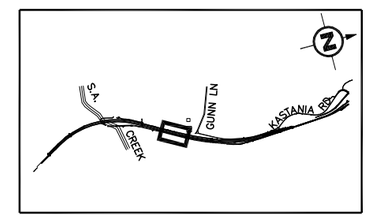
WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L
	6606+62.02	6606+94.64	N13°40'48"E	32.62'
	6606+94.64	6607+16.57	N31°19'12"W	21.93

NOTES:

1. SEE DRAWING DM-009 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-009 FOR GRADING PLAN
3. FOR TYPICAL SECTIONS, SEE DRAWING C-034A

KEYMAP



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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6597+00-STA 6607+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 16 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-009

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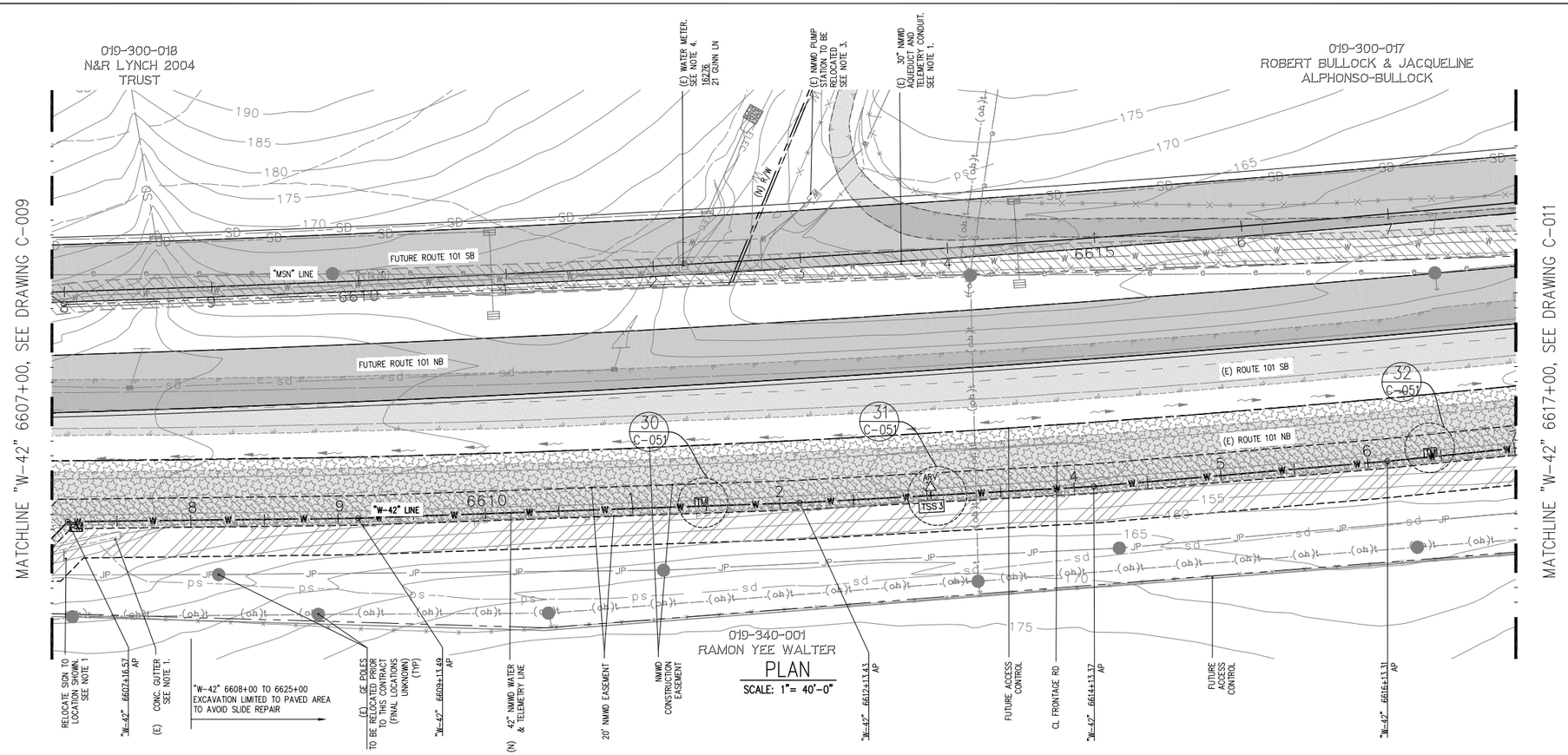
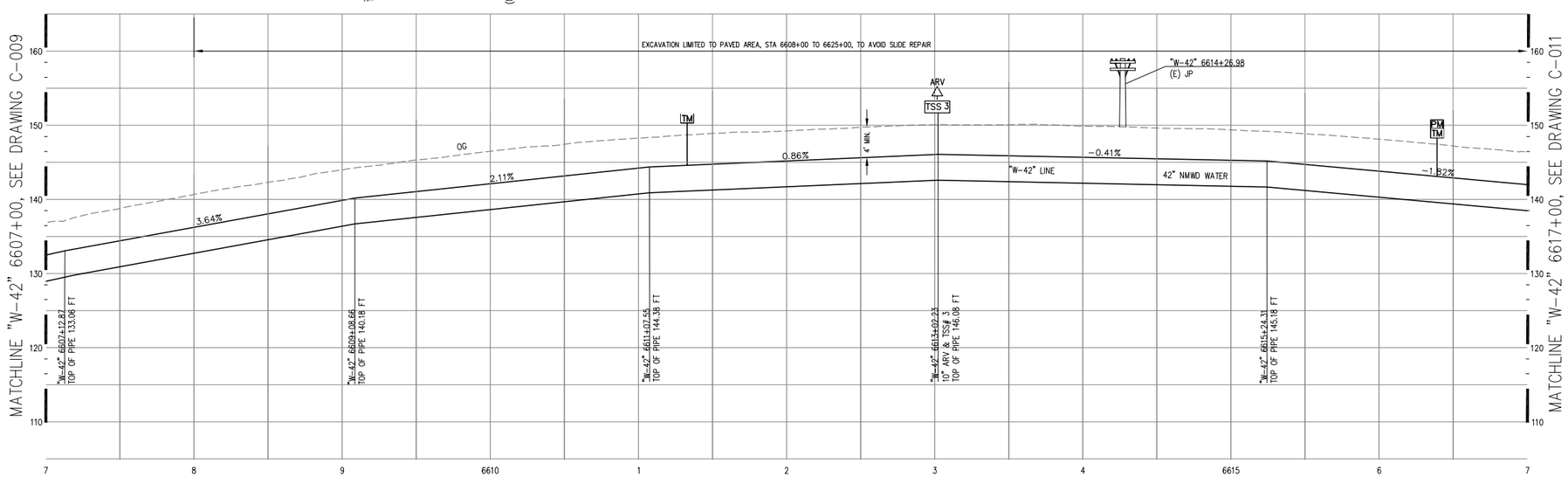


PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

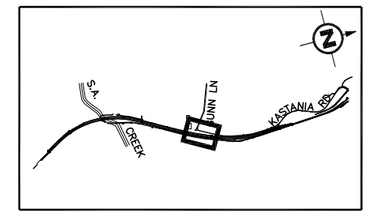
NOTES:

1. SEE DRAWING DM-010 FOR FACILITIES TO BE REMOVED OR RELOCATED
2. SEE DRAWING GR-010 FOR GRADING PLAN
3. SEE DRAWING C-026 FOR PUMP STATION DRAWINGS
4. SEE DRAWING C-056 FOR WATER METER RELOCATIONS
5. SEE DRAWING C-035 FOR TYPICAL SECTIONS

WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L
	6607+16.57	6609+13.49	N13°42'16"E	196.92'
	6609+13.49	6612+13.43	**N12°23'02"E**	299.95
	6612+13.43	6614+13.37	N11°13'20"E	199.94
	6614+13.37	6616+13.31	N09°27'26"E	199.94
	6616+13.31	6618+13.27	N08°35'33"E	199.96

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6607+00-STA 6617+00

DES	DR	CH	SCALE	1":40' HORIZ. 1":8' VERT.	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	17 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-010

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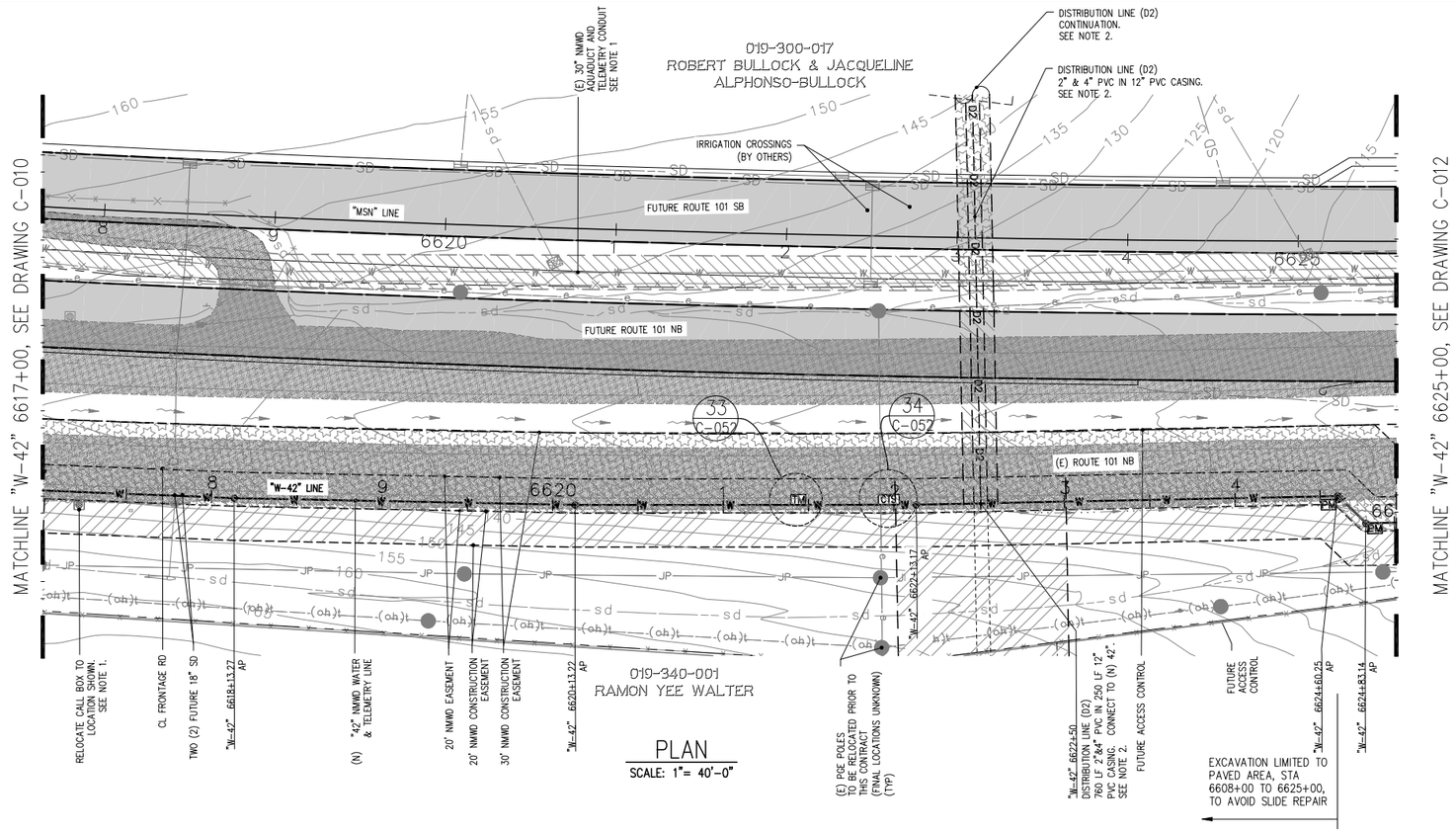
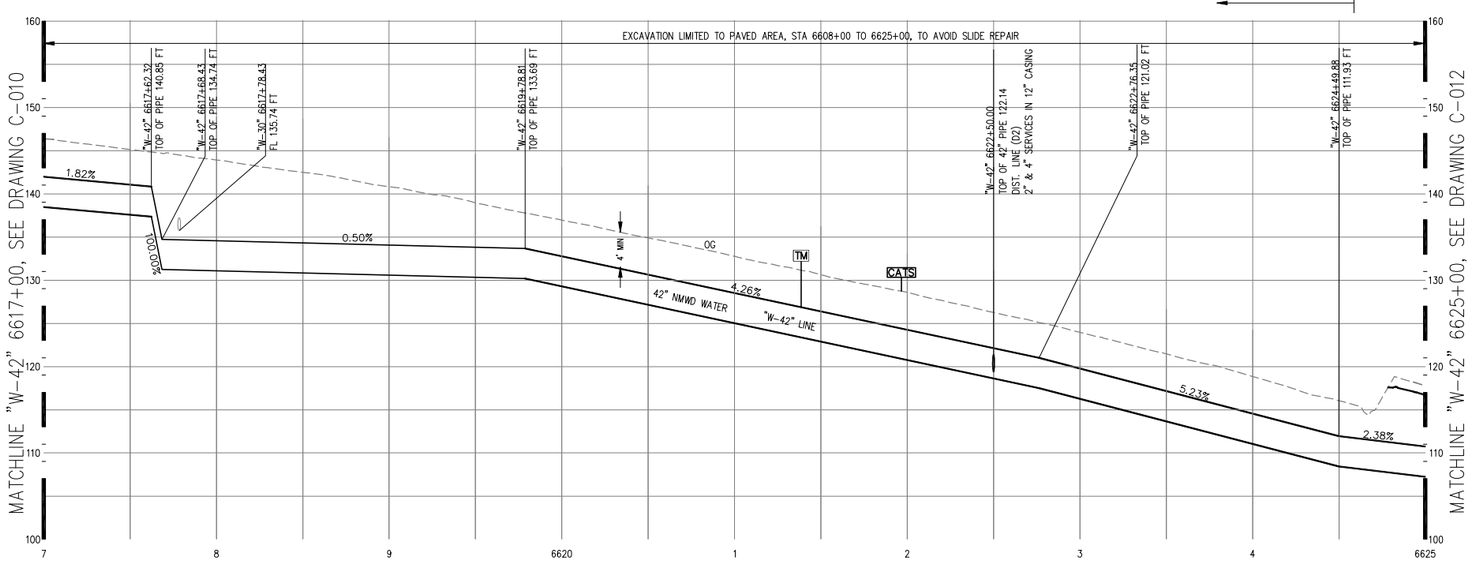


PLAN
SCALE: 1"= 40'-0"



PROFILE
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

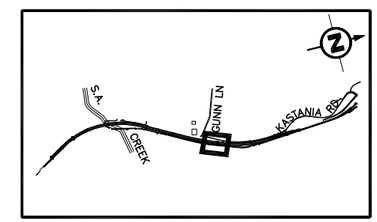
WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L
	6618+13.27	6620+13.22	N07°27'08"E	199.95'
	6620+13.22	6622+13.17	N06°16'06"E	199.95
	6622+13.17	6624+60.25	N05°08'31"E	247.08'
	6624+60.25	6624+83.14	N50°08'44"E	22.89'
	6624+83.14	6633+09.26	N05°08'44"E	826.12'

NOTES:

1. SEE DRAWING DM-011 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING C-025 FOR PLAN AND PROFILE OF DISTRIBUTION LINE D2
3. SEE DRAWING C-035 FOR TYPICAL SECTIONS

KEYMAP



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NO.	DATE	REVISION	BY	APP.
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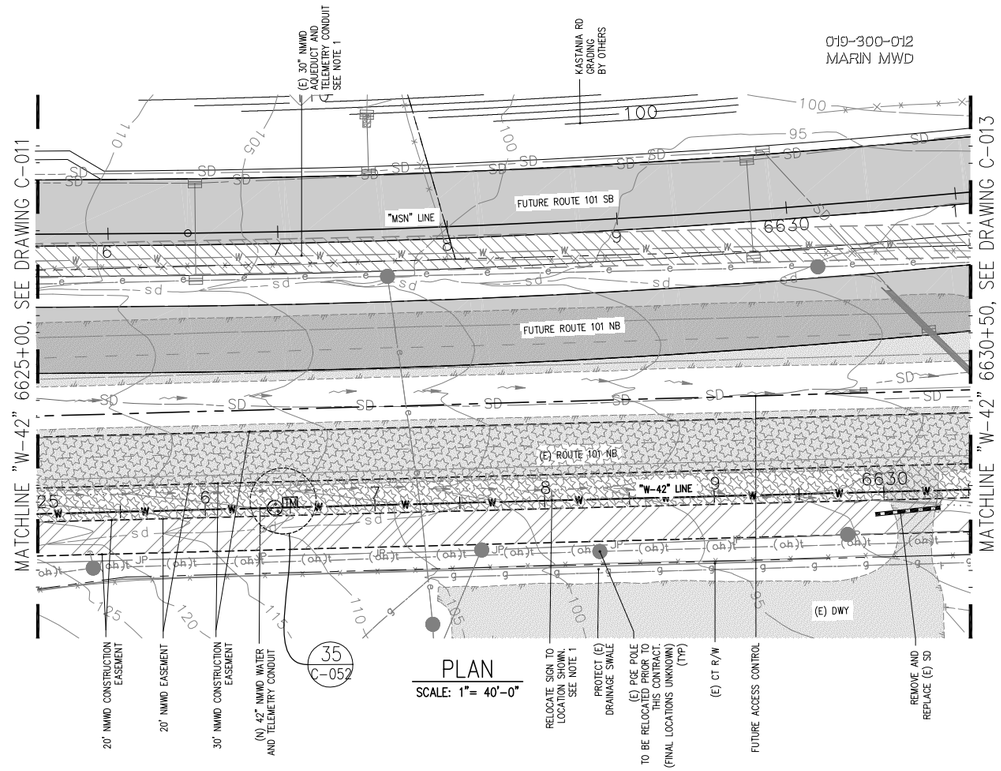
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

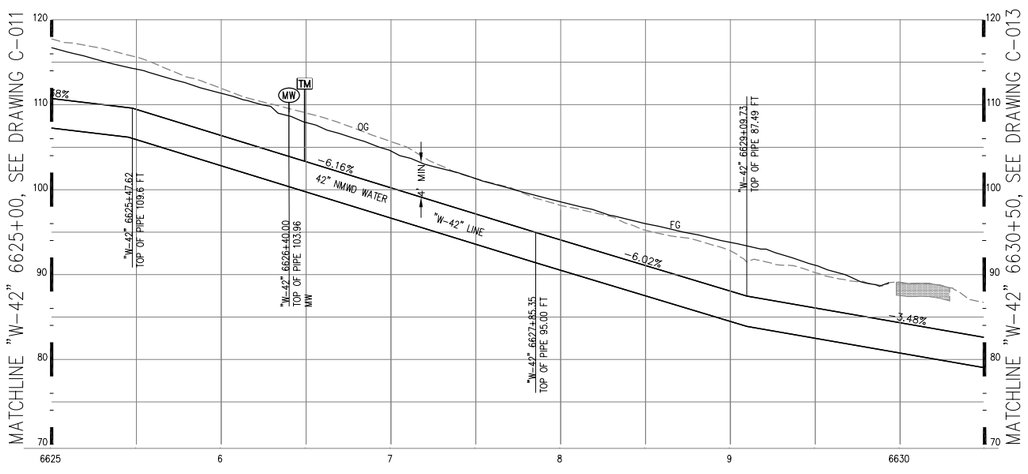
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6617+00-STA 6625+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 18 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 C-011

Dec 05, 2013 - 11:57am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C011.dwg User: BARCJ



PLAN
SCALE: 1"= 40'-0"



PROFILE
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

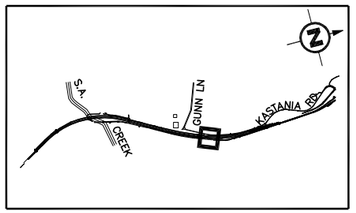
REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

NOTES:

1. SEE DRAWING DM-012 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR RELOCATED
2. SEE DRAWING GR-012 FOR GRADING PLAN
3. SEE DRAWING C-035 FOR TYPICAL SECTIONS

KEYMAP



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No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

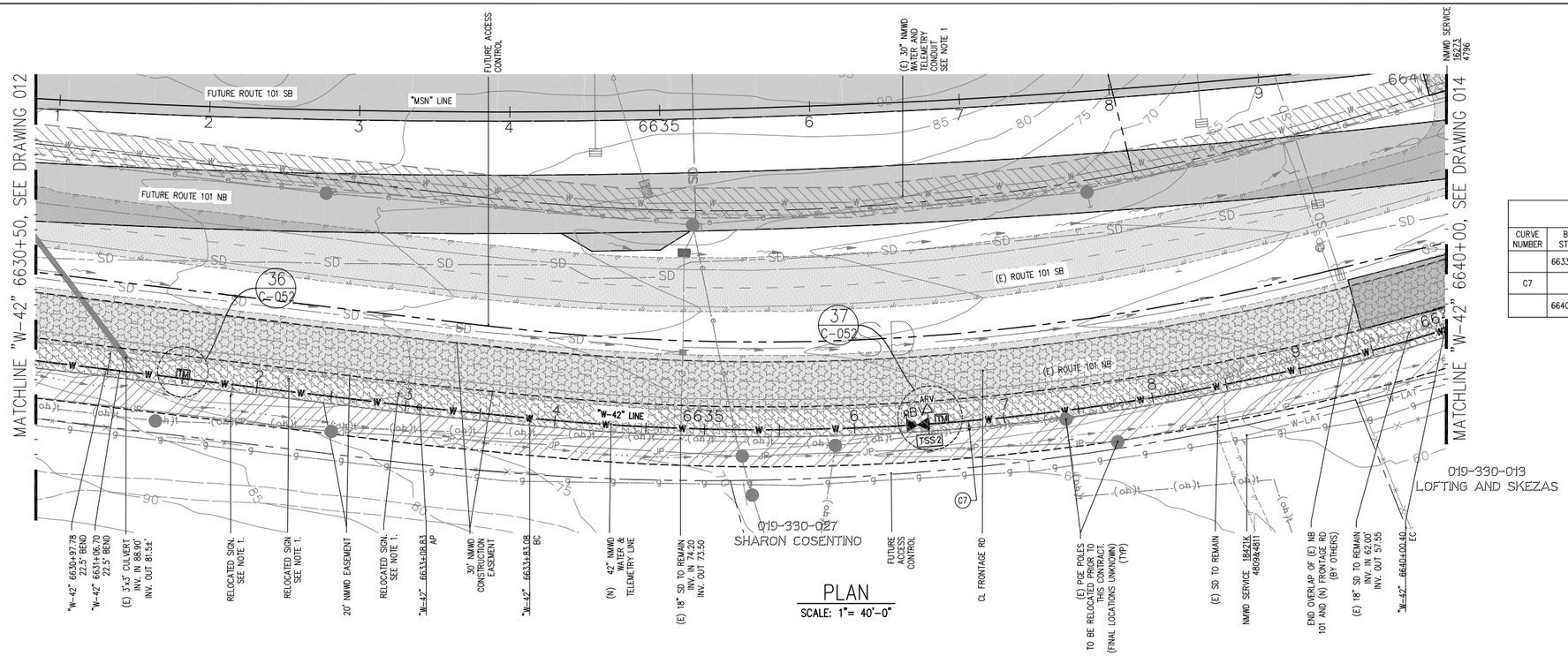
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6625+00-STA 6630+50

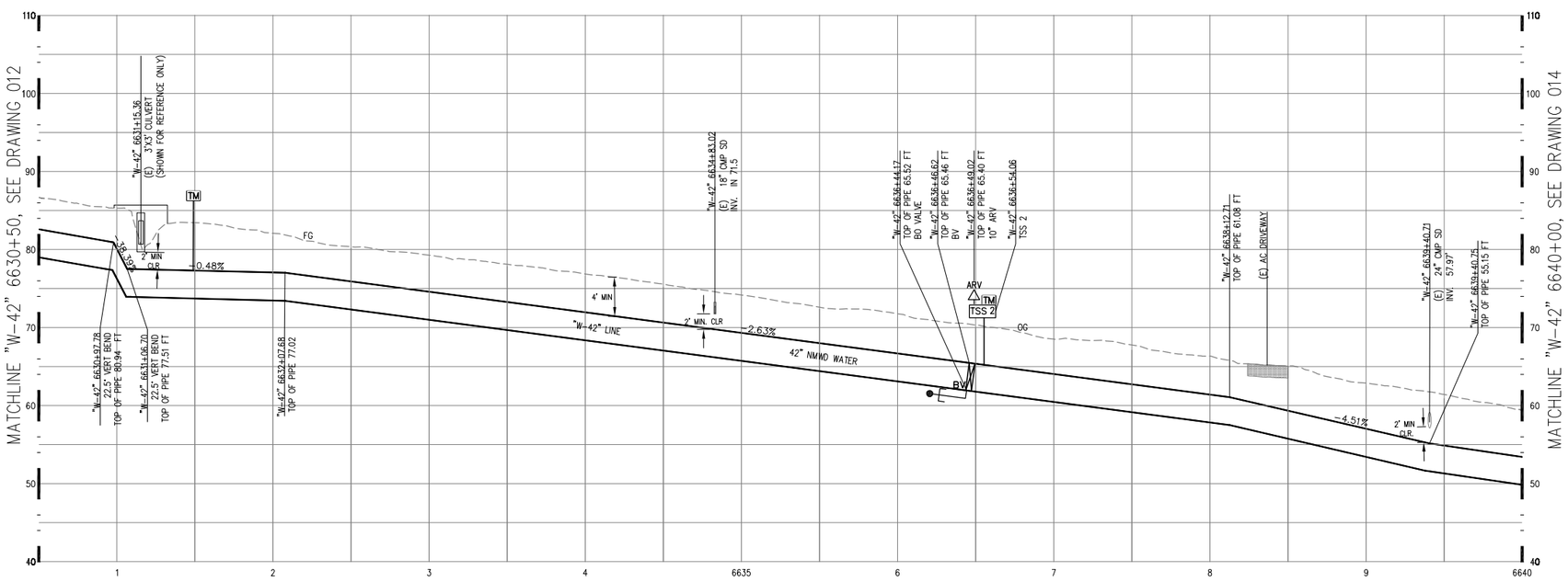
DES	DR	CH	SCALE 1": 40' HORIZ. 1": 8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 19 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-012

Dec 04, 2013 - 11:38am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C012.dwg User: BARCJ



PLAN

SCALE: 1"= 40'-0"



PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

SCALE: 1"=40'-0"

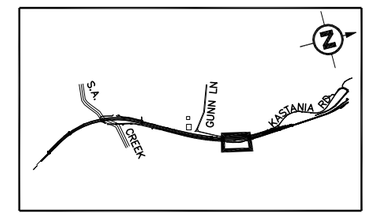
WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
	6633+09.26	6633+83.08	N03°54'03"E	73.82'				
C7				617.32	6633+83.08	6640+00.40	1582.0'	22°21'28"
	6640+00.40	6643+82.14	N18°27'25"W	381.74'				

NOTES:

1. SEE DRAWING DM-013 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED.
2. SEE DRAWING GR-013 FOR GRADING PLAN
3. SEE DRAWING C-035 FOR TYPICAL SECTIONS

KEYMAP



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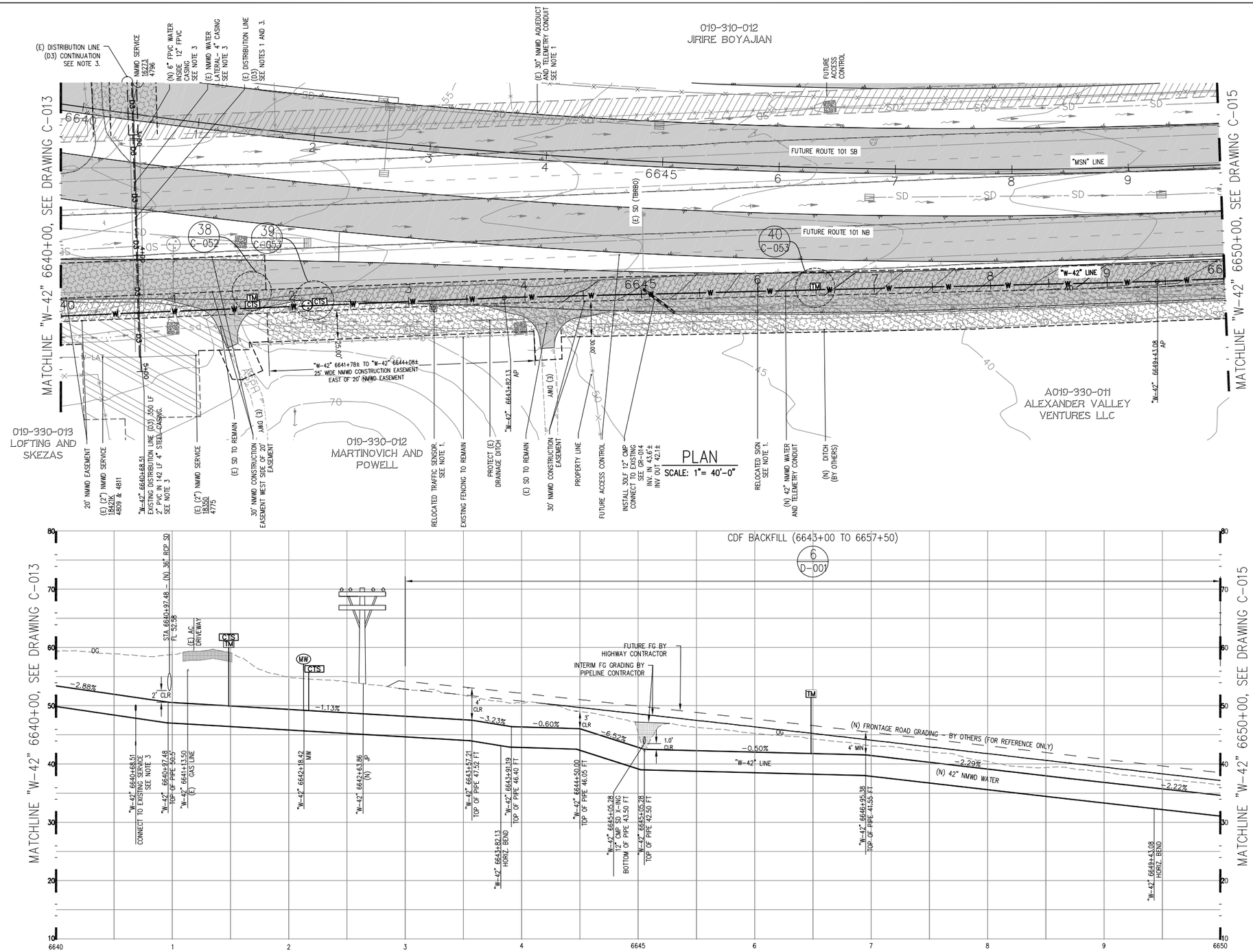
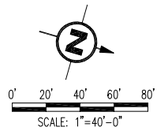
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6630+50-STA 6640+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 20 OF 192 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / C-013

Dec 04, 2013 - 11:47am N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C013.dwg User: BARCJ





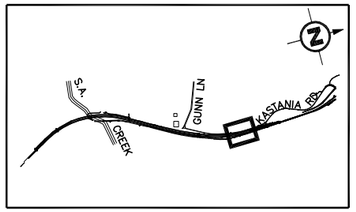
WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6643+82.13	6649+43.08	N17°30'11"W	560.95'
6649+43.08	6654+90.17	N18°28'05"W	547.09'

NOTES:

1. SEE DRAWING DM-014 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR RELOCATED.
2. SEE DRAWING GR-014 FOR GRADING PLAN
3. SEE DRAWING C-022 AND C-023 FOR PLAN AND PROFILE OF DISTRIBUTION LINE D3 AND CONNECTION DETAIL
4. SEE DRAWINGS C-035 AND C-036 FOR TYPICAL SECTIONS

KEYMAP



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NO.	DATE	REVISION	BY	APP.
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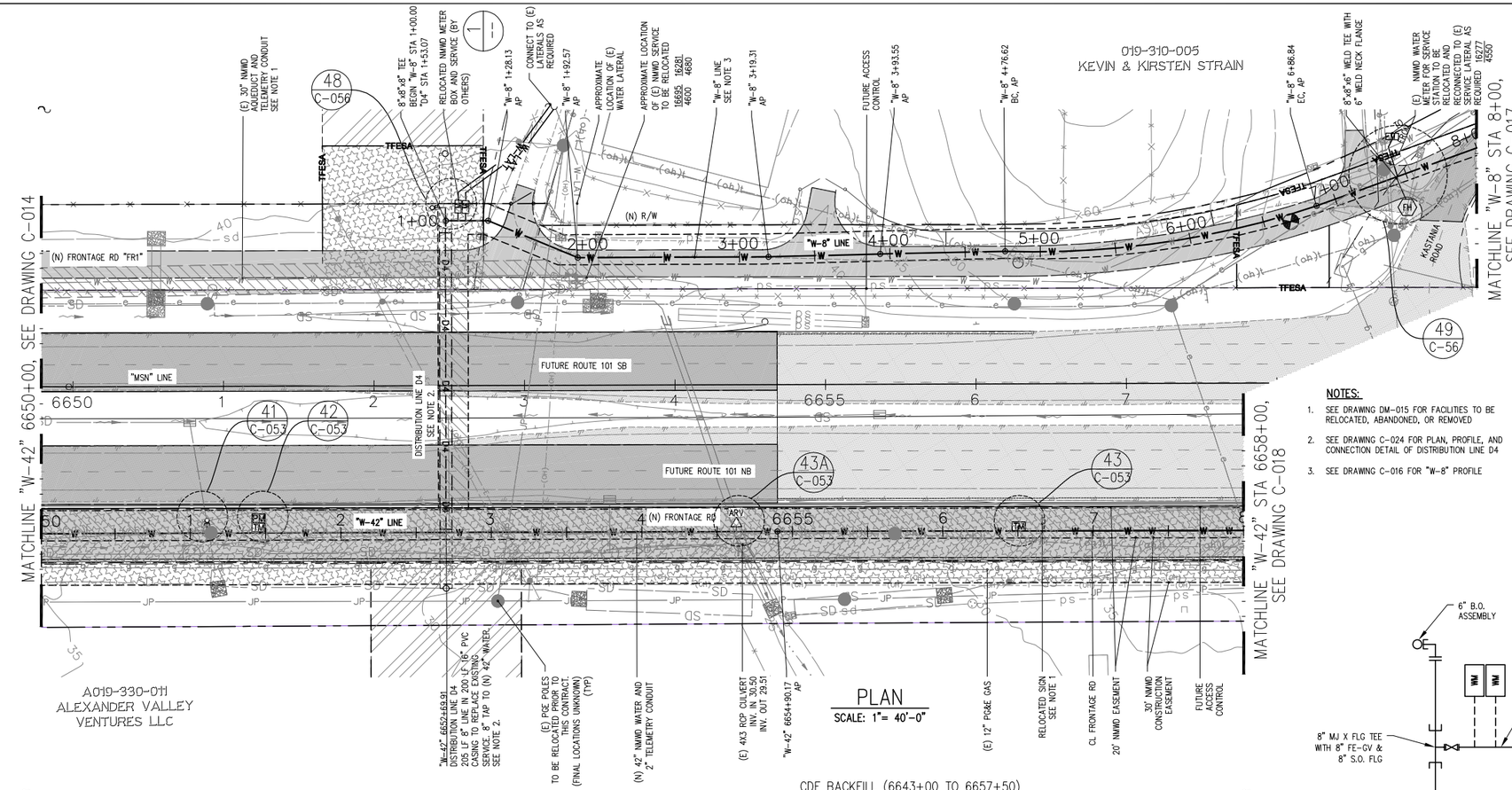
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6640+00-STA 6650+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 21 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-014

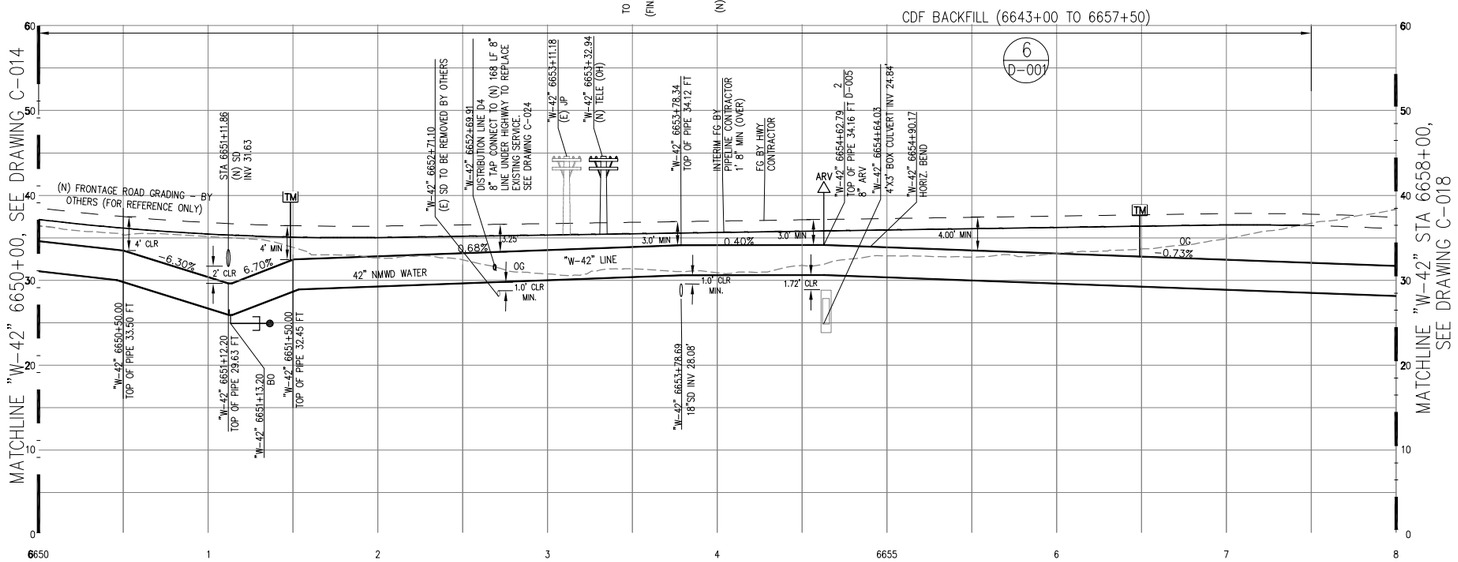
REDUCED SIZE:
NOT TO SCALE

Dec 05, 2013 - 9:37am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C014.dwg User: BARCJ



PLAN

SCALE: 1"= 40'-0"

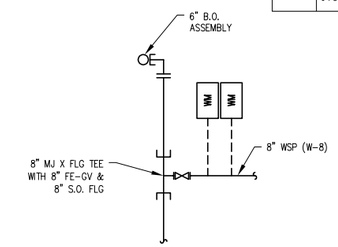


PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

NOTES:

1. SEE DRAWING DM-015 FOR FACILITIES TO BE RELOCATED, ABANDONED, OR REMOVED
2. SEE DRAWING C-024 FOR PLAN, PROFILE, AND CONNECTION DETAIL OF DISTRIBUTION LINE D4
3. SEE DRAWING C-016 FOR "W-8" PROFILE



1 CONNECTION
--

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6654+90.17	6658+18.76	N18°24'36"W	328.59'

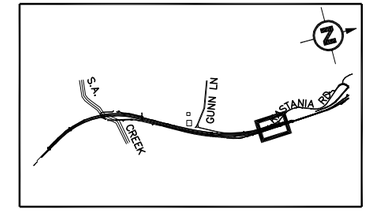
POTHOLE DATA

PH#	N	E	GROUND ELEV.	UTIL	UTIL DEPTH
16	2269928.70	5958000.06	36.16	30" WATER	

"W-8" WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
	1+00.00	1+28.13	N 18°24'19" W	28.13'				
	1+28.13	1+92.57	N 04°05'41" E	64.44'				
	1+92.57	3+19.31	N 18°31'20" W	126.74'				
	3+19.31	3+93.55	N 19°46'16" W	74.24'				
	3+93.55	4+76.62	N 19°31'46" W	83.07'				
C8				210.22'	4+76.62	6+86.84	588.58'	20°27'50"
	6+86.84	8+49.68	N 38°12'57" W	162.84'				

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

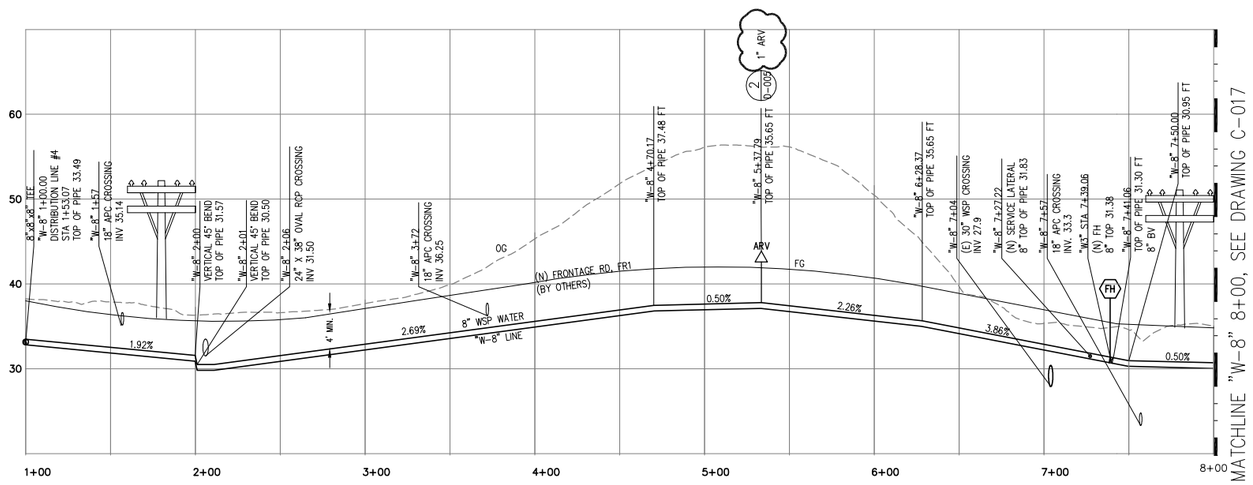
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6650+00-STA 6658+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 22 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 C-015

Dec 05, 2013 - 9:59am N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C015.dwg User: BARCJ

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"



"W-8" PROFILE

SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

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1	01/17/13	ADDENDUM 2	CJB	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
"W-8" PROFILE
STA 1+00 TO 8+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 23 OF 149		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-016

Feb 26, 2014 - 6:12pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C016.dwg User: BARCJ

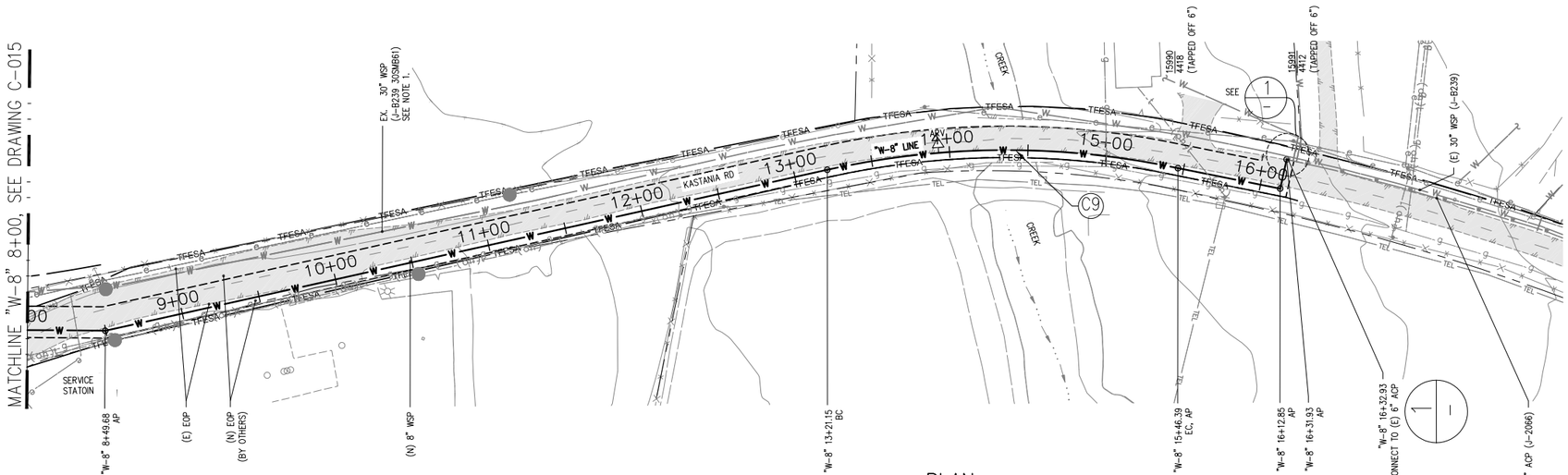
"W-8" WATERLINE HORIZONTAL DATA

CURVE NUMBER	BEGIN STATION	END STATION	BEARING	L	BC	EC	R	Δ
	8+49.68	13+21.15	N 51°16'09" W	471.47'				
C9				225.24'	13+21.15	15+46.39	524.41'	24°36'32"
	15+46.39	16+12.85	N 27°23'22" W	66.46'				
	16+12.85	16+31.93	N 63°50'39" E	19.08'				
	16+31.93	16+32.93	N 26°59'06" W	1.00'				

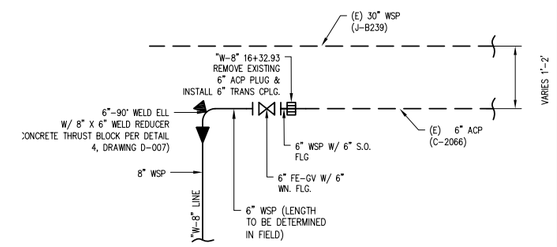
NOTES:

1. SEE DM-017 FOR FACILITIES TO BE RELOCATED.
2. CONNECTION TO (E) 6" TO BE COORDINATED WITH NMWD & FINAL LOCATION OF TIE-IN TO BE APPROVED BY ENGINEER

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

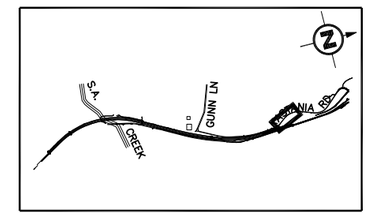


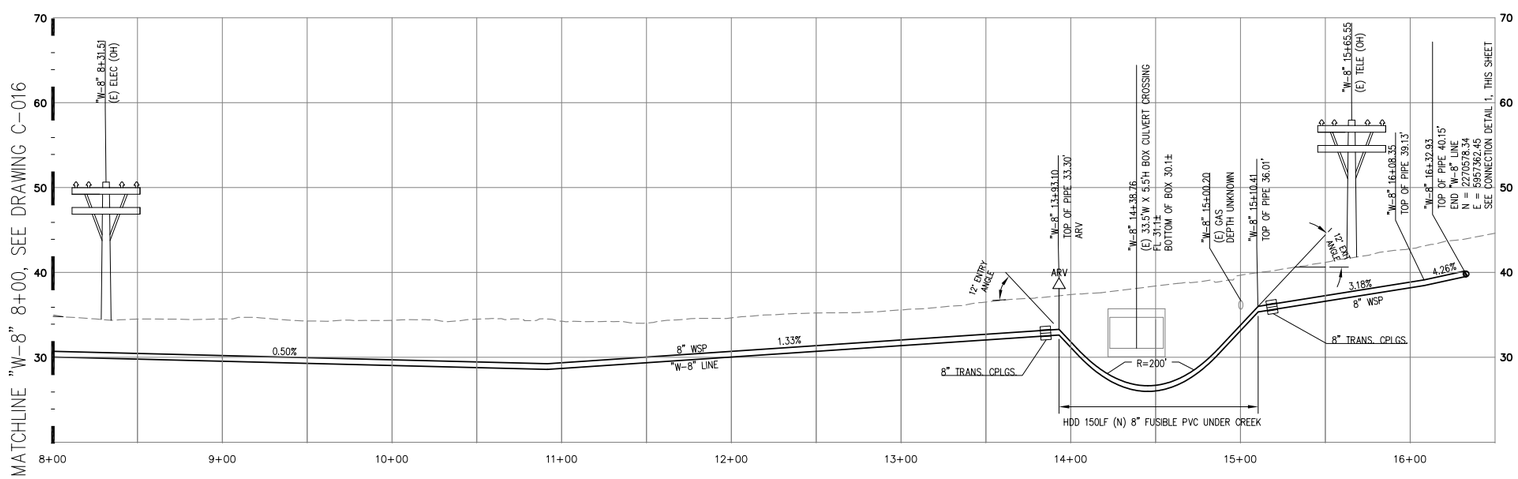
PLAN
SCALE: 1"= 40'-0"



1 — CONNECTION DETAIL
N.T.S.

KEYMAP





PROFILE
SCALE: 1"= 40'-0" HORIZ
1"= 8'-0"VERT.

REDUCED SIZE:
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
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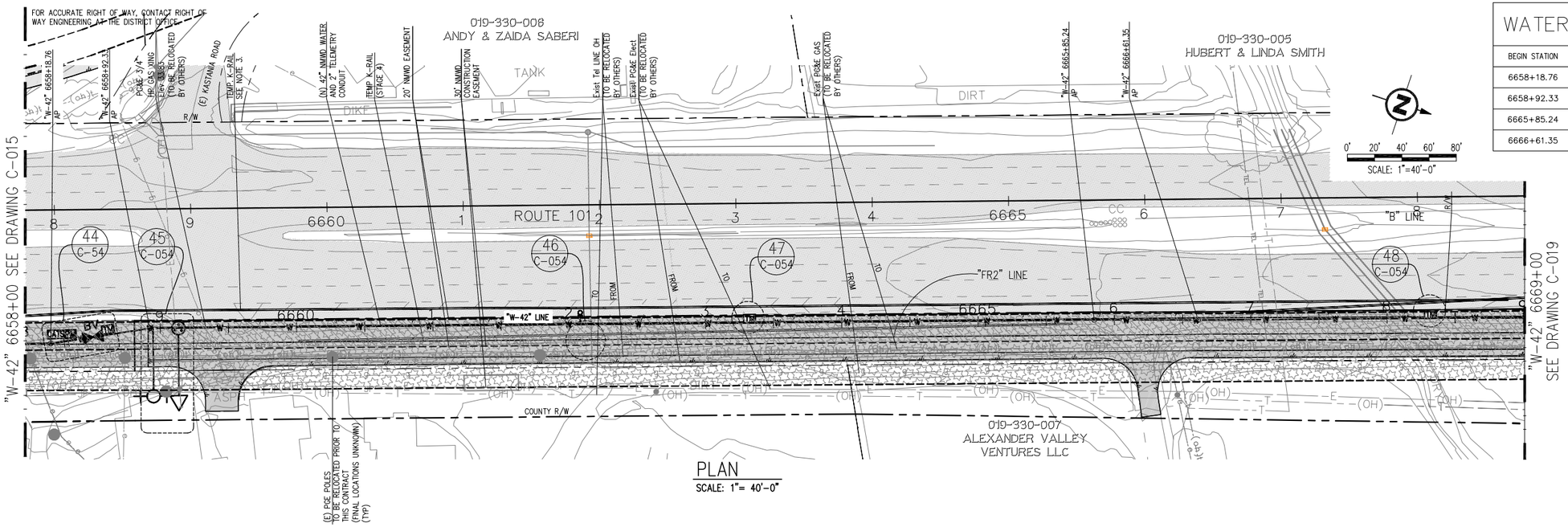
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
"W-8" STA 8+00-STA 16+32.42

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 24 OF 192 SHEETS	
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 C-017

Dec 05, 2013 - 10:31am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C017.dwg User: BARCJ



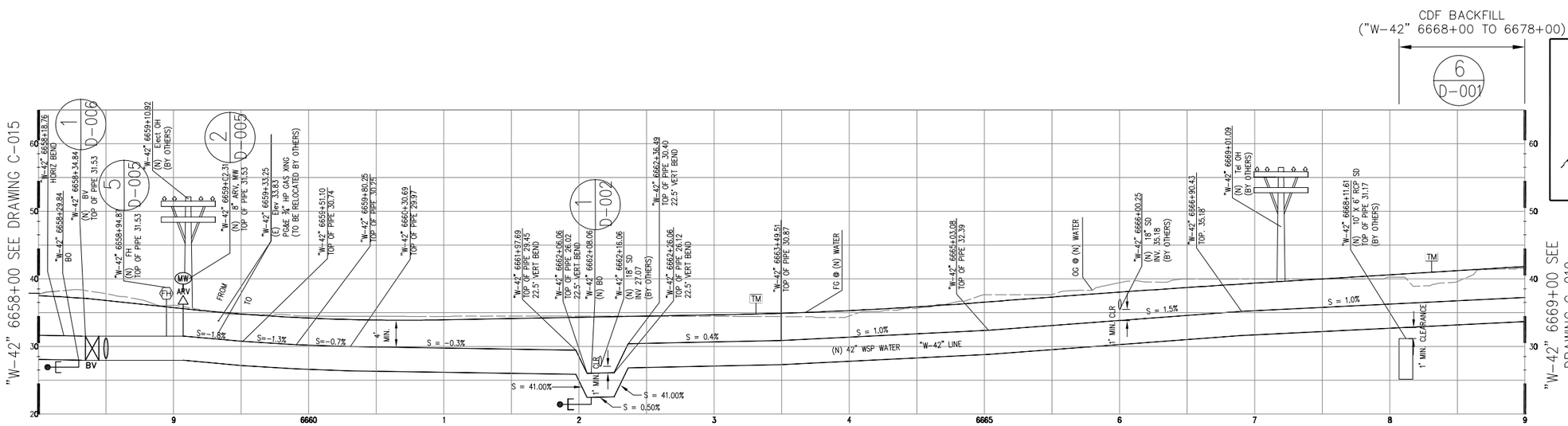
PLAN
SCALE: 1"= 40'-0"

WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6658+18.76	6658+92.33	N26°37'10"W	73.57'
6658+92.33	6665+85.24	N18°26'22"W	692.91'
6665+85.24	6666+61.35	N17°51'17"W	76.10'
6666+61.35	6669+18.69	N18°22'22"W	257.35'

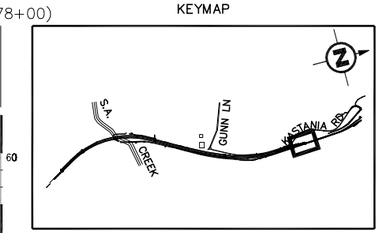
NOTES:

1. CONTRACTOR TO COORDINATE STORM DRAIN INSTALLATION (BY OTHERS) WITH AQUEDUCT INSTALLATION.
2. CONTRACTOR TO COORDINATE K-RAIL INSTALLATION WITH AQUEDUCT INSTALLATION.
3. SEE DRAWINGS C-036 FOR TYPICAL SECTIONS



"W-42" LINE PROFILE
Horiz: 1" = 40'
Vert: 1" = 8'

KEYMAP



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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6658+00-STA 6669+00

DES	DR	CH	SCALE NTS		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 25 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-018

REDUCED SIZE:
NOT TO SCALE

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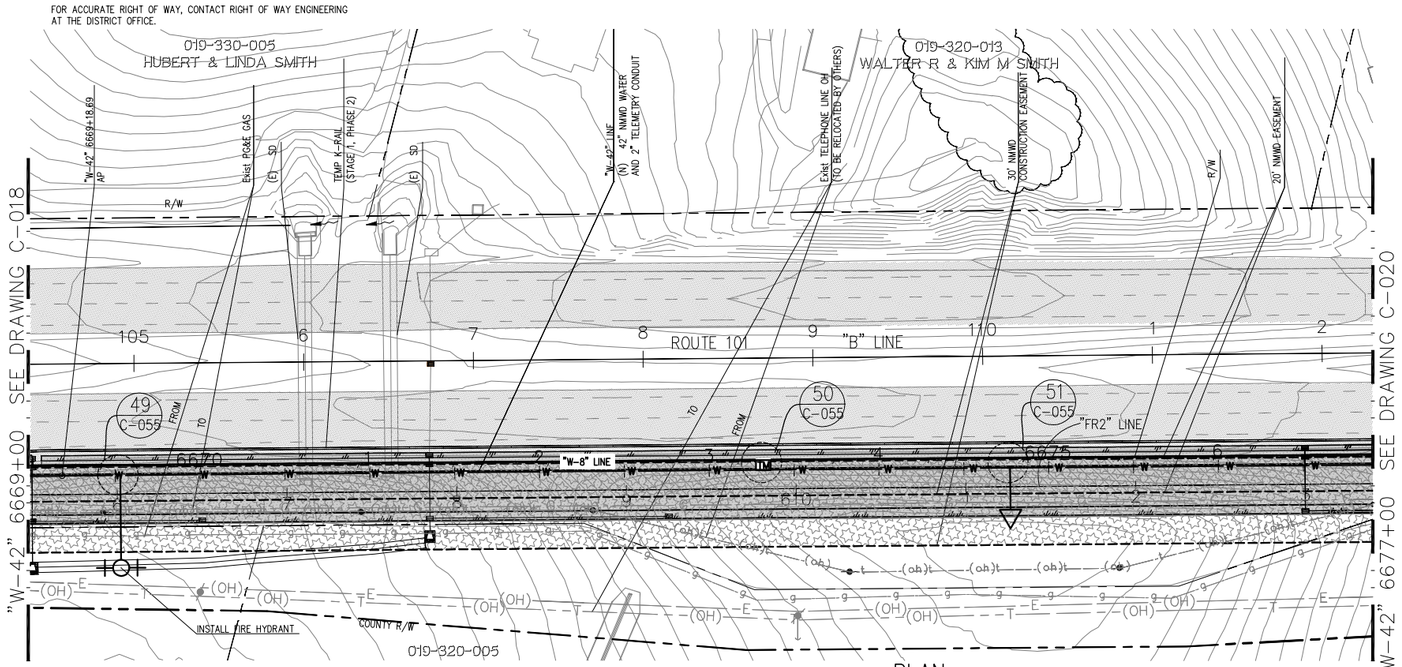


PLAN

Horiz: 1" = 40'

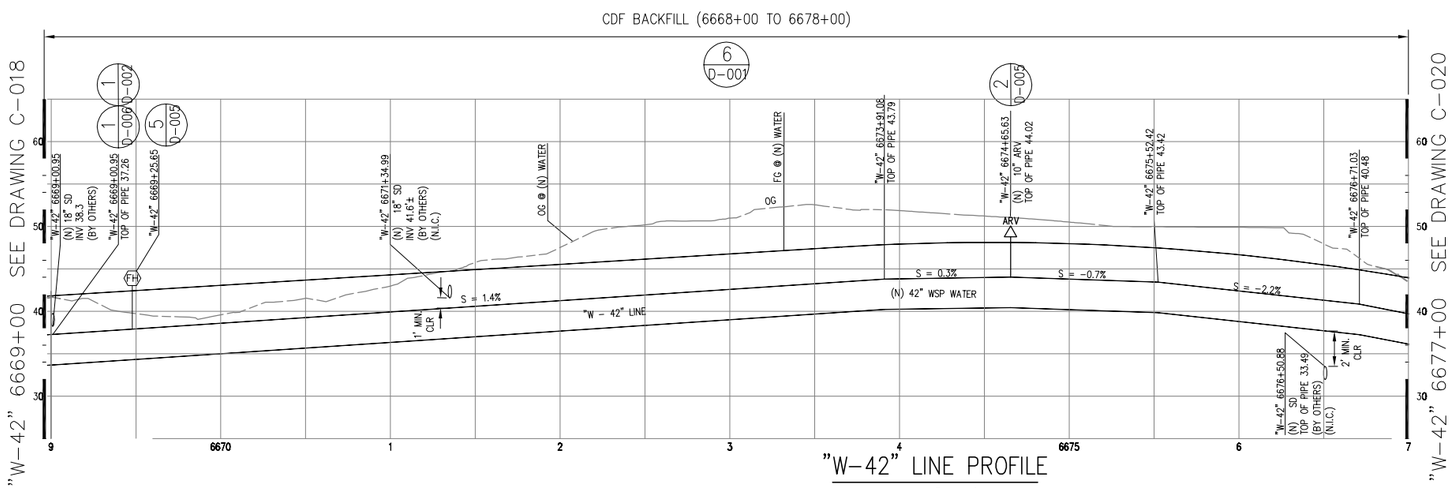
0' 20' 40' 60' 80'

SCALE: 1"=40'-0"

NOTES:

1. SEE DRAWING C-036 FOR TYPICAL SECTION.

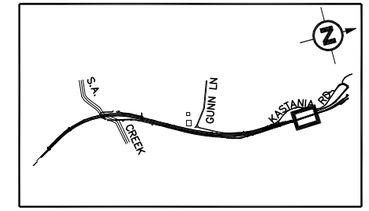
WATERLINE HORIZONTAL DATA			
BEGIN STATION	END STATION	BEARING	L
6669+18.69	6677+91.42	N 18°24'17" W	872.72'



"W-42" LINE PROFILE

Horiz: 1" = 40'
Vert: 1" = 8'

KEYMAP



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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

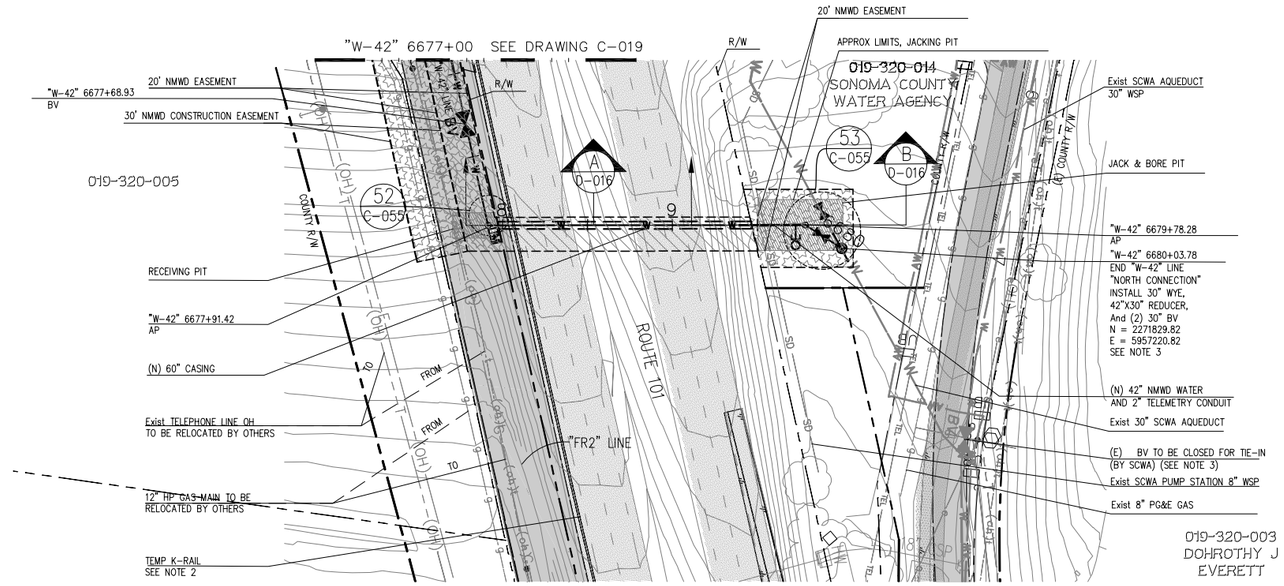
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6669+00-STA 6676+85

DES	DR	CH	SCALE AS NOTED		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 26 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-019

REDUCED SIZE:
NOT TO SCALE

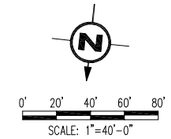
Dec 04, 2013 - 1:39pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C019.dwg User: BARCJ

FOR ACCURATE RIGHT OF WAY, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



PLAN

Horiz: 1" = 40'

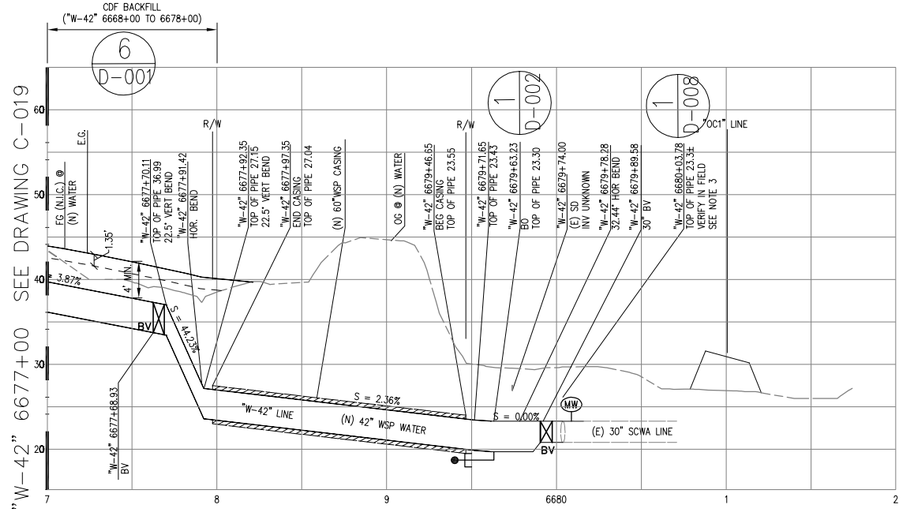


WATERLINE HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
6677+91.42	6679+78.28	N84°05'47"E	186.86'
6679+78.28	6680+03.78	N63°15'40"W	25.50'

NOTES:

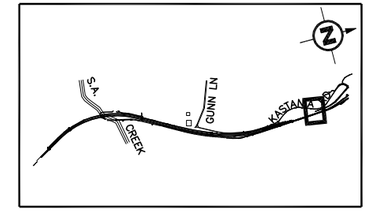
1. CONTRACTOR TO COORDINATE STORM DRAIN INSTALLATION (BY OTHERS) WITH AQUEDUCT INSTALLATION.
2. CONTRACTOR TO COORDINATE K-RAIL INSTALLATION WITH AQUEDUCT INSTALLATION.
3. SEE DRAWINGS D-014, AND D-015 FOR "NORTH CONNECTION" CONNECTION DETAILS.



"W-42" LINE PROFILE

Horiz: 1" = 40'
Vert: 1" = 8'

KEYMAP



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No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN AND PROFILE
STA 6676+85-STA 6679+95

DES	DR	CH	SCALE AS NOTED		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 27 OF 149		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-020

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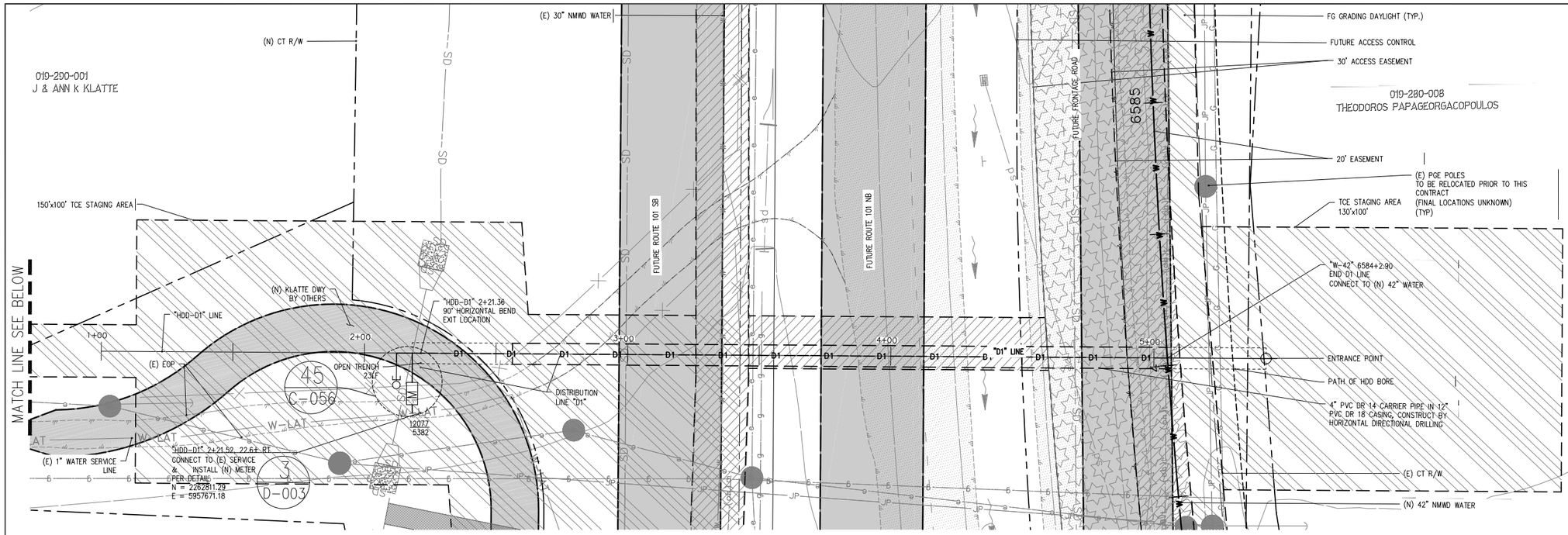
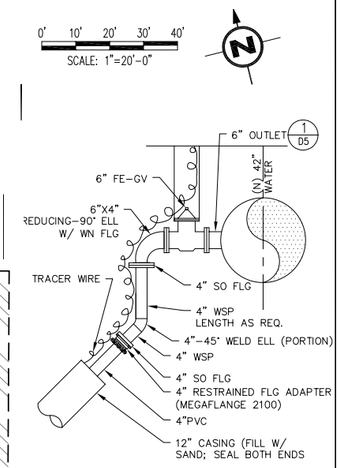
Feb 26, 2014 - 6:15pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C020.dwg User: BARCJ



PLAN
SCALE: 1"= 20'-0"

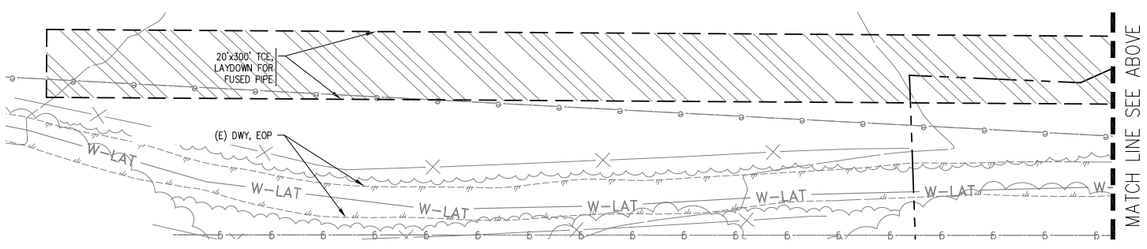


DETAIL
SCALE

NOTES:

1. EXISTING LATERAL LOCATIONS ASSUMED, VERIFY PRIOR TO CONSTRUCTION.
2. NEW AQUEDUCT TO BE DISINFECTED AND ACCEPTED BY NMWD PRIOR TO CONNECTION OF NEW METER TO EXISTING SERVICE.
3. SEE DRAWING C-007 FOR PROFILE OF (N) 42" NMWD WATER
4. CASING TO BE FUSIBLE PVC; CARRIER PIPE TO BE FUSIBLE OR CERTA-LOK JOINT.

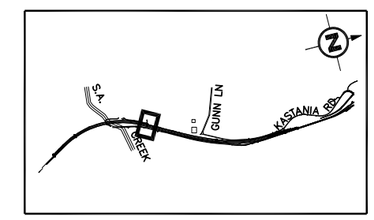
KEYMAP



PLAN
SCALE: 1"= 20'-0"

DISTRIBUTION LINE "D1" HORIZONTAL DATA

BEGIN STATION, OFFSET	END STATION, OFFSET	BEARING	L
"HDD-D1" 5+03.03, 0.00 RT	"HDD-D1" 2+18.16, 0.00 R	N78° 38' 14.94"W	286.82'
"HDD-D1" 2+18.16, 0.00 RT	"HDD-D1" 2+18.32, 22.62 RT	S14° 21' 45.06"W	4.43'



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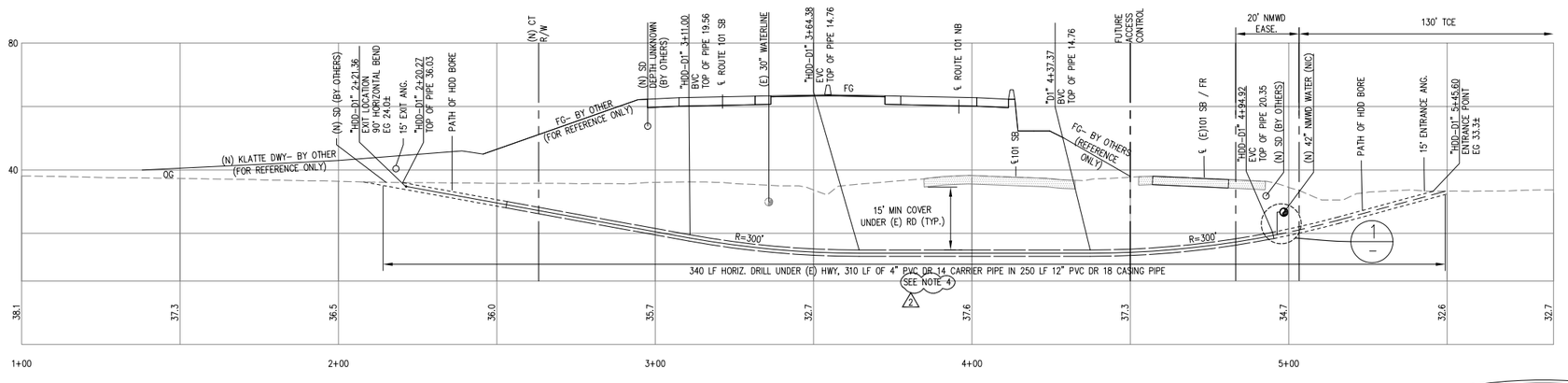

PROFILE – "HDD-D1" LINE
SCALE: 1"= 20'-0"

REDUCED SIZE:
NOT TO SCALE

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REGISTERED PROFESSIONAL ENGINEER
AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

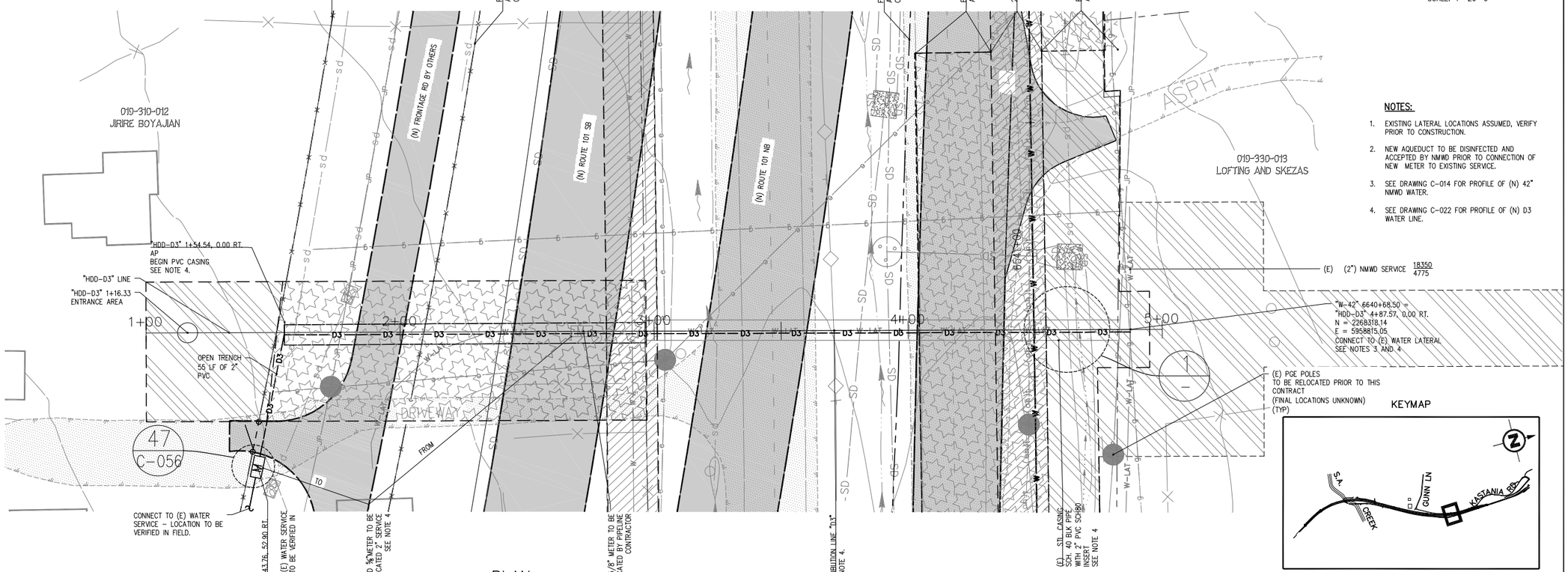
NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN & PROFILE DISTRIBUTION LINE-D1
"W-42" 6584+02.90

DES	DR	CH	SCALE 1"=20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 28 OF 149	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-021

Jan 13, 2014 - 5:00pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C021.dwg User: SHUJK



PLAN

SCALE: 1"= 20'-0"

0' 10' 20' 30' 40'

SCALE: 1"=20'-0"

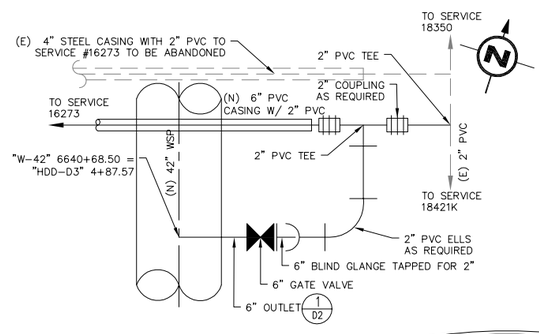
NOTES:

1. EXISTING LATERAL LOCATIONS ASSUMED, VERIFY PRIOR TO CONSTRUCTION.
2. NEW AQUEDUCT TO BE DISINFECTED AND ACCEPTED BY NMWD PRIOR TO CONNECTION OF NEW METER TO EXISTING SERVICE.
3. SEE DRAWING C-014 FOR PROFILE OF (N) 42" NMWD WATER.
4. SEE DRAWING C-022 FOR PROFILE OF (N) D3 WATER LINE.

KEYMAP

DISTRIBUTION LINE "D3" HORIZONTAL DATA

BEGIN STATION, OFFSET	END STATION, OFFSET	BEARING	L
"HDD-D3" 4+87.57, 0.00 RT.	"HDD-D3" 1+54.54, 0.00 RT.	N 72°14'60" E	333.03'
"HDD-D3" 1+54.54, 0.00 RT.	"HDD-D3" 1+43.76, 52.90 RT.	N 6°14'17" W	54.00



1 CONNECTION DETAIL

N.T.S.

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Exp. 12/31/13
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STATE OF CALIFORNIA

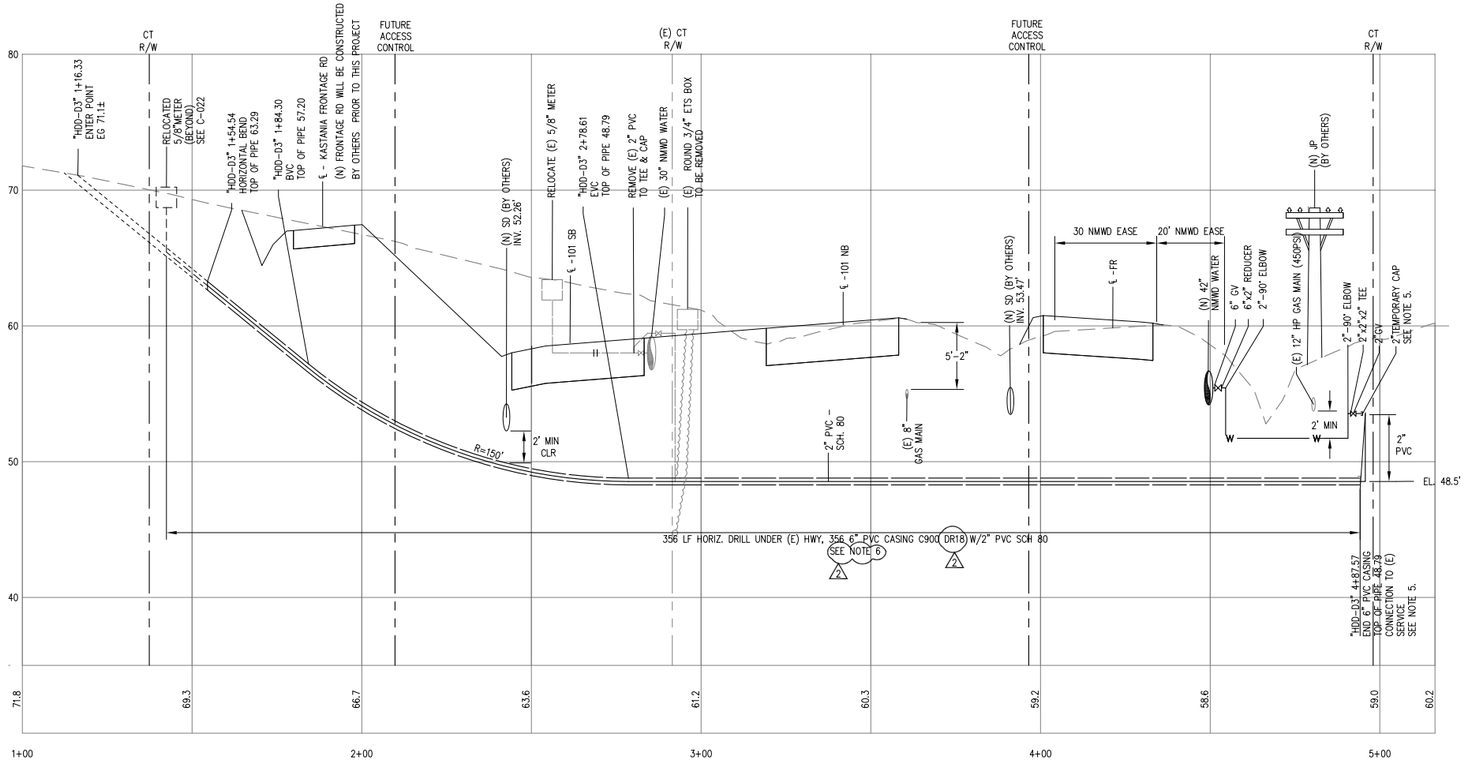
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
PLAN DISTRIBUTION LINE–D3
"W–42" 6640+68.50

DES	DR	CH	SCALE 1":20'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 29 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C–022

Dec 04, 2013 – 1:53pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C022.DWG User: BARCJ



PROFILE – "HDD-D3" LINE

SCALE: 1"= 20'-0" HORIZ
1"= 5'-0" VERT

NOTES:

1. EXISTING LATERAL LOCATIONS ASSUMED, VERIFY PRIOR TO CONSTRUCTION.
2. NEW AQUEDUCT TO BE DISINFECTED AND ACCEPTED BY NMWD PRIOR TO CONNECTION OF NEW METER TO EXISTING SERVICE.
3. SEE DRAWING C-014 FOR PROFILE OF (N) 42" NMWD WATER.
4. SEE DRAWING C-022 FOR DISTRIBUTION LINE "D3" PLAN.
5. FOR CONNECTION TO EXISTING SERVICE, SEE DETAIL 1, DRAWING C-022
6. CASING TO BE FUSIBLE PVC; CARRIER PIPE TO BE GLUED JOINTS. (2)

CSW ST2

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NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PROFILE DISTRIBUTION LINE-D3
"W-42" 6640+68.50

DES	DR	CH	SCALE 1":20'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 30 OF 149		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-023

REDUCED SIZE:
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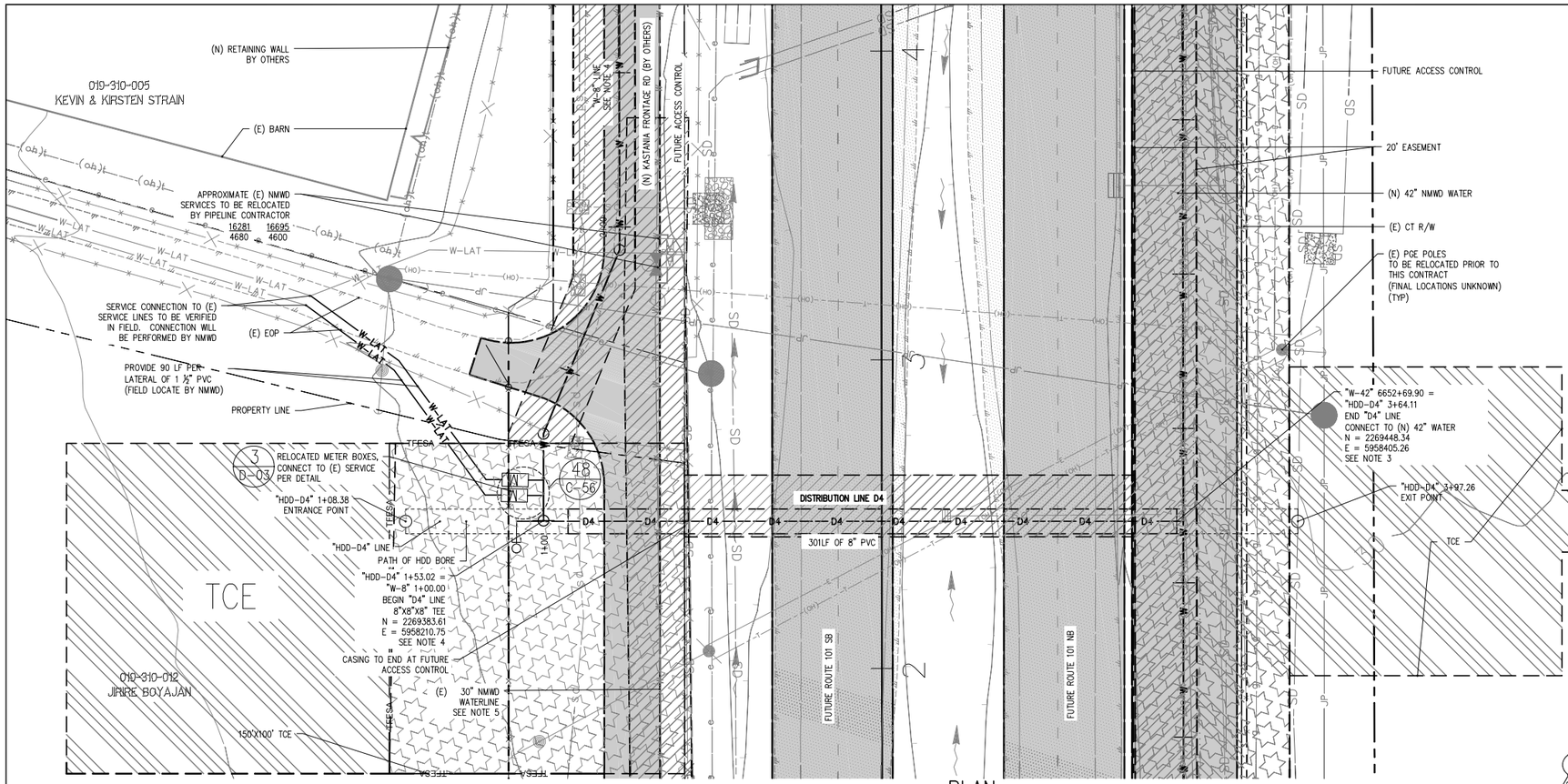
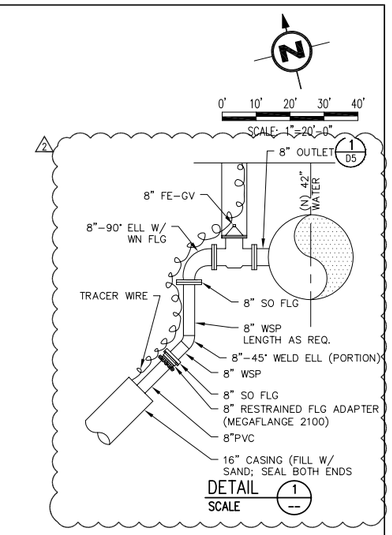


PLAN

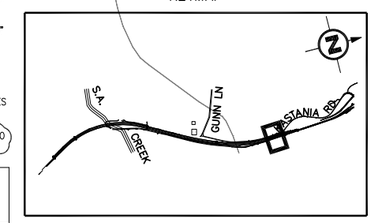
SCALE: 1"= 20'-0"



NOTES:

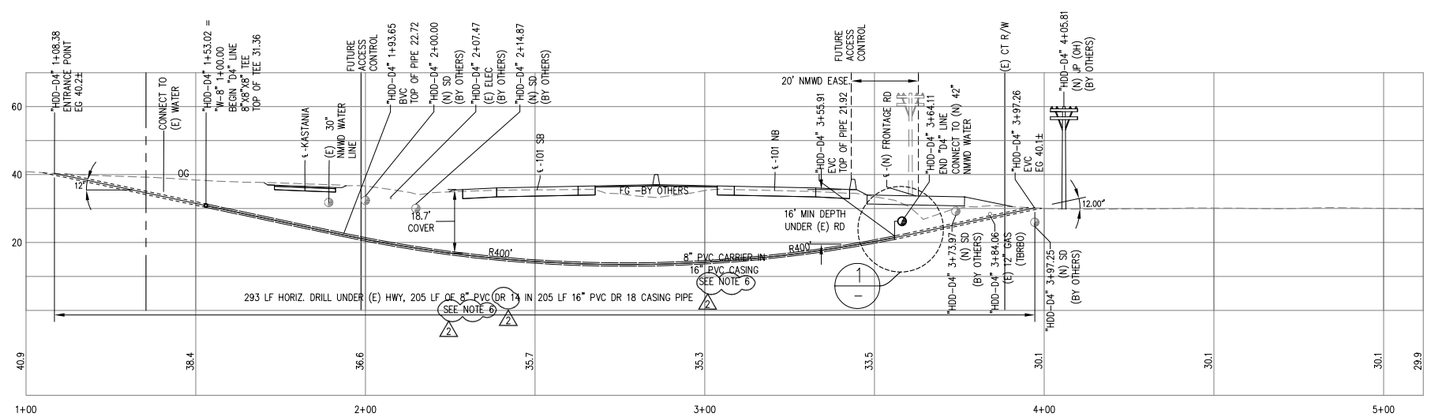
1. EXISTING LATERAL LOCATIONS ASSUMED, VERIFY PRIOR TO CONSTRUCTION.
2. NEW AQUEDUCT TO BE DISINFECTED AND ACCEPTED BY NMWD PRIOR TO CONNECTION OF NEW METER TO EXISTING SERVICE.
3. SEE DRAWING C-015 FOR PROFILE OF (N) 42" NMWD WATER.
4. SEE DRAWING C-016 FOR PROFILE OF "W-8" (N) 8" NMWD WATER.
5. SEE DRAWING DM-015 FOR EXISTING FACILITIES TO BE ABANDONED OR REMOVED
6. CASING TO BE FUSIBLE PVC; CARRIER PIPE TO BE FUSIBLE OR CERTA-LOK JOINT.

KEYMAP



DISTRIBUTION LINE "D4" HORIZONTAL DATA

BEGIN STATION, OFFSET	END STATION, OFFSET	BEARING	L
"HDD-D4" 1+53.02	"HDD-D4" 3+64.11	N71° 35' 42"E	205.00



PROFILE – "HDD-D4"

SCALE: H AND V: 1"= 20'-0"

REDUCED SIZE: NOT TO SCALE

CSW ST2

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STATE OF CALIFORNIA

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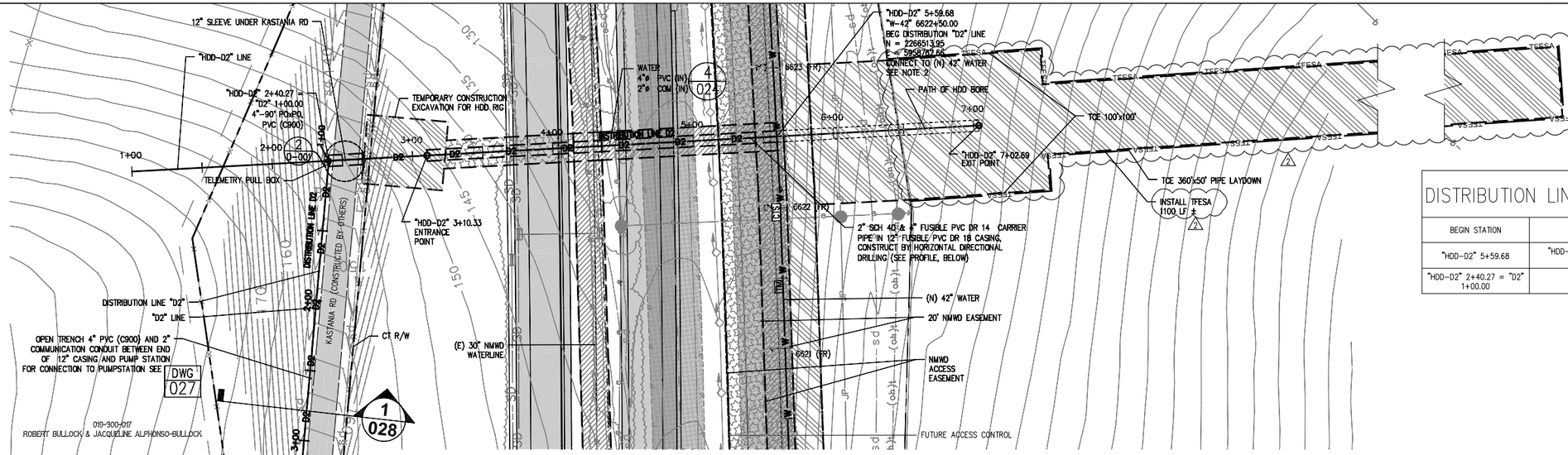
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

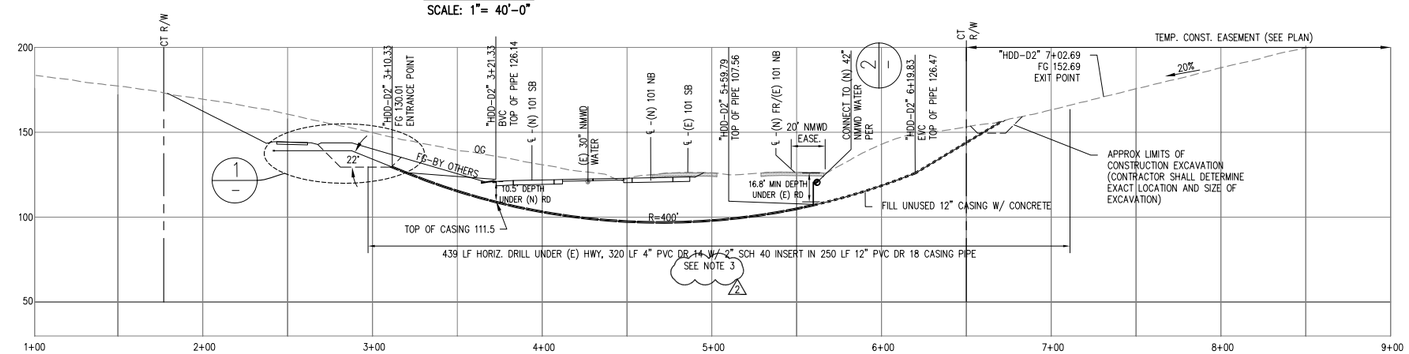
AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
PLAN & PROFILE DISTRIBUTION LINE–D4
"W–42" 6652+69.90

DES	DR	CH	SCALE as shown		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 31 OF 149		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C–024

Jan 13, 2014 – 5:08pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C024.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"



PROFILE – "HDD-D2"
SCALE: 1"= 40'-0" H,V

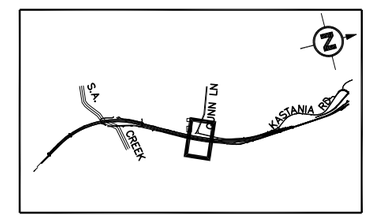
DISTRIBUTION LINE "D2" HORIZONTAL DATA			
BEGIN STATION	END STATION	BEARING	L
"HDD-D2" 5+59.68	"HDD-D2" 2+40.27 = "D2" 1+00.00	N84° 51' 29"W	319.41'
"HDD-D2" 2+40.27 = "D2" 1+00.00	"D2" 5+13.47	N13° 18' 09"W	414.14'

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

NOTES:

1. NEW AQUEDUCT TO BE DISINFECTED AND ACCEPTED BY NMWD PRIOR TO CONNECTION OF NEW METER TO EXISTING SERVICE.
2. SEE DRAWING C-011 FOR PROFILE OF (N) 42" NMWD WATER
3. CASING TO BE FUSIBLE PVC. 4" CARRIER PIPE SHALL BE FUSIBLE OR CERTA-LOK JOINTS. 2" CARRIER PIPE SHALL BE GLUED JOINTS.

KEYMAP



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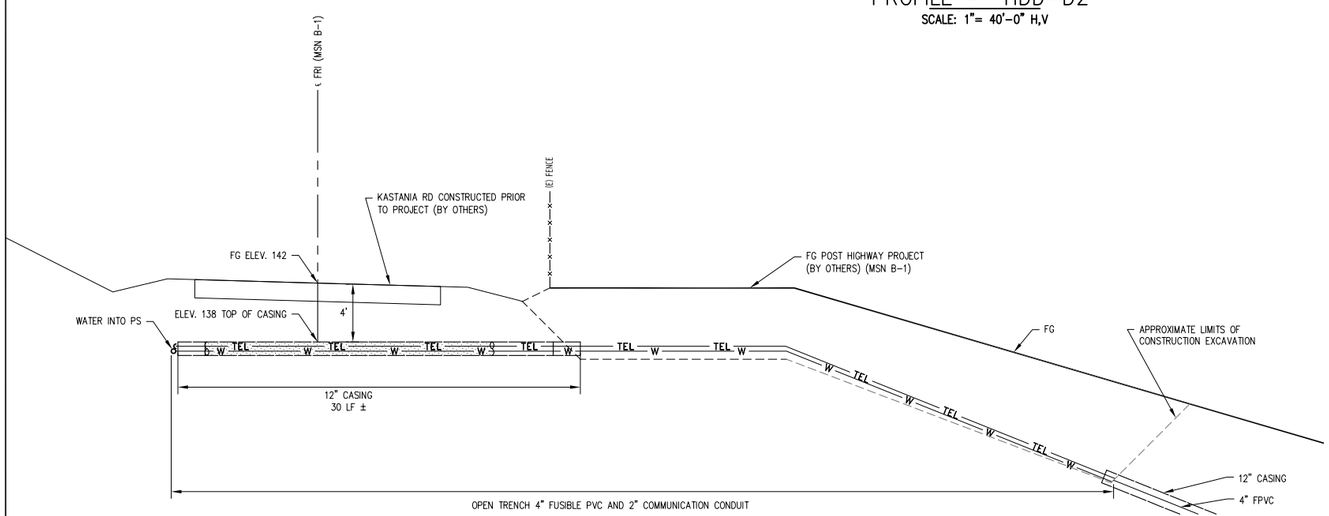
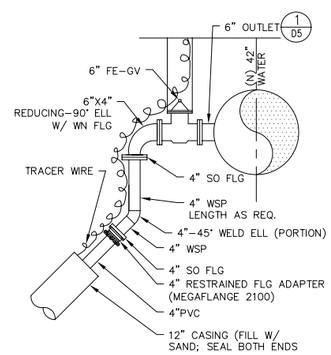


1 DETAIL
1"=5'



2 DETAIL
NTS

REDUCED SIZE:
NOT TO SCALE

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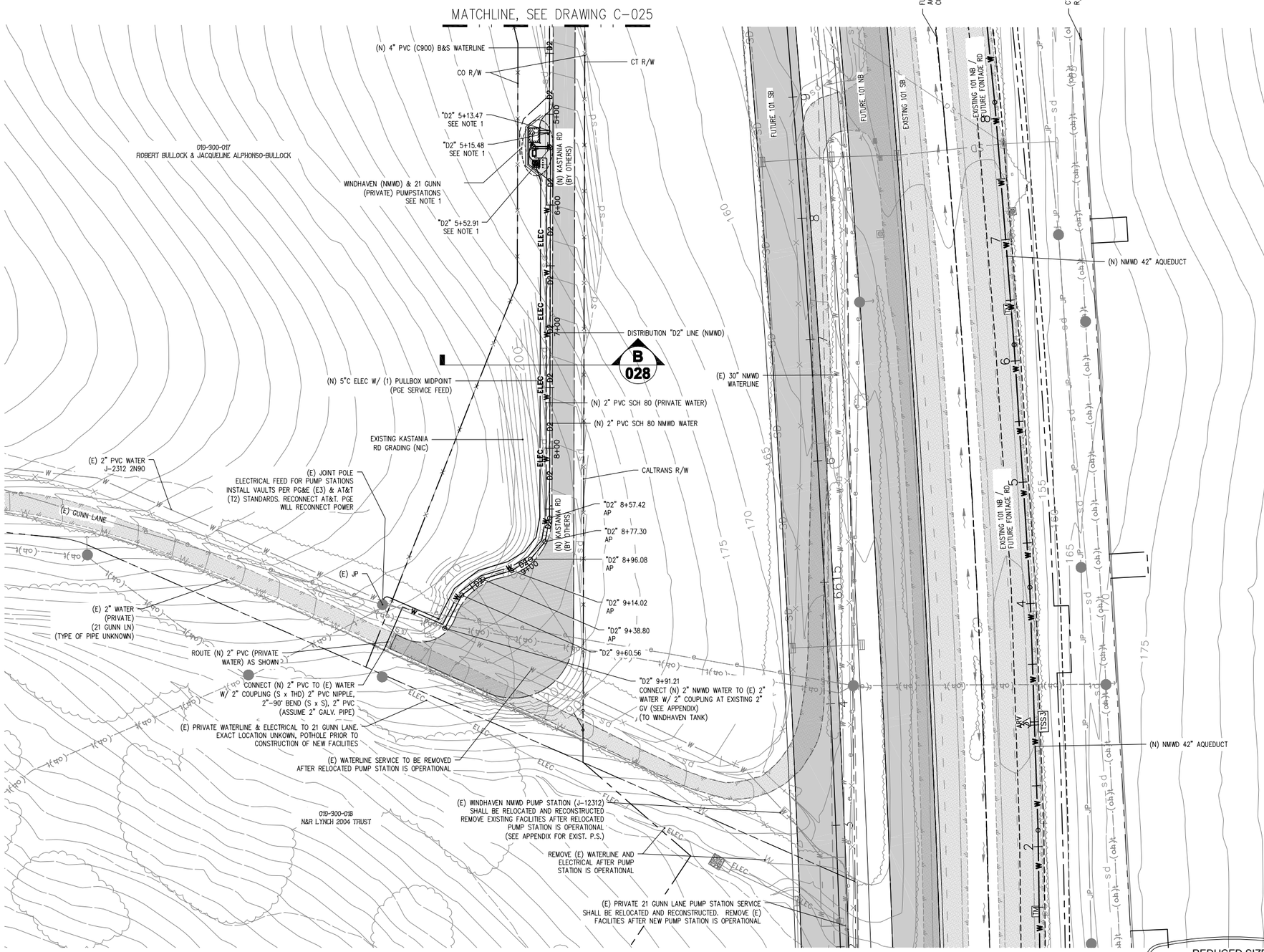
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN & PROFILE DISTRIBUTION LINE-D2
STA 6622+50

DES	DR	CH	SCALE	1":40'	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	32 OF 149	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-025

Jan 16, 2014 - 9:22am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C025.dwg User: SHUJK



PUMP STATION PLAN

SCALE: 1"= 40'-0"

REDUCED SIZE:
NOT TO SCALE

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

DISTRIBUTION LINE "D2" (NMWD) HORIZONTAL DATA

BEGIN STATION	END STATION	BEARING	L
"D2" 5+13.47 (SEE NOTE 1)	"D2" 5+15.48 (SEE NOTE 1)	N13° 18' 09.00"W	2.00'
SEE NOTE 1	SEE NOTE 1		
"D2" 5+52.91 (SEE NOTE 1)	"D2" 8+57.42 (SEE NOTE 1)	N13° 18' 56.65"E	304.52'
"D2" 8+57.42	"D2" 8+77.30	N24° 03' 24.93"E	19.88'
"D2" 8+77.30	"D2" 8+96.08	N52° 42' 55.75"E	18.78'
"D2" 8+96.08	"D2" 9+14.02	N72° 16' 29.38"E	17.95'
"D2" 9+14.02	"D2" 9+38.80	N86° 37' 24.83"E	24.78'
"D2" 9+38.80	"D2" 9+60.56	N65° 59' 47.01"E	21.75'
"D2" 9+60.56	"D2" 9+91.21	N40° 23' 56.69"E	30.60'

NOTE:

1. FOR PUMP STATION SEE DWG C-027

CSW ST2

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
WINDHAVEN AND 21 GUNN LANE PUMP STATIONS - SITE PLAN

DES	DR	CH	SCALE	AS SHOWN	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	33 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-026

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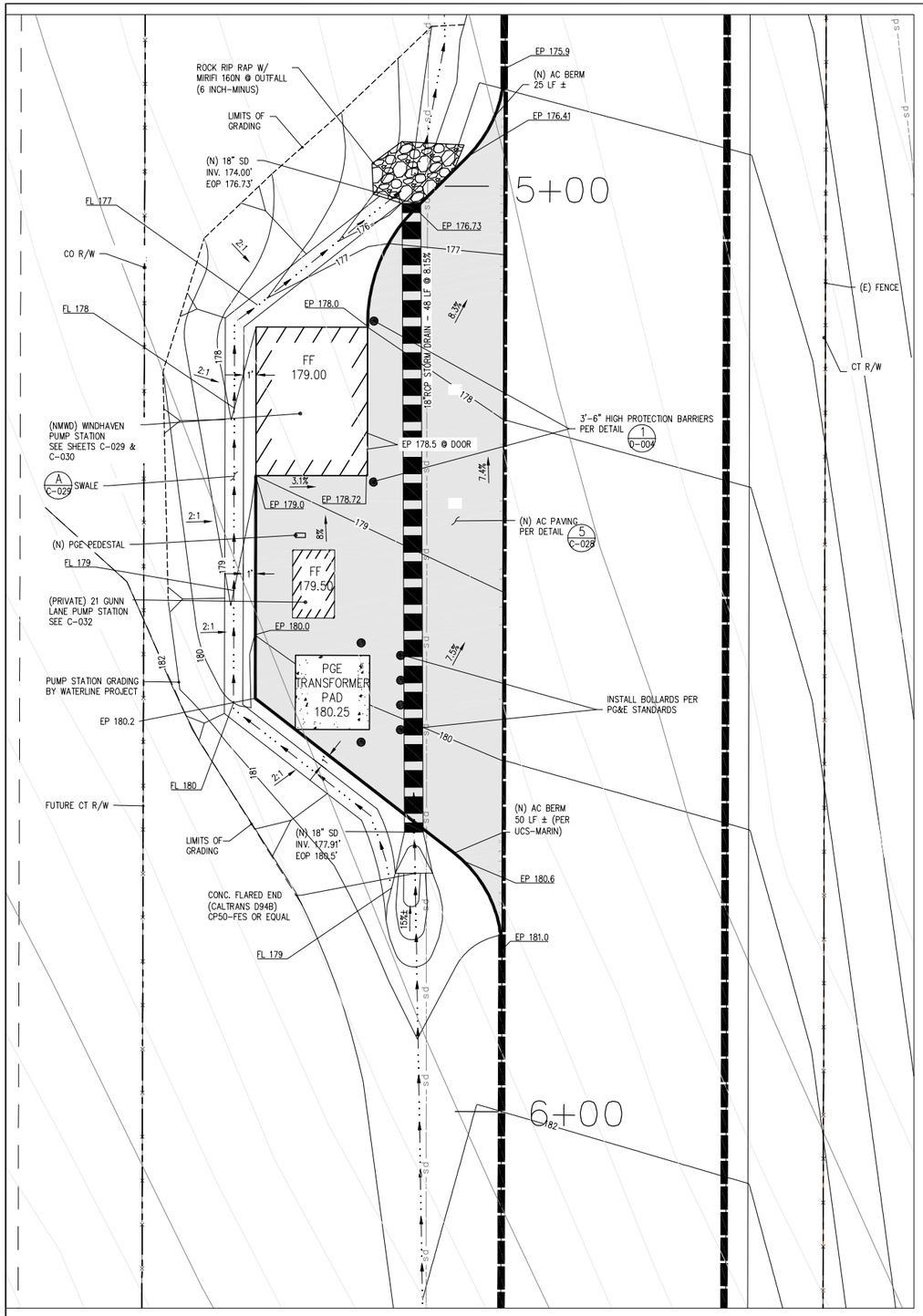
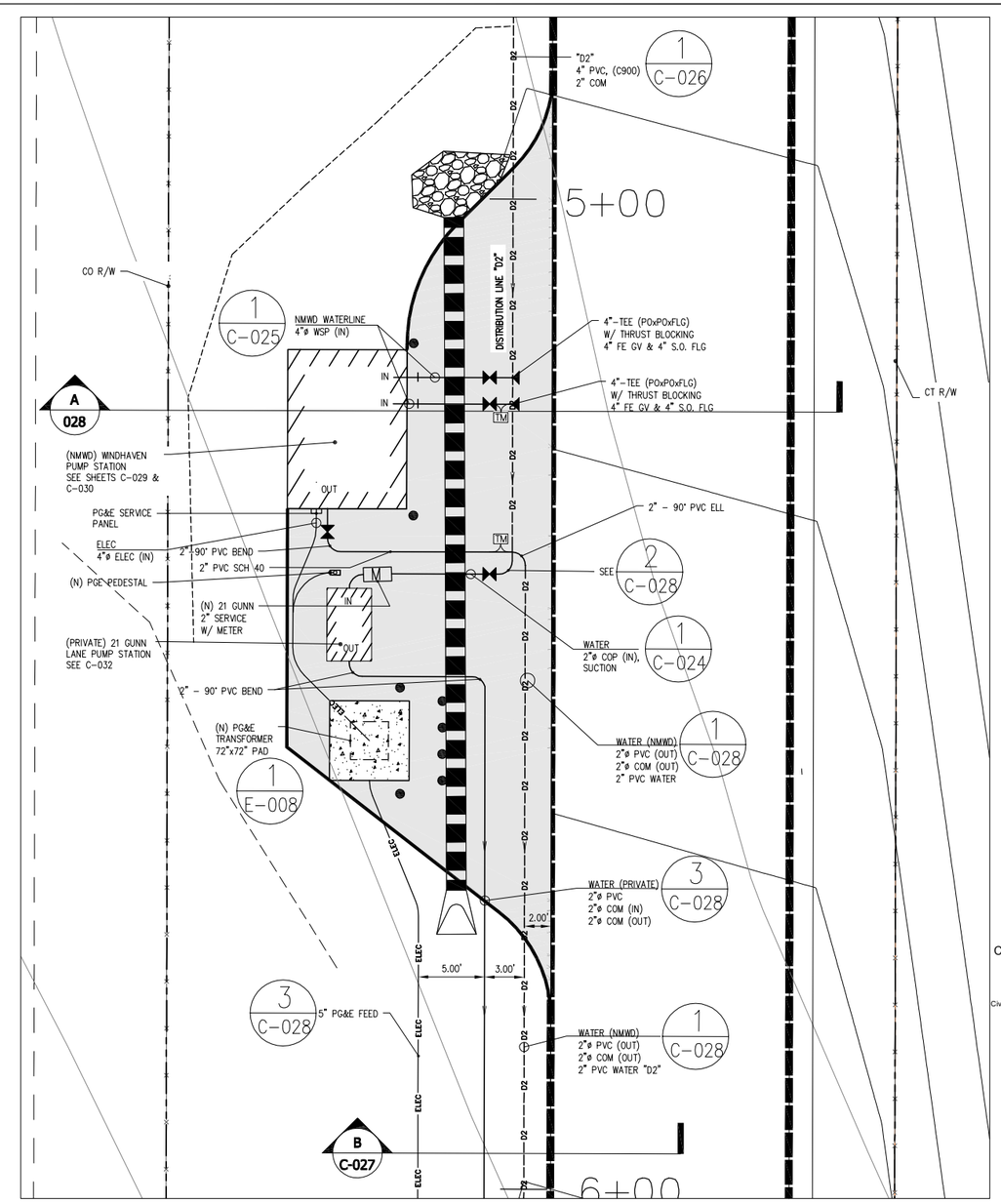


PUMP STATION GRADING

SCALE: 1"= 5'-0"



PUMP STATION UTILITY LAYOUT

SCALE: 1"= 5'-0"

0' 5' 10' 15' 20'

SCALE: 1"=5'-0"

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, CA 94949
tel: 415.883.9850
fax: 415.883.9835
Civil & Structural Engineers Surveying & Mapping Environmental Planning Land Planning Construction Management Landscape Architecture

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Al G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

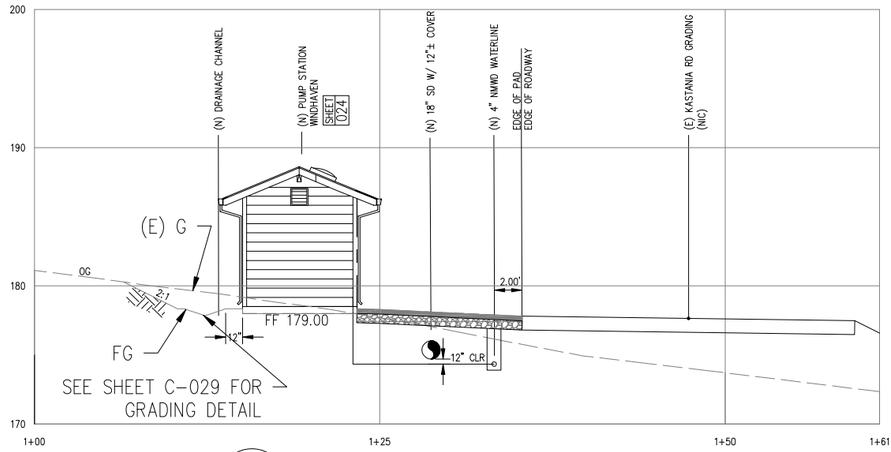
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
WINDHAVEN AND 21 GUNN LANE
SITE PLAN

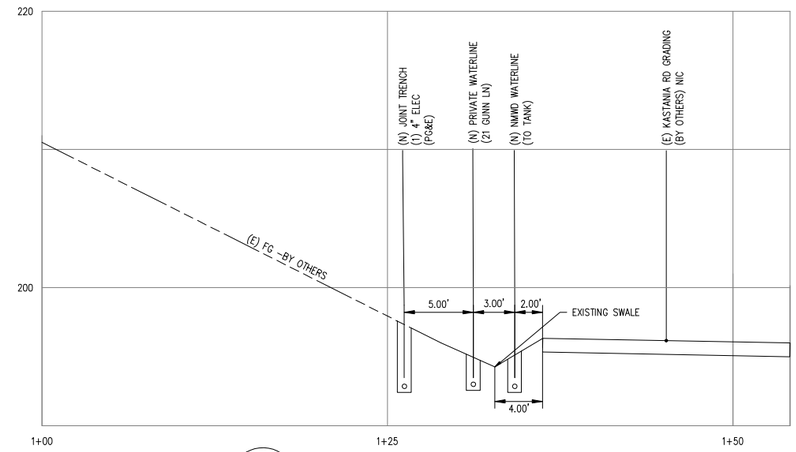
DES	DR	CH	SCALE	1" = 5'	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	34 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-027

REDUCED SIZE:
NOT TO SCALE

Dec 04, 2013 - 2:11pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C027.dwg User: BARCJ



A C-027 SECTION @ PUMPSTATION
SCALE: 1" = 5'-0"

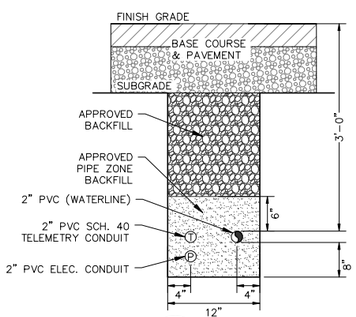


B C-027 SECTION @ ROADWAY
SCALE: 1" = 5'-0"

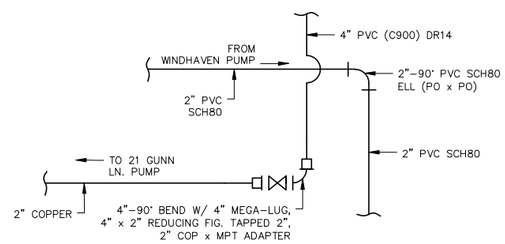
0' 5' 10' 15' 20'
SCALE: 1"=5'-0"

NOTES:

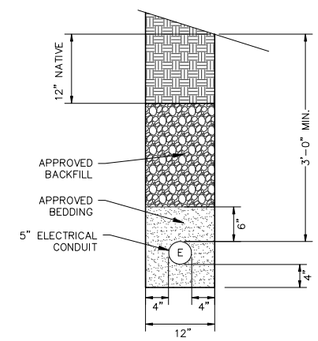
1. JOINT TRENCH LAYOUT FOR PUMP STATION BASED UPON FINISH GRADING FOR FUTURE KASTANIA FRONTAGE ROAD HAS BEEN COMPLETED.



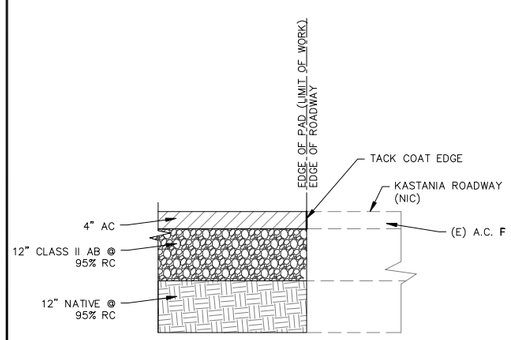
1 C-027 TRENCH (NMWD)
N.T.S.



2 C-027 SUCTION @ 21 GUNN LN P.S.
N.T.S.



3 C-027 UTILITY TRENCH (PGE & PRIVATE WATER)
N.T.S.



5 C-027 AC PAVING SECTION
N.T.S.

REDUCED SIZE:
NOT TO SCALE

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No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

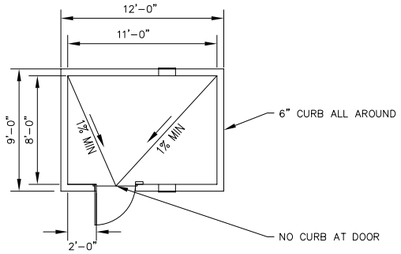
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

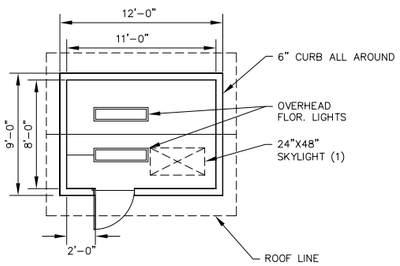
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PUMP STATION
DETAILS & SECTIONS

DES	DR	CH	SCALE	AS SHOWN	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	35 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-028

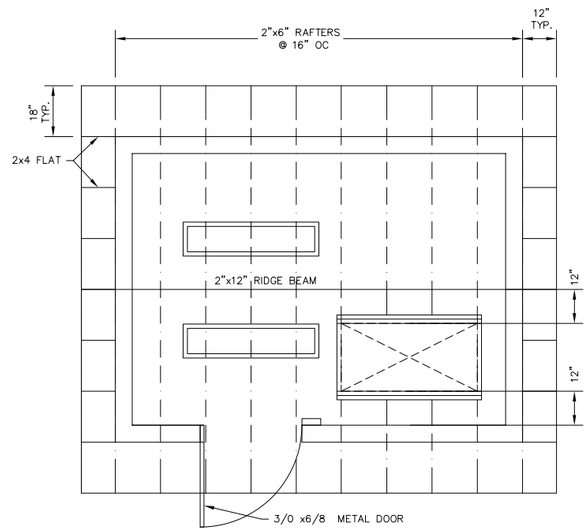
Dec 04, 2013 - 2:21pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C028.DWG User: BARCJ



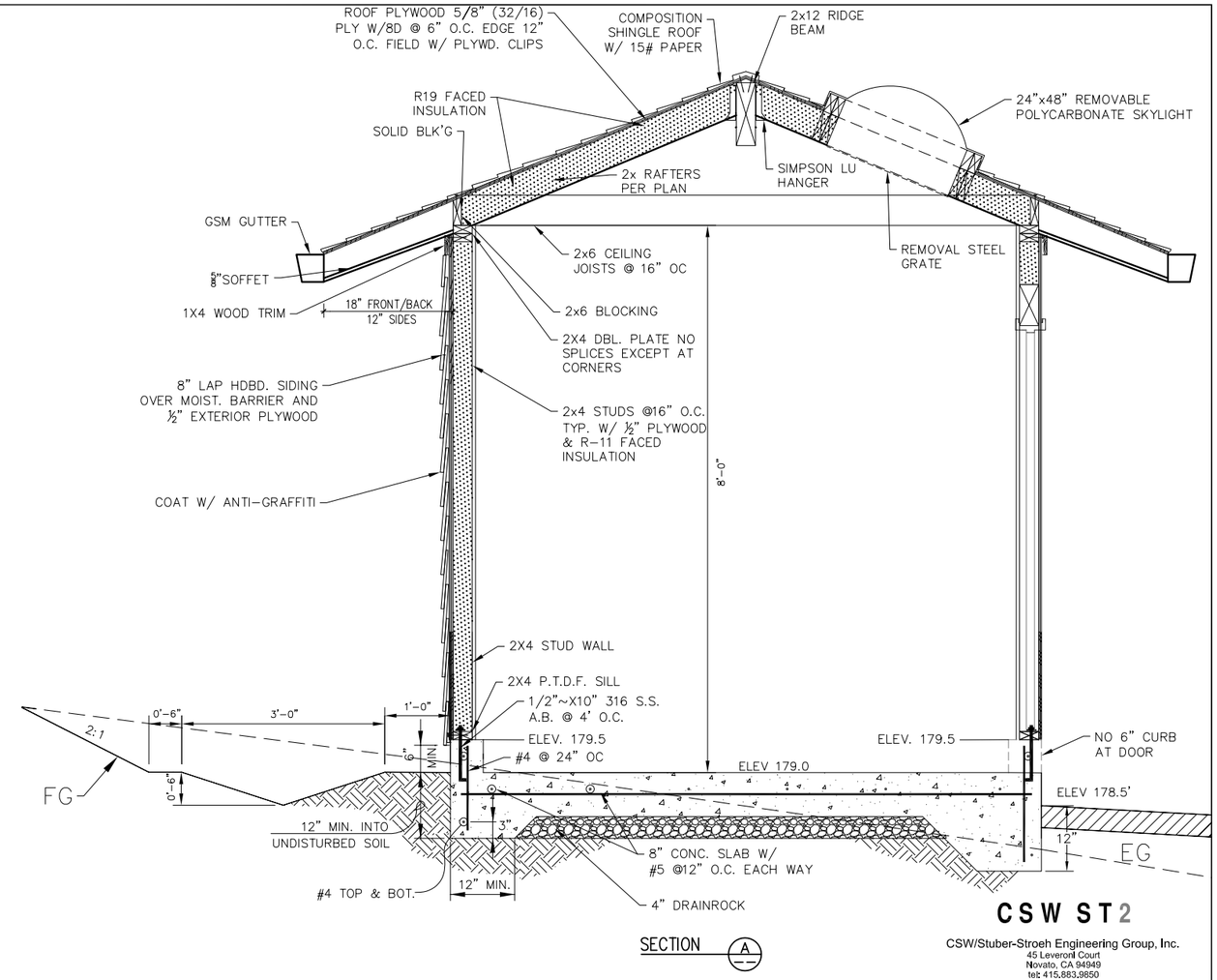
FLOOR PLAN
SCALE: 1"=5'-0"



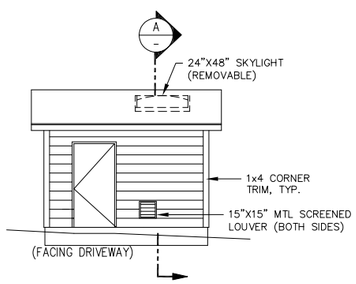
CEILING PLAN
SCALE: 1"=5'-0"



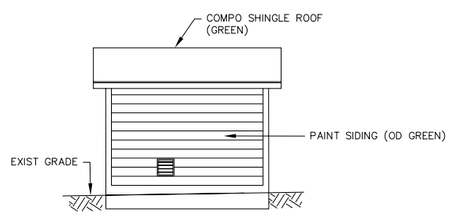
ROOF FRAMING PLAN
SCALE: 1"=2'-0"



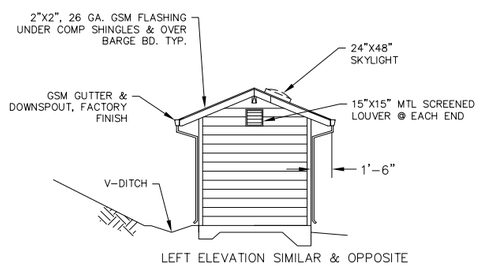
SECTION A



FRONT ELEVATION
SCALE: 1"=5'-0"



REAR ELEVATION
SCALE: 1"=5'-0"



RIGHT ELEVATION
SCALE: 1"=5'-0"

NOTES:

1. PROVIDE METAL DOORS.
2. PROVIDE STAINLESS STEEL HINGES.
4. PROVIDE STAINLESS STEEL HASPS ABOVE PASSAGE SETS.
5. PROVIDE DOOR CLOSERS W/ NMWD LOCKS.
6. USE GALVANIZED NAILS
7. P.E.N.
   EDGE : 6" O.C.
   FIELD : 12" O.C.
8. PROVIDE FLUORESCENT LIGHT FIXTURES

REDUCED SIZE:
NOT TO SCALE

CSW ST2
CSW/Stuber-Stroeh Engineering Group, Inc.
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STATE OF CALIFORNIA

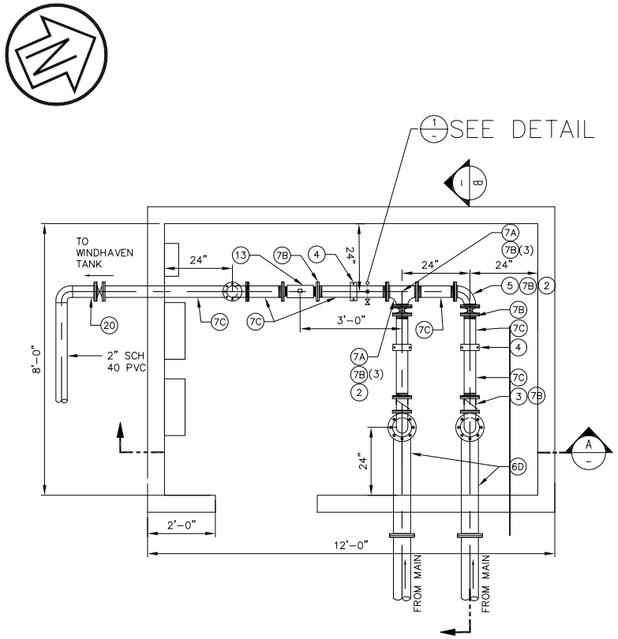
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
WINDHAVEN PUMP STATION DETAIL
STRUCTURE

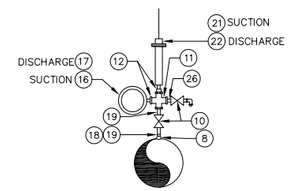
DES	DR	CH	SCALE	NOT TO SCALE	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	36 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-029

Dec 06, 2013 - 10:13am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C029.DWG User: SHUJK



MECHANICAL PLAN

N.T.S.



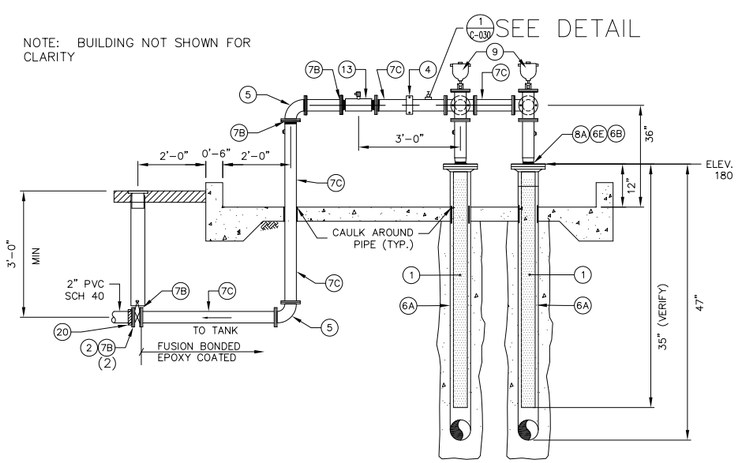
DETAIL

N.T.S.

MATERIALS LIST		
NO.	ITEM	VENDOR AND MODEL (OR EQUAL)
1	PUMP AND MOTOR	GRUNDFOS, MODEL: 16S15-14 (1-1/2"HP)
2	BALL VALVE, 2", FLANGED END, FULL PORT,	WATTS, G4000-FDA
3	CHECK VALVE, 2" CHECK VALVE FLANGED END	WATTS, MODEL: ICV-125
4	STYLE 99 VICTUALIC COUPLING	
5	ELBOW - 2"90° FE BEND	
PUMP BARREL ASSEMBLY (SUCTION)		
6A	PIPE, 6-INCH, SCH 40, STEEL CASING, LENGTH AS REQUIRED	
6B	FLANGE, 6-INCH, S.O. FLG. TAPPED 1-1/4"	
6C	ELBOW, REDUCING 6" x 4", SCH 40, STEEL	
6D	PIPE, 4" SCH 40 STEEL	
6E	FLANGE, 4" S.O.	
HEADER ASSEMBLY (DISCHARGE)		
7A	TEE 2" - THREADED (MPT)	
7B	FLANGE, 2" THREADED	
7C	PIPE, 2" THREADED PIPE, LENGTH AS REQUIRED	
7D	2"x 1-1/4" THREADED REDUCER	
7E	FLANGE, 4", SLIP ON	
8	HALF COUPLING, 3/4-INCH, 3000#, STEEL	
8A	REDUCER, 2" 1 1/4, THREADED W/ 1 1/4" NIPPLE	
9	AIR RELEASE VALVE, 1/2-INCH (MODEL M5 CRISPIN)	0700--03-03
10	BALL VALVE, 1/2-INCH, THREADED, BRASS	0760--03-03
11	CROSS, 1/2" THREADED BRASS	
12	BUSHINGS, 1/2" x 1/4" BRASS	
13	FLOW SENSOR, FLANGED END 2"	ROSEMOUNT, 8705 FLANGED SENSOR
14	NOT USED	
15	BASE SUPPORT, 2" THR STAND PIPE	TOLCO FIG. 316T
16	GAUGE, 0-100 PSI, 4" DIAL, 1/4"	ASHCROFT, MODEL T27M0242EW100#GXCY
17	GAUGE, 0-300 PSI, 4" DIAL, 1/4"	ASHCROFT, MODEL R27M0242EW300#GXCY
18	BUSHING, 3/4" X 1/2" NYLON HEAVY HXX	
19	NIPPLE, 1/2" BRASS	0140-03-06
20	2" SxMIPT ADAPTER	
21	PRESSURE TRANSDUCER, 1/4" NPT-M,0-100PSI 4-20 MAMP OUTPUT	ASHCROFT, MODEL K1-5-M02-42-C1-100
22	PRESSURE TRANSDUCER, 1/4" NPT-M,0-100PSI 4-20 MAMP OUTPUT	ASHCROFT, MODEL K1-5-M02-42-C1-100

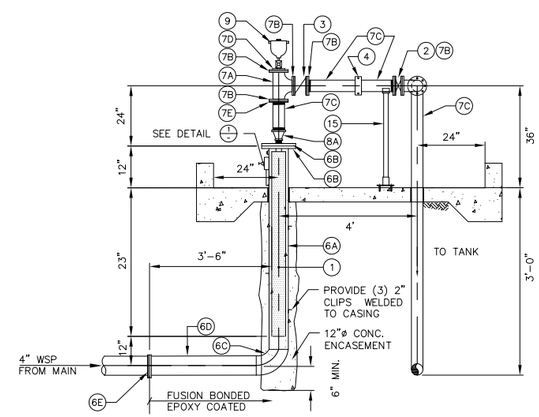
NOTES:
1. ALL PIPE UNLESS OTHERWISE NOTED, SHALL BE HOT DIPPED GALVANIZED.

NOTE: BUILDING NOT SHOWN FOR CLARITY



SECTION

N.T.S.



SECTION

N.T.S.

REDUCED SIZE:
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CSW ST2

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No. 27577
Exp. 12/31/13
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STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
WINDHAVEN PUMP STATION
MECHANICAL PLAN

DES	DR	CH	SCALE NTS		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 37 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-030

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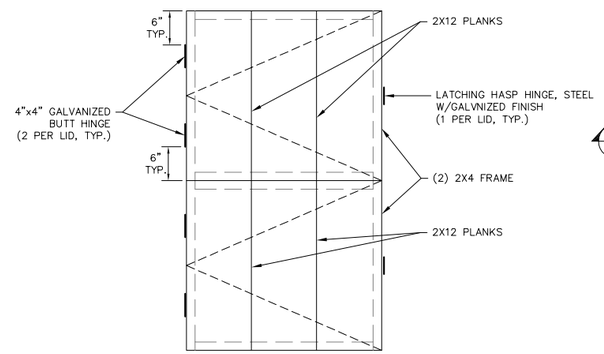
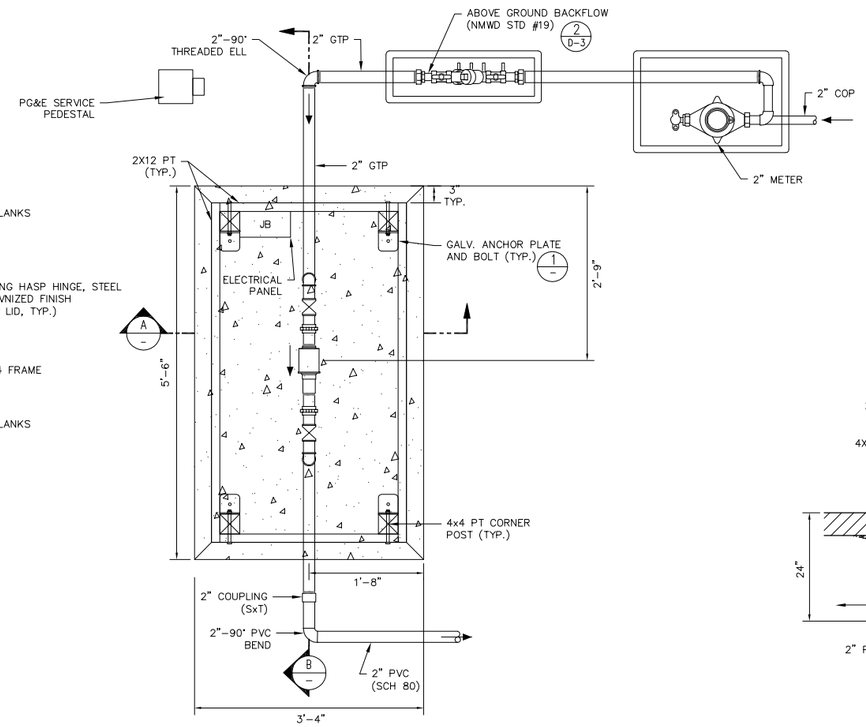


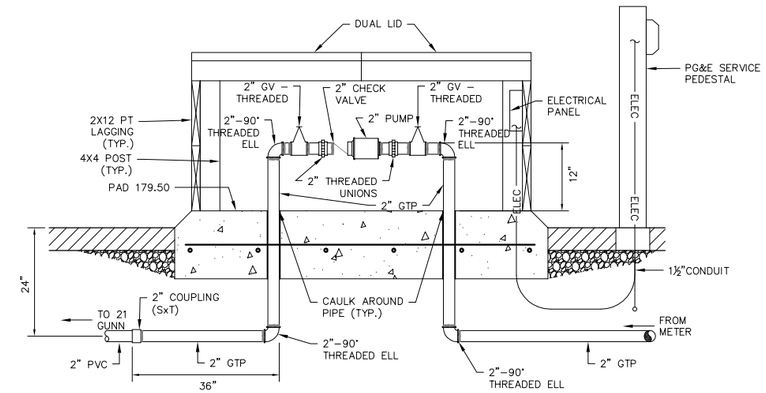
PLAN – DUAL LID

SCALE: 1"=2'-0"



PLAN VIEW

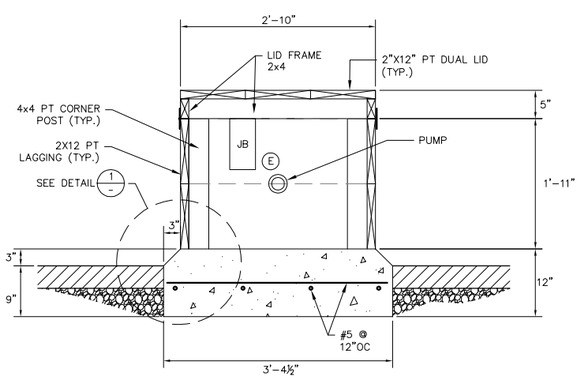
SCALE: 1"=2'-0"



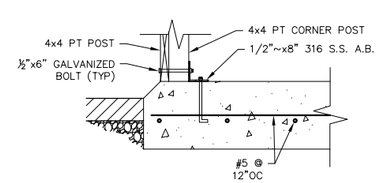
SECTION B

NOTE:

1. FOR LOCATION, GRADING AND PAD ELEVATIONS SEE SHEET C-027.



SECTION A



DETAIL 1

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STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

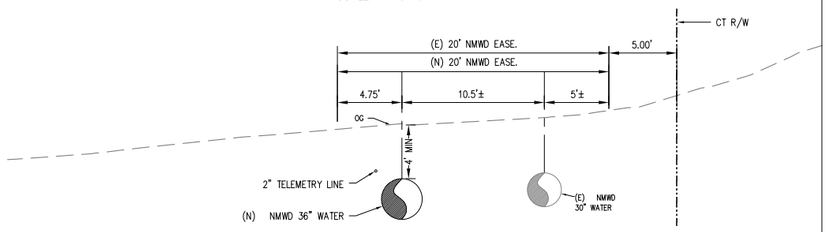
AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
21 GUNN PUMP STATION DETAILS
STRUCTURE

DES	DR	CH	SCALE	NOT TO SCALE	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	38 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-032

Dec 06, 2013 – 10:15am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C032.DWG User: SHUJK

SECTION: 6522+81.31± TO 6542+49.04±

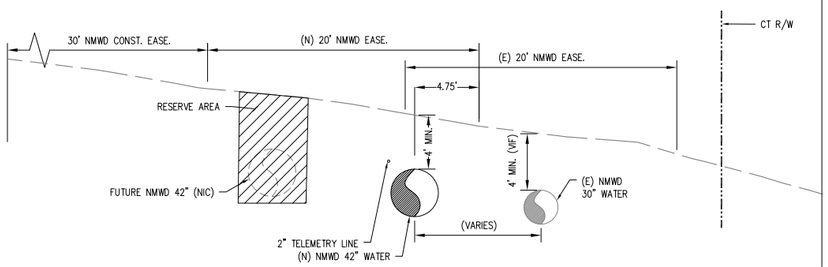
SCALE: 1"=5'-0"



SECTION: 6542+49.04± TO 6543+74.04

2

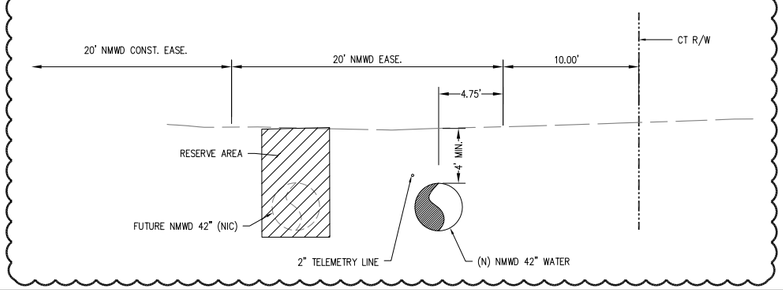
SCALE: 1"=5'-0"



SECTION: 6543+74.05 to 6548+45.62

2

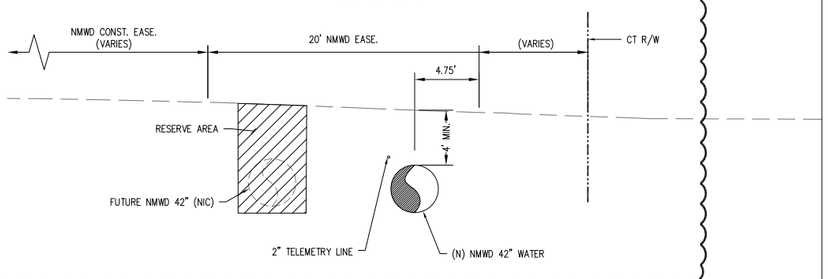
SCALE: 1"=5'-0"



SECTION: 6548+45.63 TO 6551+67.63

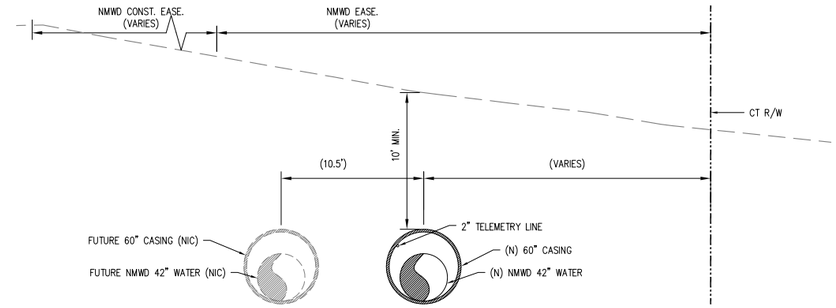
2

SCALE: 1"=5'-0"



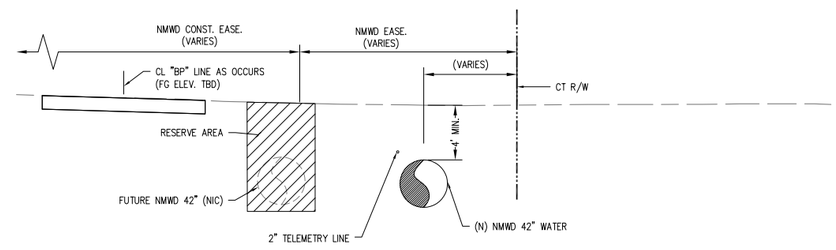
SECTION: 6551+67.64 TO 6556+23.90

SCALE: 1"=5'-0"



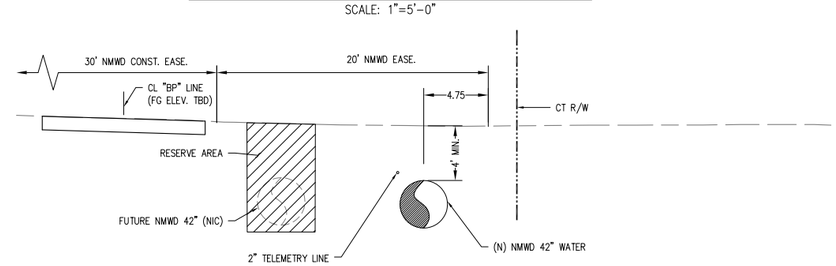
SECTION: 6556+23.91 TO 6560+01.01

SCALE: 1"=5'-0"



SECTION: 6560+01.02 TO 6561+33.54

SCALE: 1"=5'-0"



REDUCED SIZE:
NOT TO SCALE

0' 5' 10' 15' 20'

SCALE: 1"=5'-0"

NOTES:

1. DIMENSIONS TO PROPERTY LINE FROM RIGHT OF WAY ARE APPROXIMATE.
2. VERTICAL LOCATIONS SHOWN FOR INFORMATIONAL PURPOSES ONLY. SEE PLAN AND PROFILE DRAWINGS.

CSW ST2

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STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

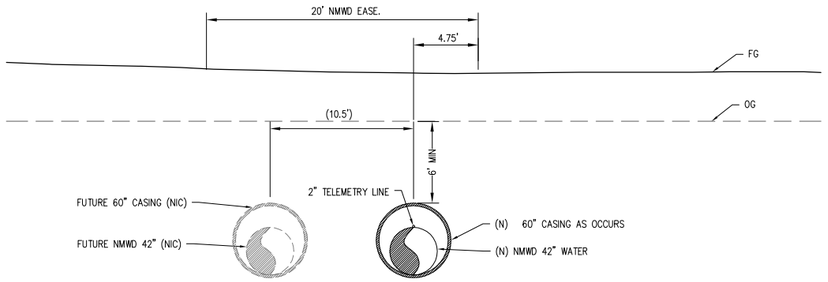
SECTIONS

DES	DR	CH	SCALE 1":40' HORIZ. 1":4' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 39 OF 149 SHEETS		
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-033

Jan 16, 2014 - 12:23pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C033.dwg User: SHUJK

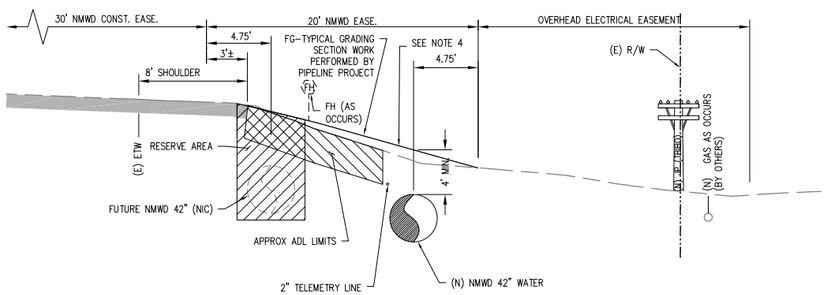
SECTION: 6561+33.55 TO 6565+77.55

SCALE: 1"=5'-0"



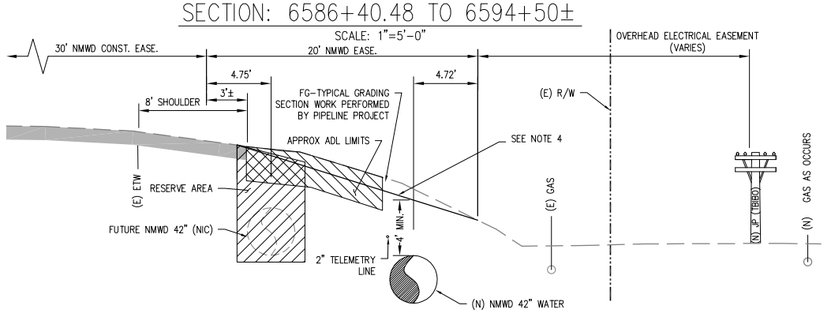
SECTION: 6565+77.56 TO 6586+40.47

SCALE: 1"=5'-0"



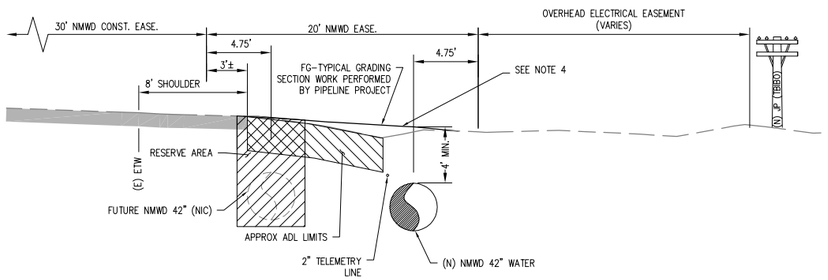
SECTION: 6586+40.48 TO 6594+50±

SCALE: 1"=5'-0"



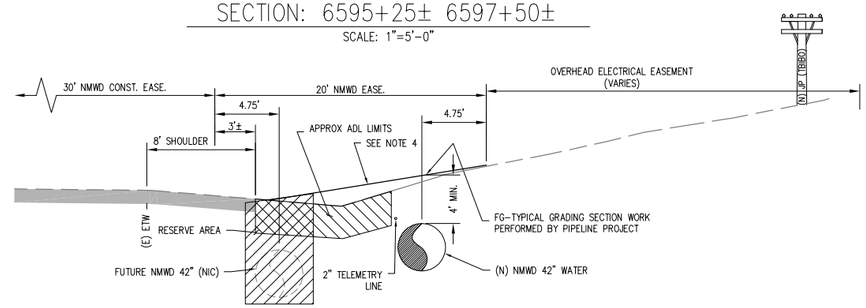
SECTION: 6594+50± TO 6595+25±

SCALE: 1"=5'-0"



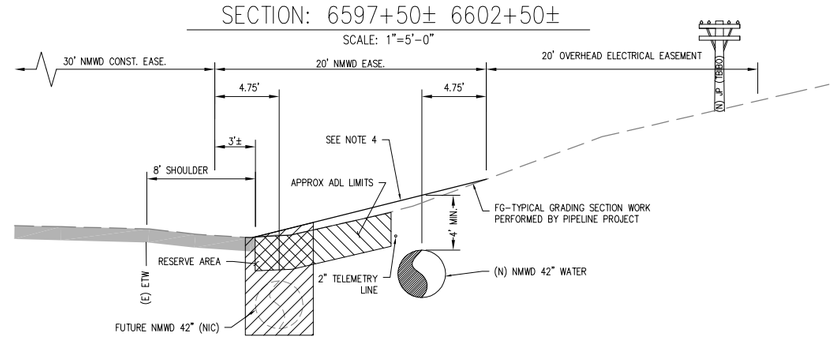
SECTION: 6595+25± 6597+50±

SCALE: 1"=5'-0"



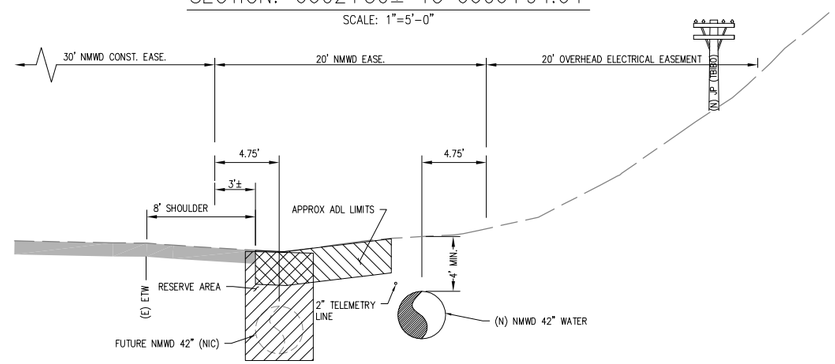
SECTION: 6597+50± 6602+50±

SCALE: 1"=5'-0"



SECTION: 6602+50± TO 6606+94.64

SCALE: 1"=5'-0"



REDUCED SIZE:
NOT TO SCALE

0' 5' 10' 15' 20'

SCALE: 1"=5'-0"

NOTES:

1. DIMENSIONS TO PROPERTY LINE FROM RIGHT OF WAY ARE APPROXIMATE.
2. VERTICAL LOCATIONS SHOWN FOR INFORMATIONAL PURPOSES ONLY. SEE PLAN AND PROFILE DRAWINGS.
3. FOR GRADING, SEE SHEET GR-005 THROUGH GR-007 (SEE MARKUPS)
4. GRADE TO CREATE BENCH FOR EQUIPMENT. GRADE AT COMPLETION OF PIPELINE INSTALLATION TO REBUILD SLOPE. LIMITED ACCESS.

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CSW/Stuber-Stroeh Engineering Group, Inc.
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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

SECTIONS

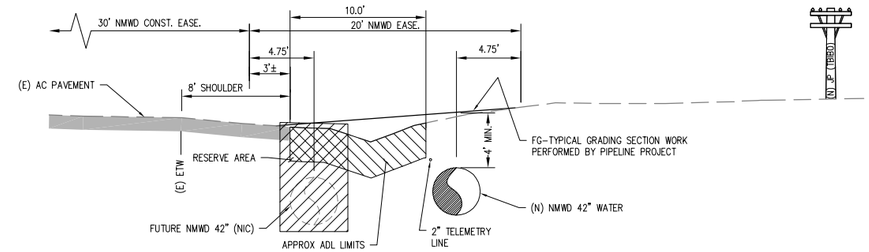
DES	DR	CH	SCALE	1"=5'	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	40 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-034

Dec 04, 2013 - 2:28pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C034.dwg User: BARCJ

0' 5' 10' 15' 20'
SCALE: 1"=5'-0"

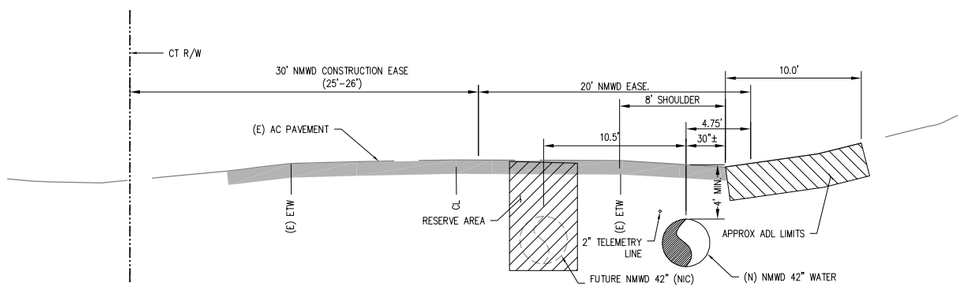
SECTION: 6627+00± TO 6630+00±

SCALE: 1"=5'-0"



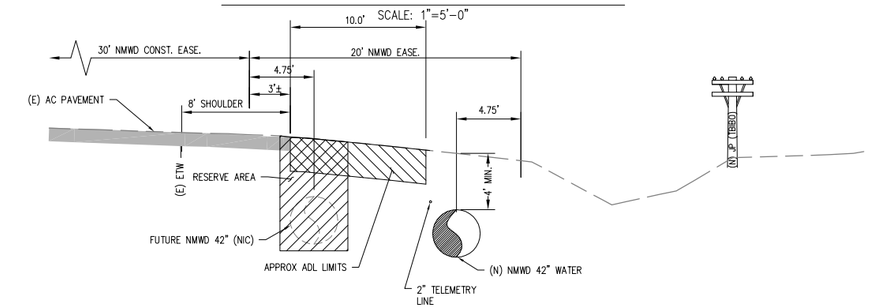
SECTION: 6606+94.65 TO 6624+60.25

SCALE: 1"=5'-0"



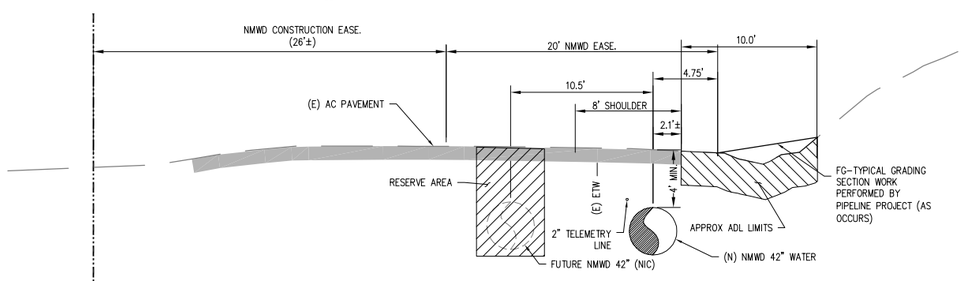
SECTION: 6630+00± TO 6639+50±

SCALE: 1"=5'-0"



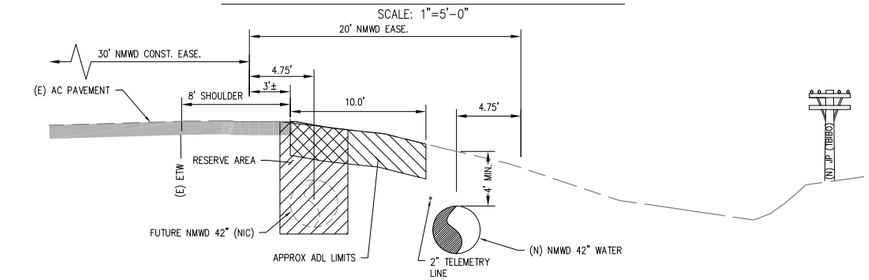
SECTION: 6624+60.26 TO 6624+83.14

SCALE: 1"=5'-0"



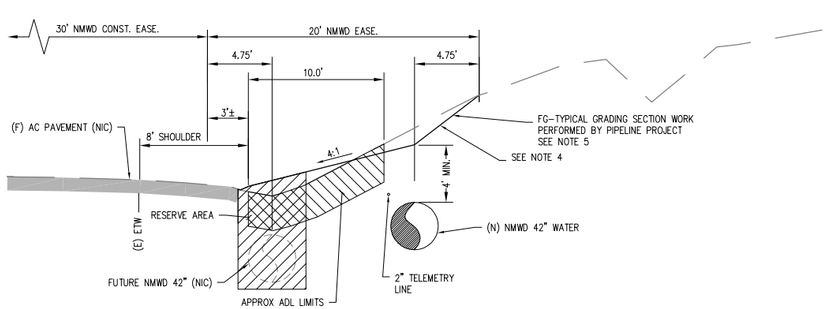
SECTION: 6639+50± TO 6642+75±

SCALE: 1"=5'-0"



SECTION: 6624+83.15 TO 6627+00±

SCALE: 1"=5'-0"



NOTES:

1. DIMENSIONS TO PROPERTY LINE FROM RIGHT OF WAY ARE APPROXIMATE.
2. VERTICAL LOCATIONS SHOWN FOR INFORMATIONAL PURPOSES ONLY. SEE PLAN AND PROFILE DRAWINGS.
3. FOR GRADING, SEE SHEET GR-014 THROUGH GR-015. (SEE MARKUPS)
4. MAINTAIN A MINIMUM OF 24" OF COVER AT ALL TIMES OVER NEW 42" AQUEDUCT.
5. INTERIM GRADING:
   - CONTRACTOR SHALL PROVIDE FILL (AS APPROVED BY GEOTECHNICAL ENGINEER) AND PLACE AS SHOWN PRIOR TO PIPELINE WORK.
   - AFTER PLACEMENT AND COMPACTION, CONTRACTOR SHALL INSTALL NEW 42" WATER PER PLANS AND SPECIFICATIONS. (SEE NOTE 4)
   - FINAL GRADING SHALL BE AS SHOWN
   - CONTRACTOR SHALL COORDINATE WITH CALTRANS PRIOR TO PLACEMENT OF FILL.

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STATE OF CALIFORNIA

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

SECTIONS

DES	DR	CH	SCALE	1" = 5'	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	41 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-035

REDUCED SIZE:
NOT TO SCALE

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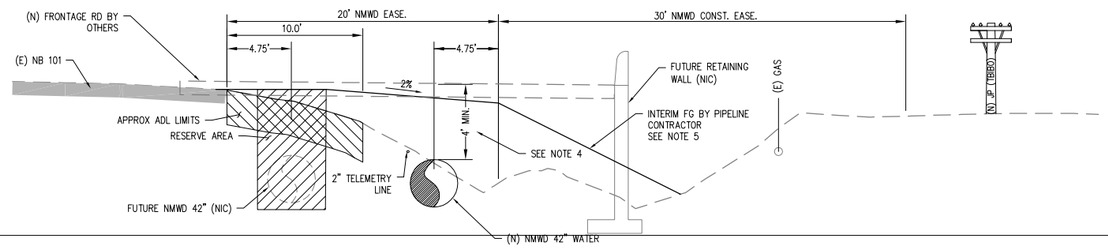
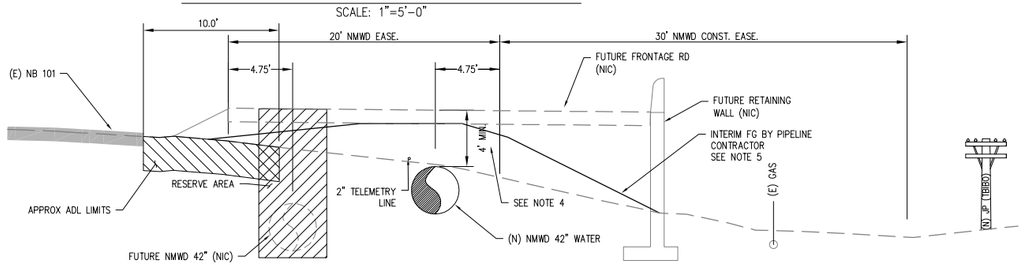
SECTION: 6642+75± TO 6649+00±

SCALE: 1"=5'-0"



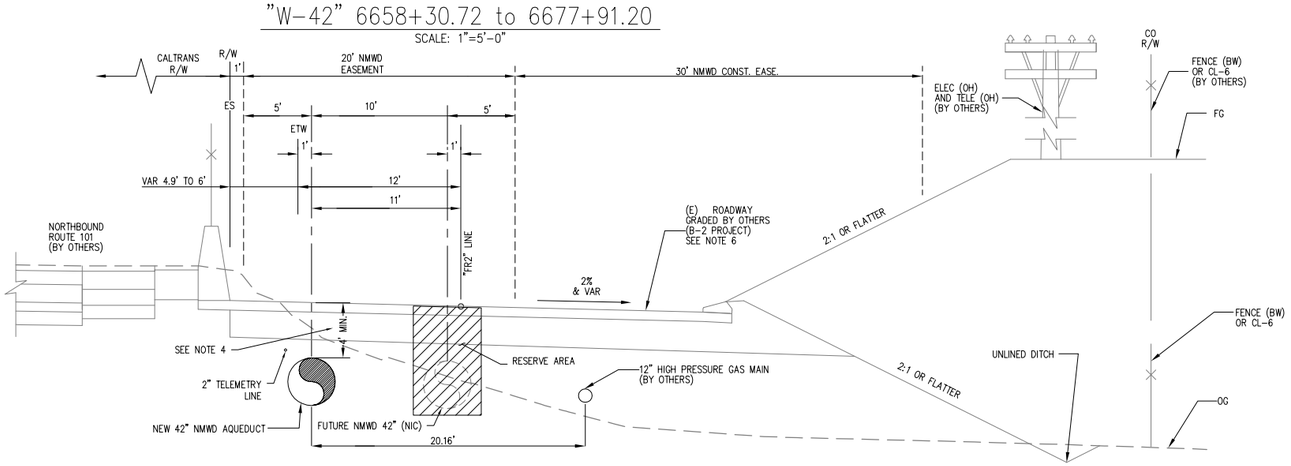
SECTION: 6649+00± TO 6658+31.71

SCALE: 1"=5'-0"



"W-42" 6658+30.72 to 6677+91.20

SCALE: 1"=5'-0"



0' 5' 10' 15' 20'

SCALE: 1"=5'-0"

NOTES:

1. DIMENSIONS TO PROPERTY LINE FROM RIGHT OF WAY ARE APPROXIMATE.
2. VERTICAL LOCATIONS SHOWN FOR INFORMATIONAL PURPOSES ONLY. SEE PLAN AND PROFILE DRAWINGS.
3. FOR GRADING, SEE SHEET GR-014 THROUGH GR-015. (SEE MARKUPS)
4. MAINTAIN A MINIMUM OF 24" OF COVER AT ALL TIMES OVER NEW 42" AQUEDUCT.
5. INTERIM GRADING:
   - CONTRACTOR SHALL PROVIDE FILL (AS APPROVED BY GEOTECHNICAL ENGINEER) AND PLACE AS SHOWN PRIOR TO PIPELINE WORK.
   - AFTER PLACEMENT AND COMPACTION, CONTRACTOR SHALL INSTALL NEW 42" WATER PER PLANS AND SPECIFICATIONS. (SEE NOTE 4)
   - FINAL GRADING SHALL BE AS SHOWN
   - CONTRACTOR SHALL COORDINATE WITH CALTRANS PRIOR TO PLACEMENT OF FILL.
6. REACH A PORTION OF CONTRACT SHALL BE INSTALLED BEGINNING JUNE 4, 2014 AND COMPLETED AUGUST 8, 2014.

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

SECTIONS

DES	DR	CH	SCALE	1" = 5'	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	42 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-036

REDUCED SIZE:
NOT TO SCALE

Dec 04, 2013 - 2:31pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C036.dwg User: BARCJ

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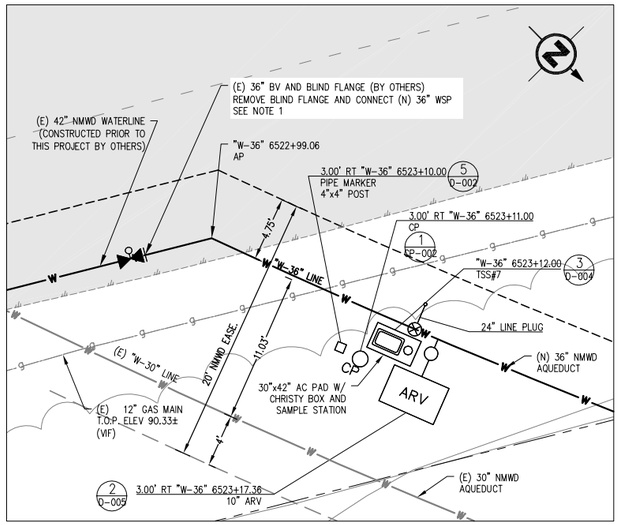
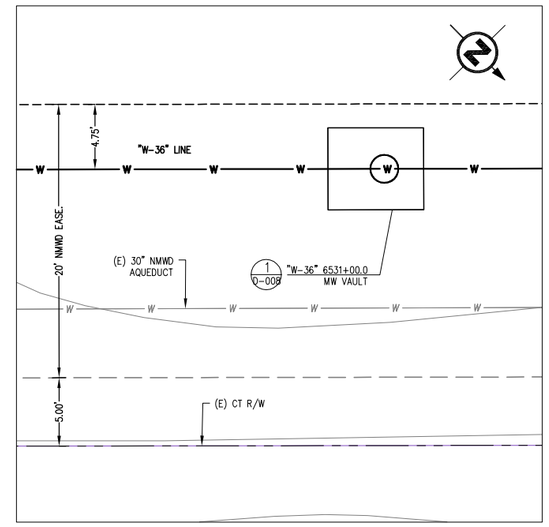
SCALE: 1"=5'-0"



1 / C-001 PLAN ENLARGMENT
SCALE: 1"= 5'-0"

(NOT USED)

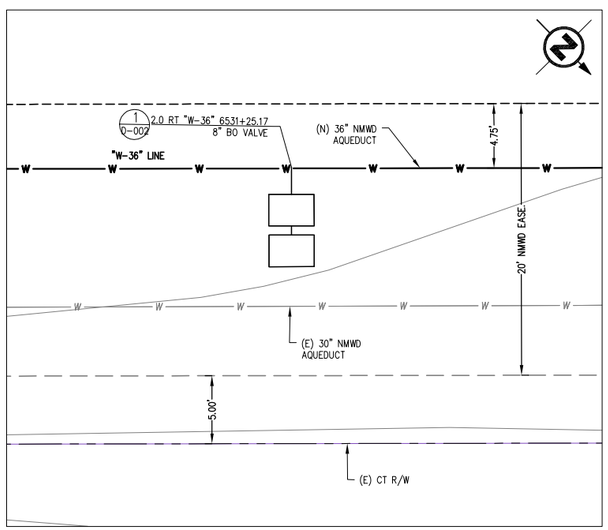
2 / C-001 PLAN ENLARGMENT
SCALE: 1"= 5'-0"



3 / C-001 PLAN ENLARGMENT
SCALE: 1"= 5'-0"

NOTES

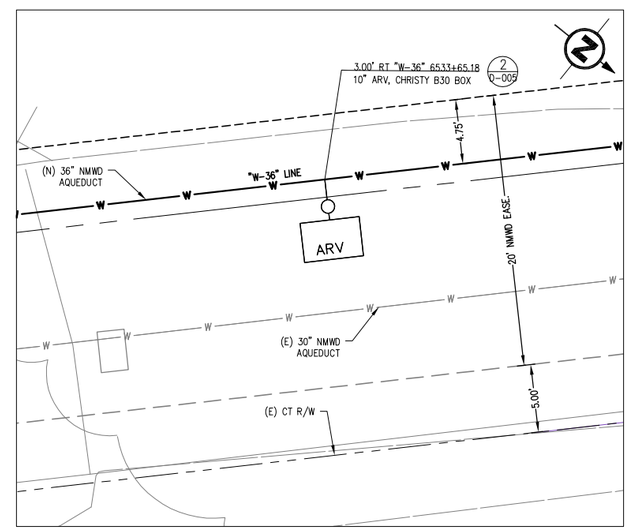
1. SEE DRAWING D-010 FOR "SOUTHERN CONNECTION" CONNECTION DETAILS.
2. SEE PLAN AND PROFILE DRAWINGS FOR ADDITIONAL (N) 36" NMWD AQUEDUCT INFORMATION.
3. DIMENSIONS SHOWN ARE INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES SHALL BE CONSTRUCTED PER APPLICABLE STANDARDS.



4 / C-001 PLAN ENLARGMENT
SCALE: 1"= 5'-0"

(NOT USED)

5 / C-002 PLAN ENLARGMENT
SCALE: 1"= 5'-0"



6 / C-002 PLAN ENLARGMENT
SCALE: 1"= 5'-0"

REDUCED SIZE:
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

DES	DR	CH	SCALE 1"=5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 43 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-046

Dec 04, 2013 – 2:33pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C046.dwg User: BARCJ

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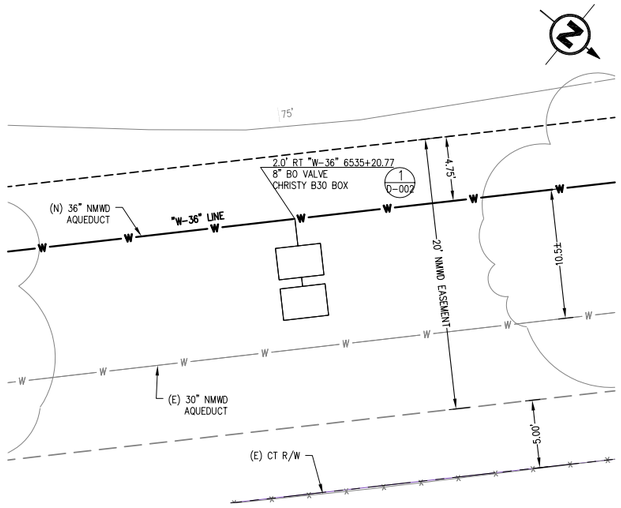
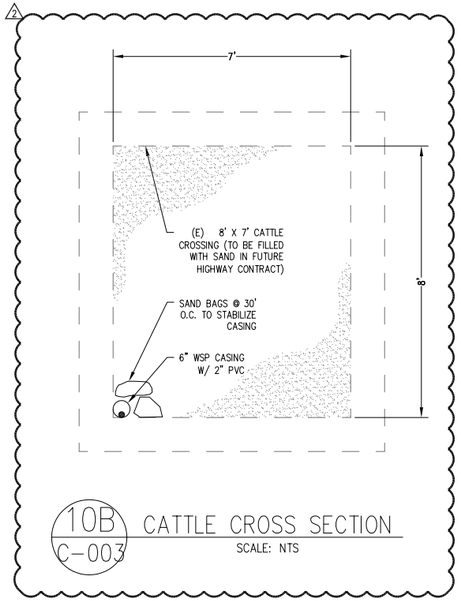
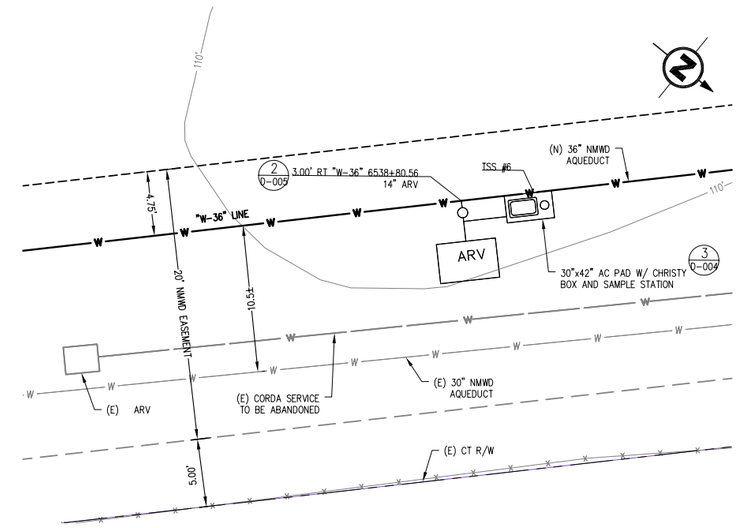
SCALE: 1"=5'-0"



7 C-002 PLAN ENLARGMENT
SCALE: 1"= 5'-0"



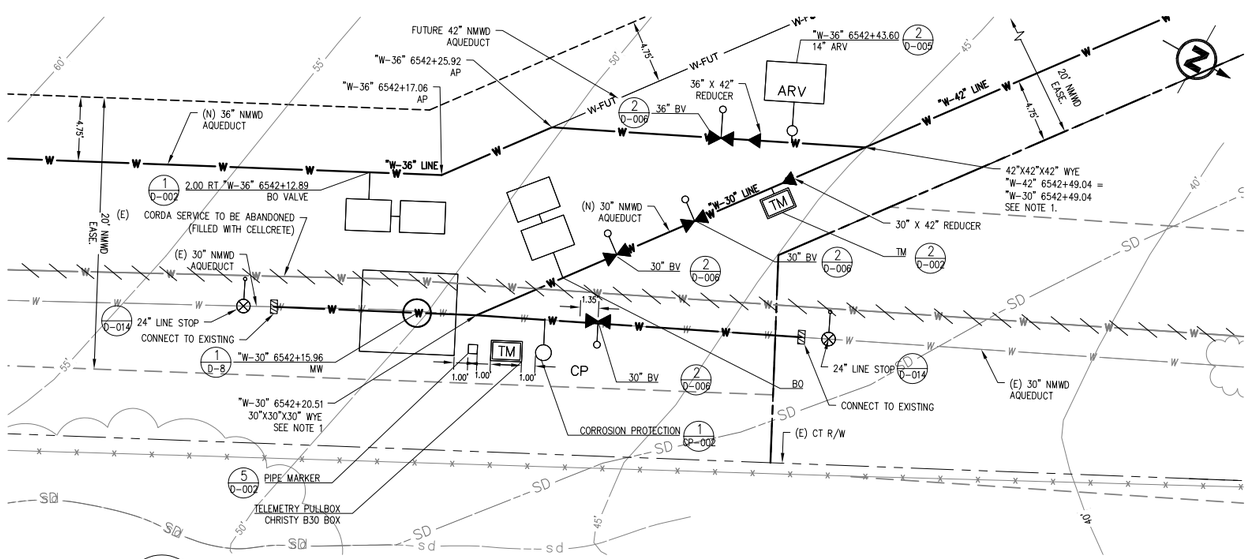
10B C-003 CATTLE CROSS SECTION
SCALE: NTS



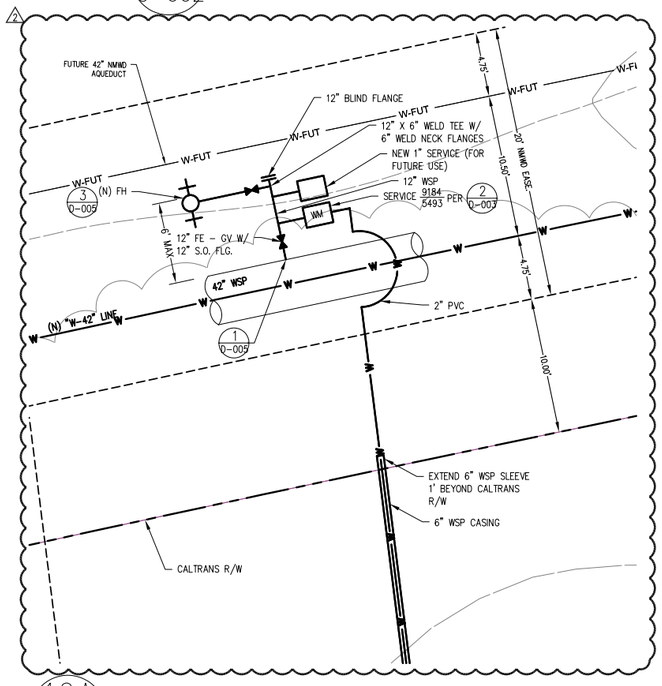
9 C-002 PLAN ENLARGMENT
SCALE: 1"= 5'-0"

NOTES:

1. SEE DRAWING D-012 FOR "MIDDLE CONNECTION" CONNECTION DETAILS.
2. SEE PLAN AND PROFILE DRAWINGS FOR ADDITIONAL INFORMATION.
3. DIMENSIONS SHOWN INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES TO BE CONSTRUCTED PER APPLICABLE STANDARDS.



10 C-003 PLAN ENLARGMENT
SCALE: 1"= 5'-0"



10A C-003 METER FOR CORDA SERVICE (SERVICE #9184/5493)
SCALE: 1"= 5'-0"

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NO.	DATE	REVISION	BY	APP.
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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN - APPURTENANCES, PLAN ENLARGEMENT

DES	DR	CH	SCALE 1"=5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 44 OF 149	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-047

Jan 14, 2014 - 2:33pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\C047.dwg User: SHUJK

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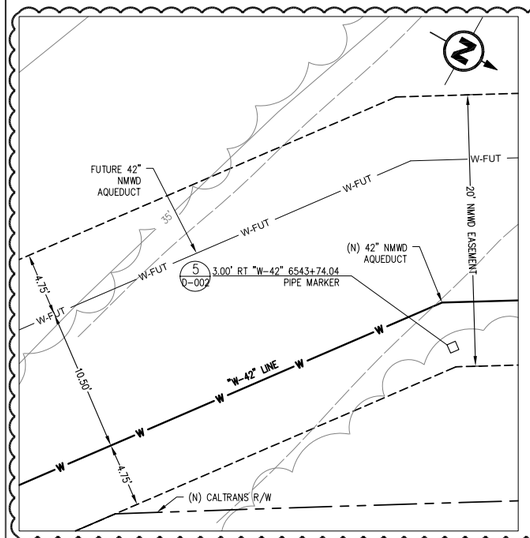
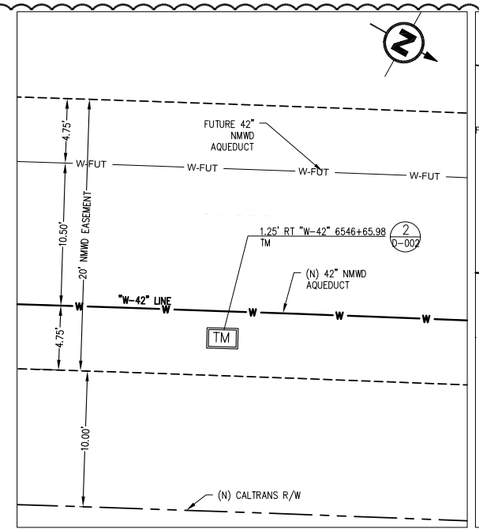
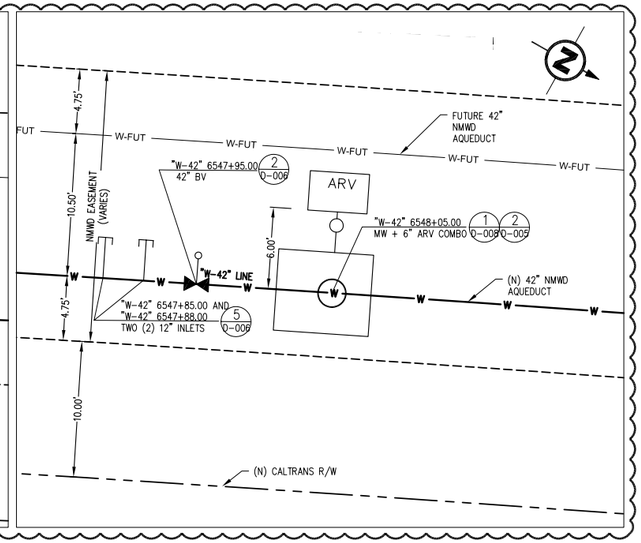
SCALE: 1"=5'-0"



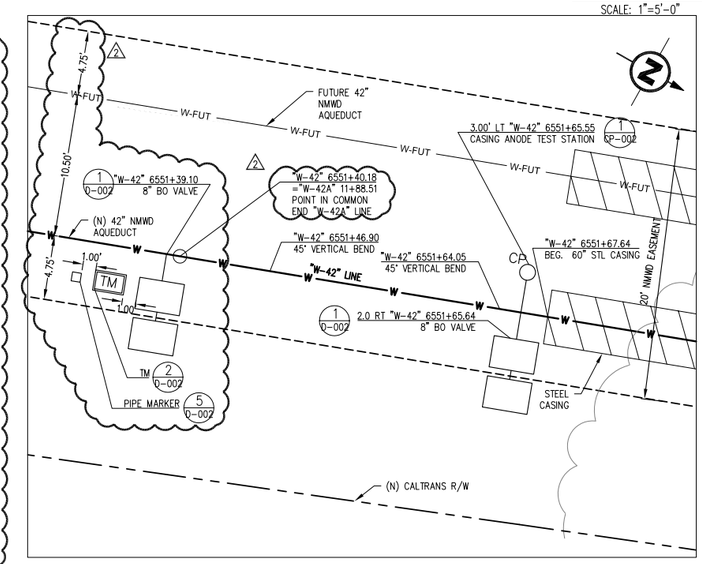
11 C-003 PLAN ENLARGEMEMT
SCALE: 1"= 5'-0"



12 C-003 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



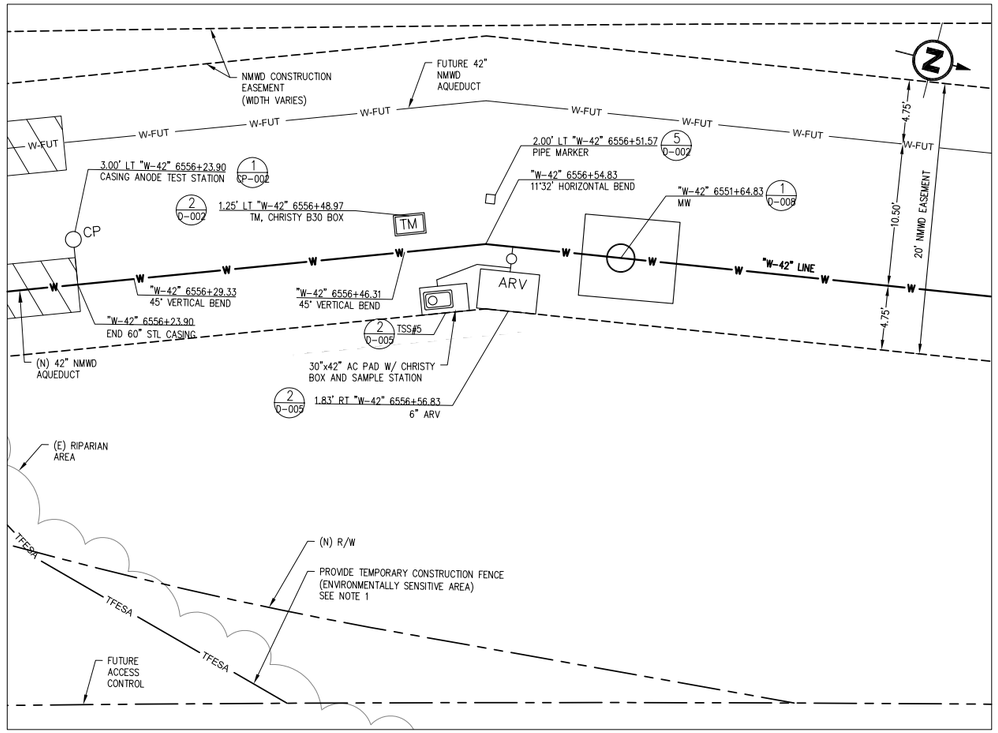
12A C-003 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



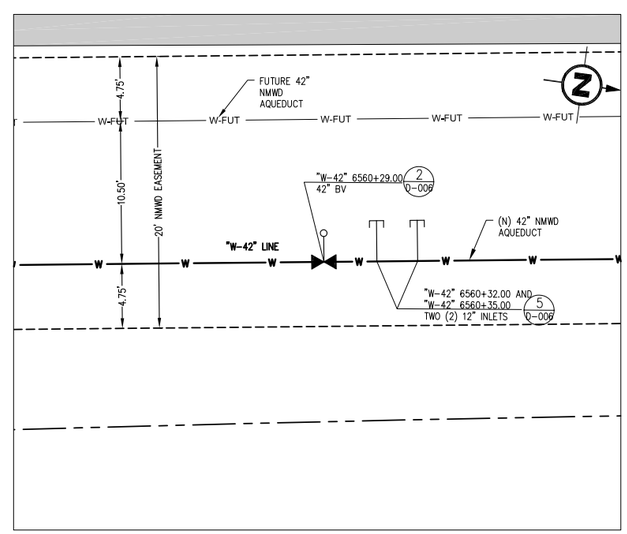
13 C-003 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

NOTES:

1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.



14 C-004 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



14A C-004 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE: NOT TO SCALE

CSW ST2
CSW/Stuber-Stroeh Engineering Group, Inc.
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NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

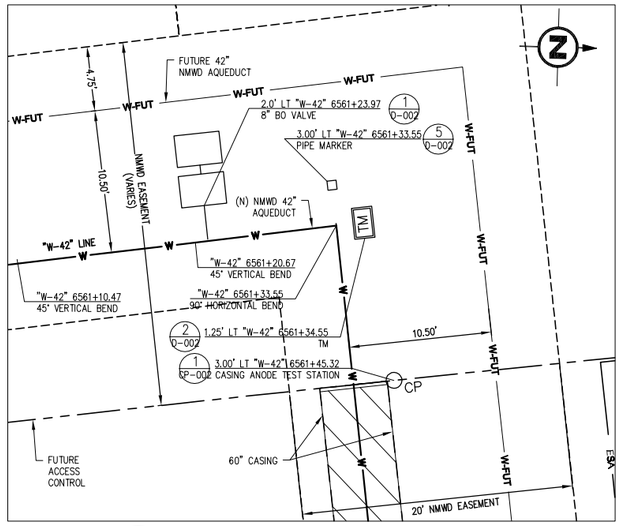
DES	DR	CH	SCALE 1"=5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 45 OF 149	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-048

Jan 16, 2014 – 12:04pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C048.dwg User: SHUJK

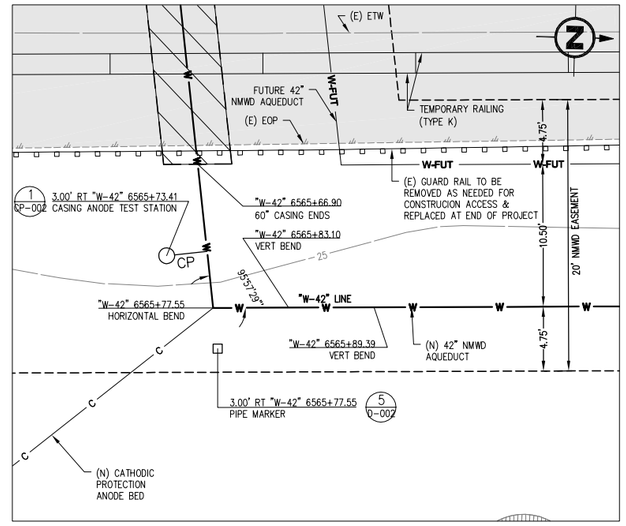
0' 2.5 5 7.5 10
SCALE: 1"=5'-0"

NOTES:

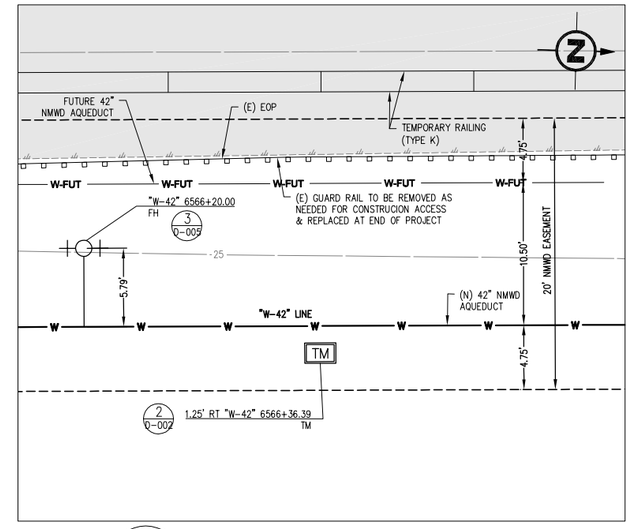
1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.
2. DIMENSIONS SHOWN INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES TO BE CONSTRUCTED PER APPLICABLE STANDARDS.



15 C-005 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



16 C-005 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



17 C-005 PLAN ENLARGEMENT
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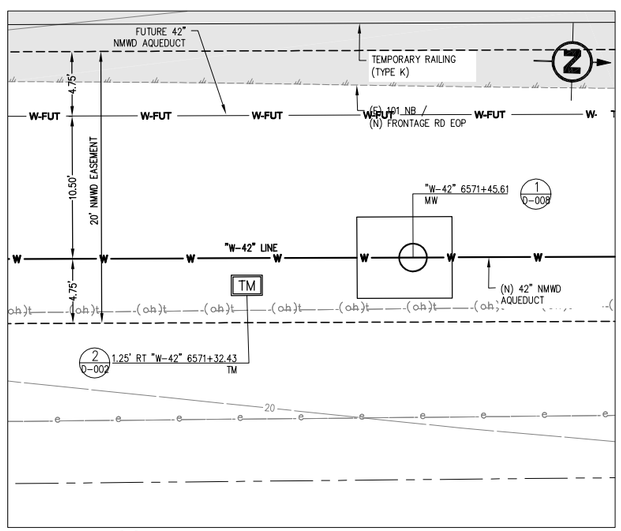
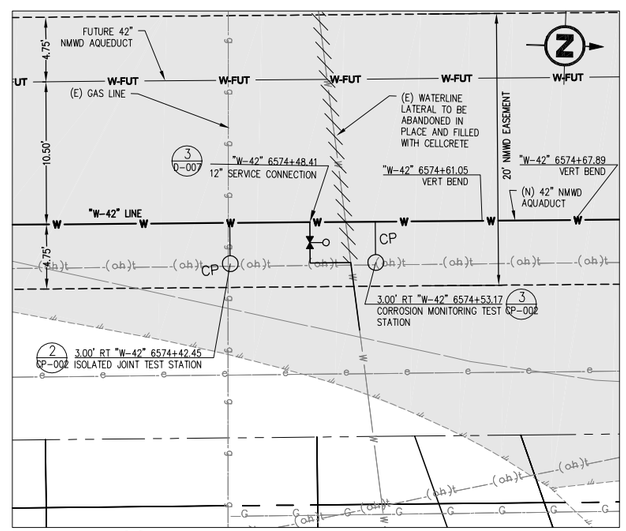
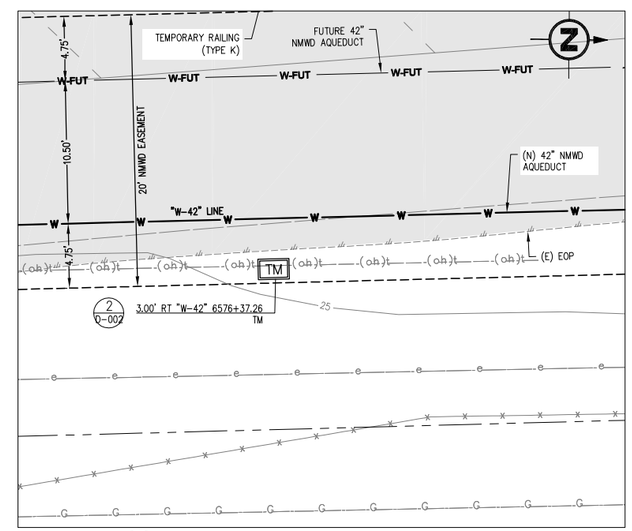


18 C-006 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



19 C-006 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



20 C-006 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE: NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, CA 94949
tel: 415.883.9850
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No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

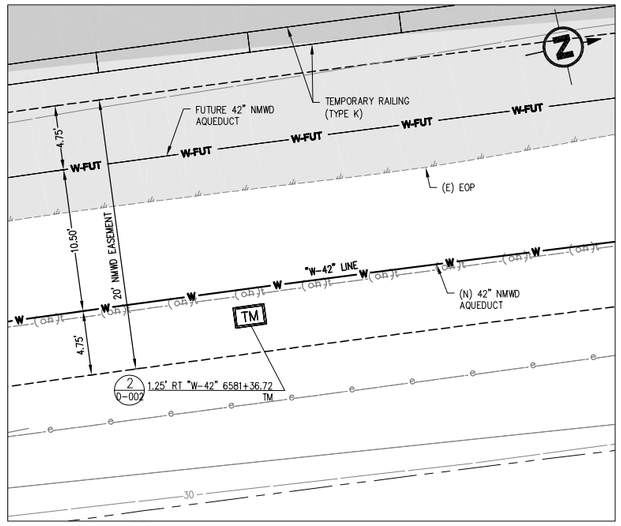
DES	DR	CH	SCALE 1"=5'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 46 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-049

Dec 04, 2013 – 3:10pm N:\CIVIL\A\4113100\Dwg\Sheet Dwgs\C049.dwg User: BARCJ

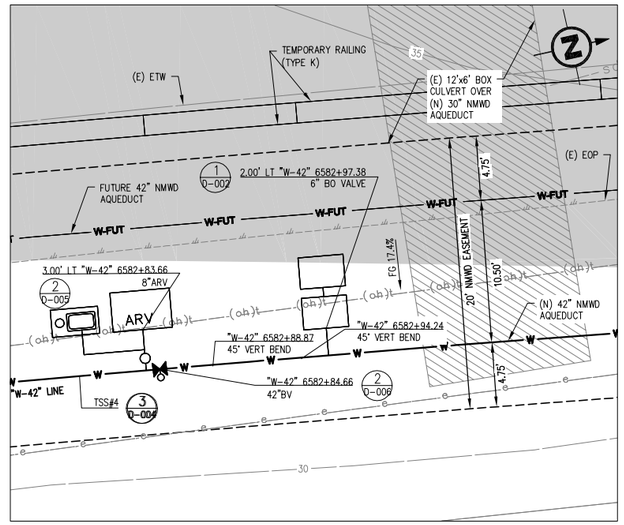
0' 2.5 5 7.5 10
SCALE: 1"=5'-0"

NOTES:

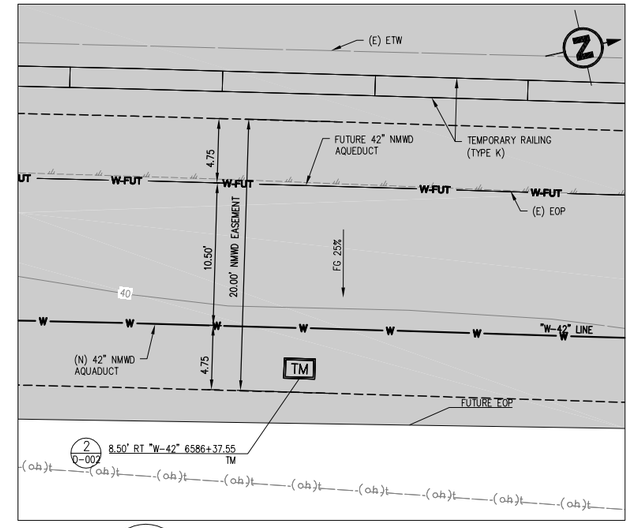
1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.



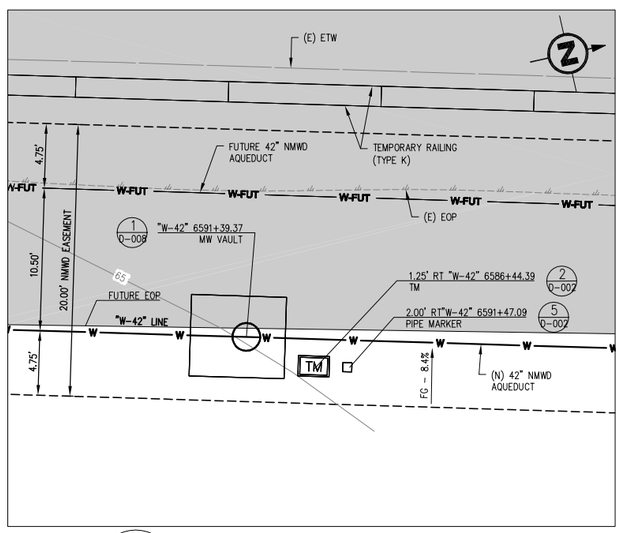
21 C-007 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



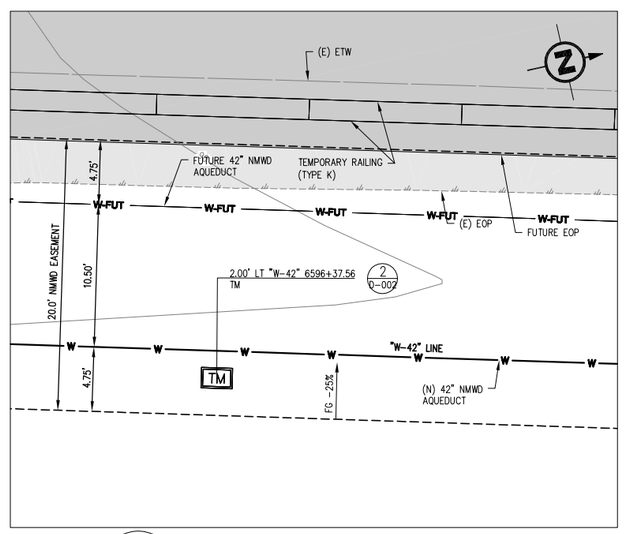
22 C-007 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



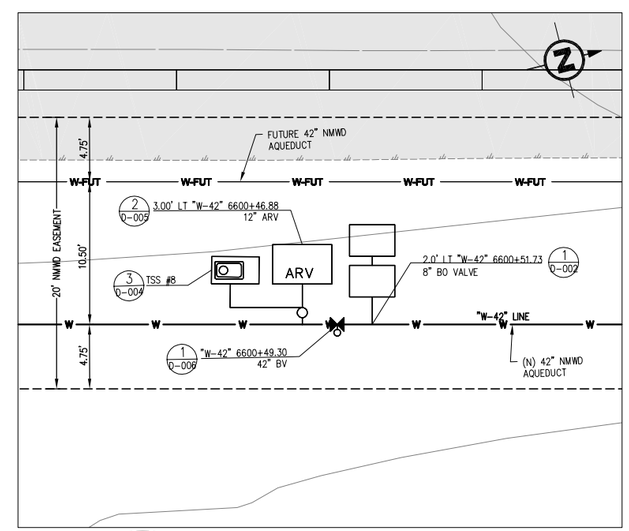
23 C-007 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



24 C-008 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



25 C-008 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



26 C-009 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE:
NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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STATE OF CALIFORNIA

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN - APPURTENANCES, PLAN ENLARGEMENTS

DES	DR	CH	SCALE 1":5'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 47 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-050

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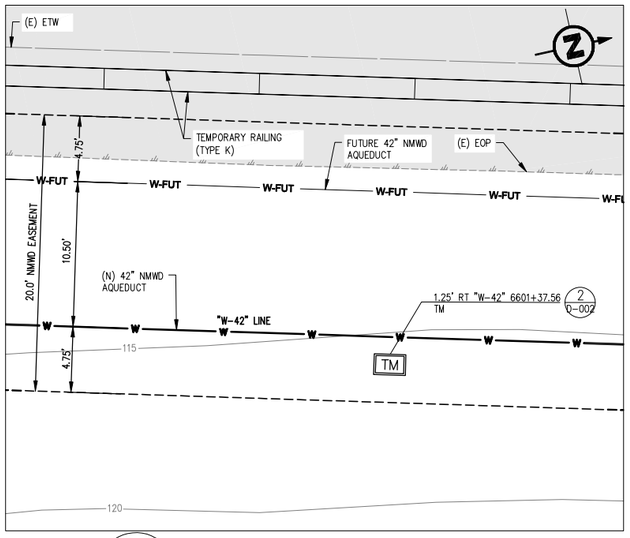
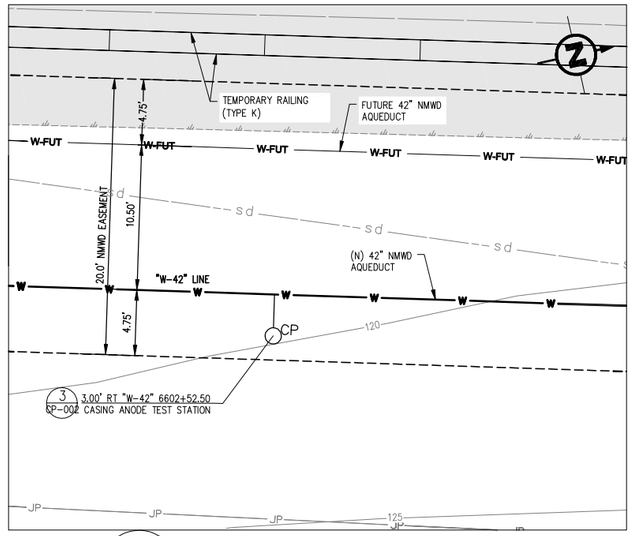
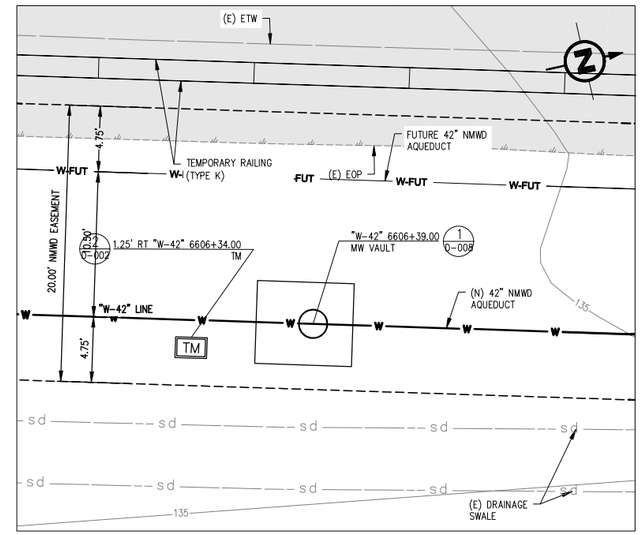
SCALE: 1"=5'-0"



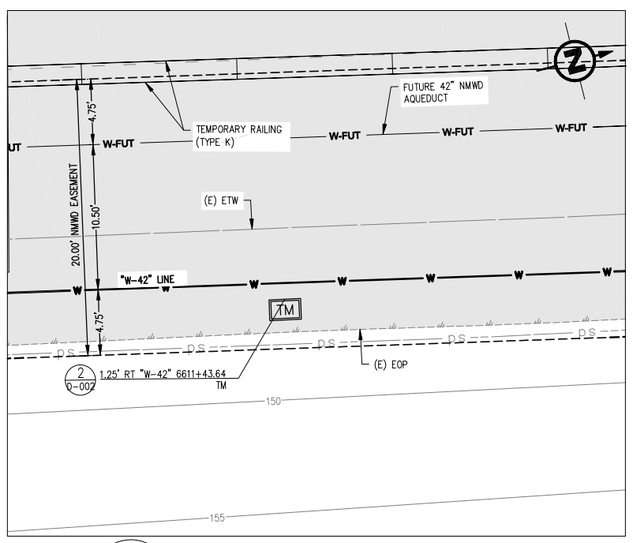
27 C-009 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



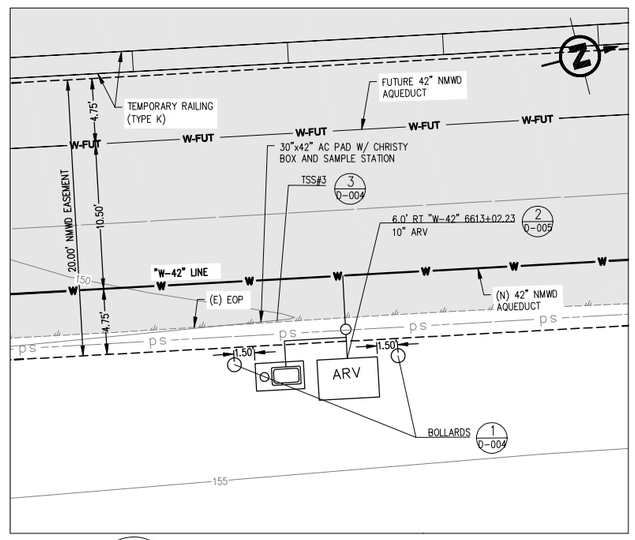
28 C-009 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



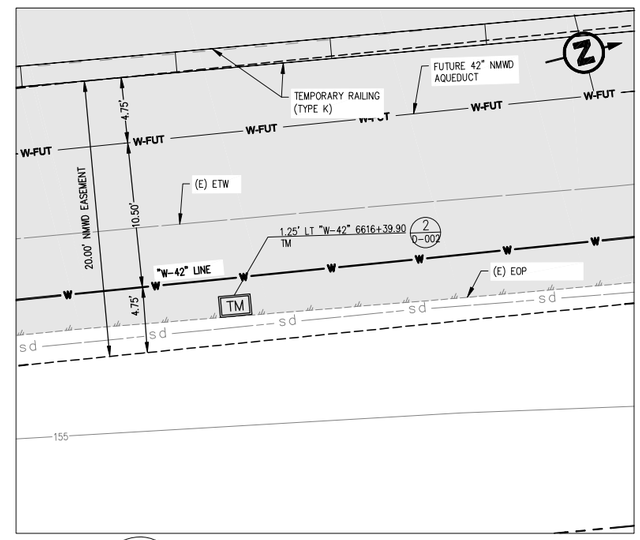
29 C-009 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



30 C-010 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



31 C-010 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



32 C-010 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE:
NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

DES	DR	CH	SCALE 1":5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 48 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-051

Dec 04, 2013 – 3:27pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C051.dwg User: BARCJ

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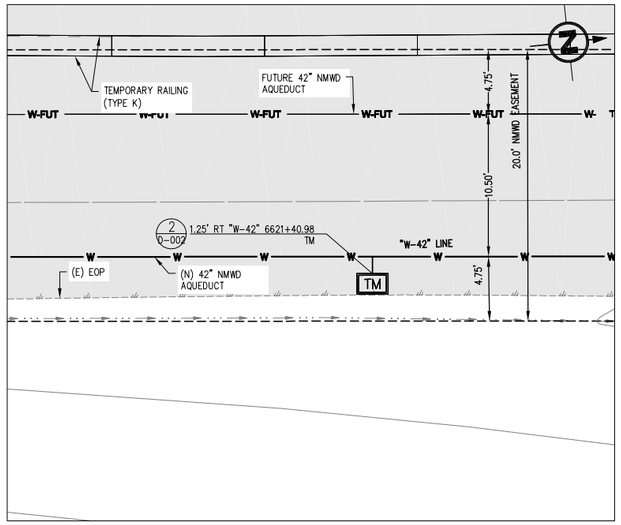
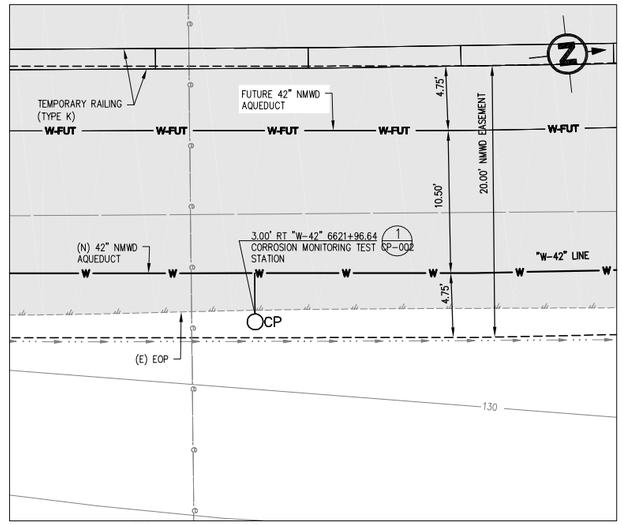
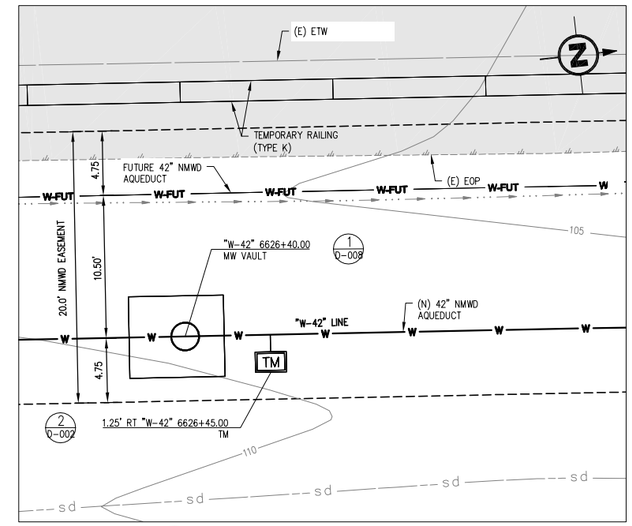
SCALE: 1"=5'-0"



33 C-011 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



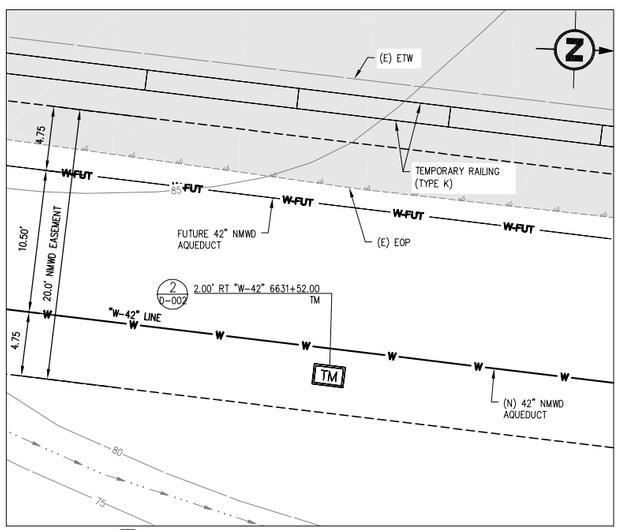
34 C-011 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



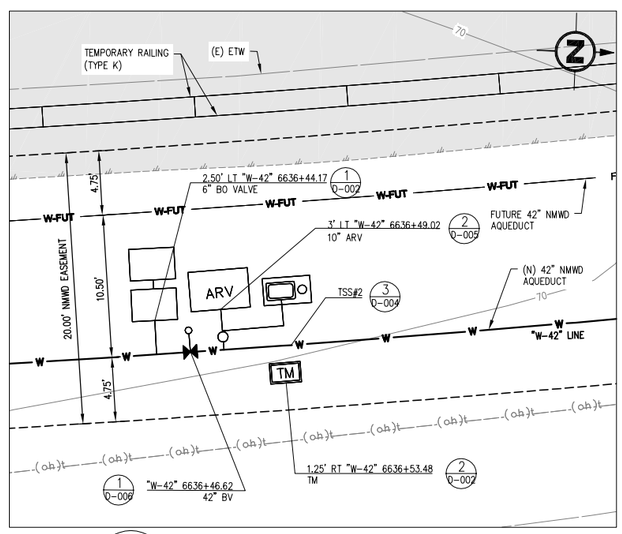
35 C-012 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

NOTES

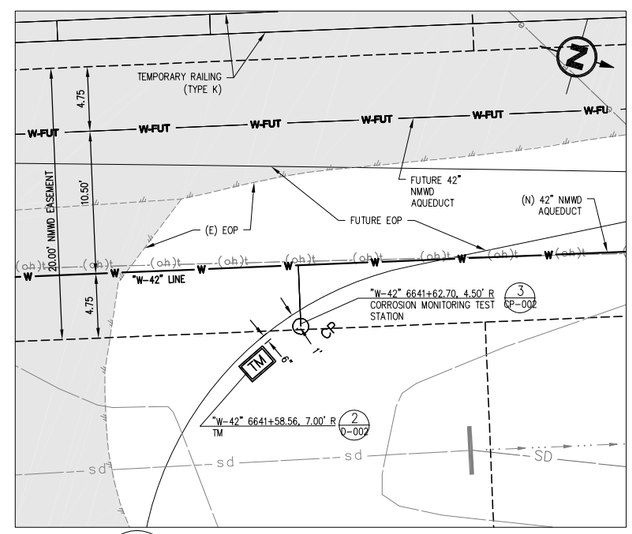
1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION



36 C-013 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



37 C-013 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



38 C-014 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE:
NOT TO SCALE

CSW ST2

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tel: 415.883.9850
fax: 415.883.9835

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

DES	DR	CH	SCALE 1"=5'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 49 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-052

Dec 04, 2013 – 3:35pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C052.dwg User: BARCJ

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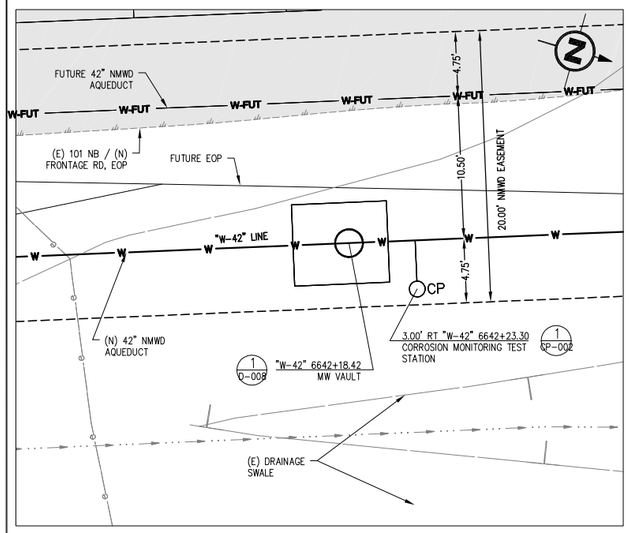
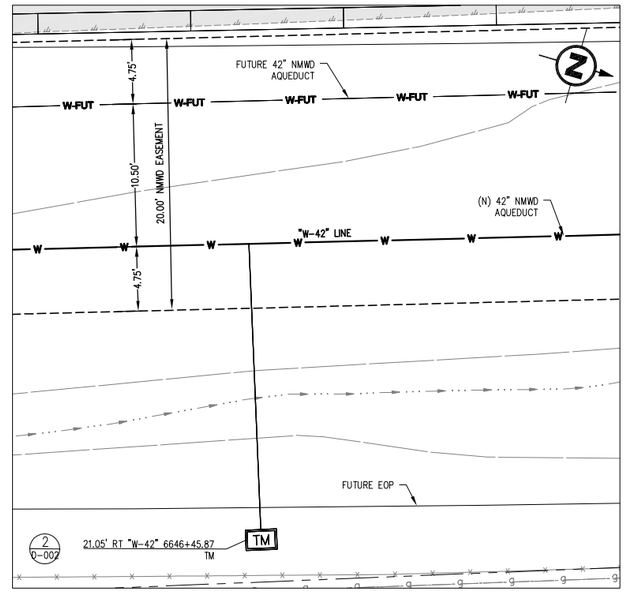
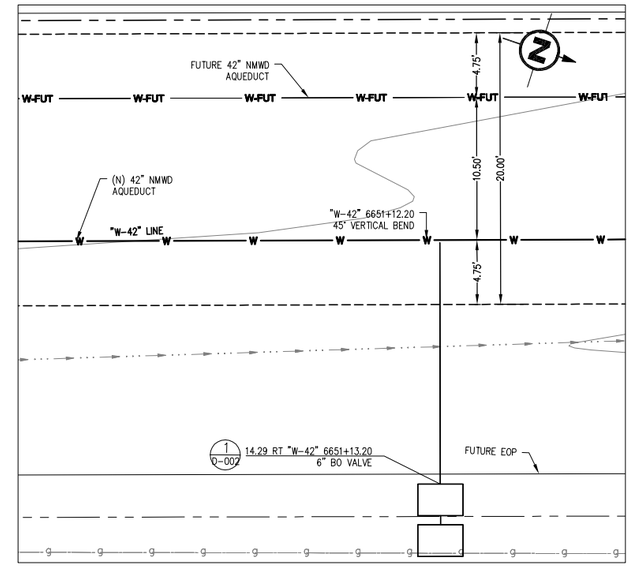
SCALE: 1"=5'-0"



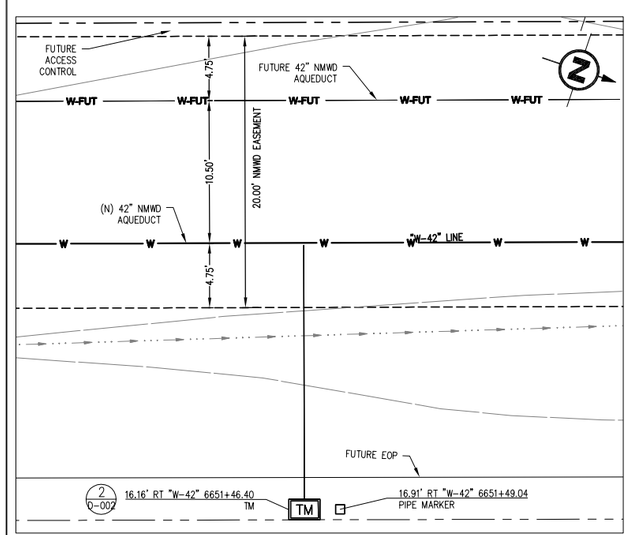
39 C-014 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



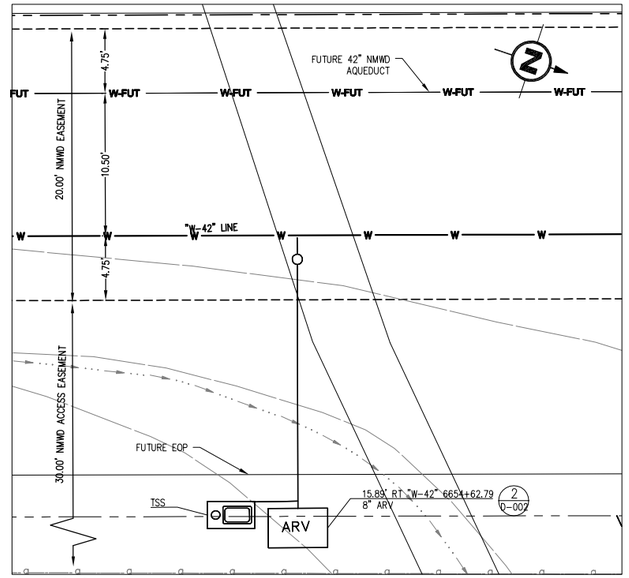
40 C-014 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



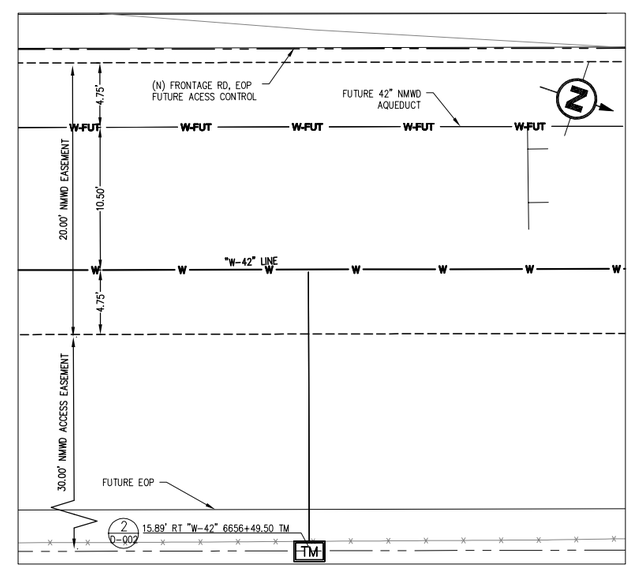
41 C-015 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



42 C-015 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



43A C-015 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"



43 C-015 PLAN ENLARGEMENT
SCALE: 1"= 5'-0"

REDUCED SIZE:
NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
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tel: 415.883.9850
fax: 415.883.9835

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

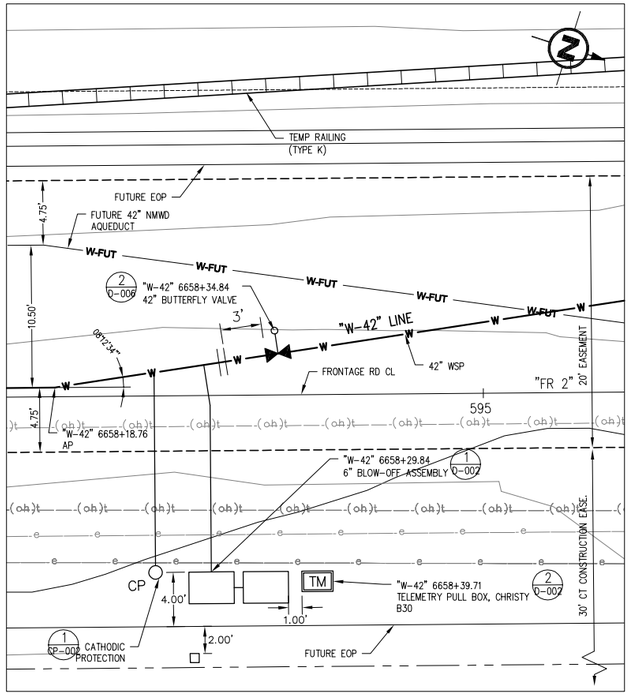
DES	DR	CH	SCALE 1"=5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 50 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 C-053

Dec 04, 2013 – 3:44pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C053.dwg User: BARCJ

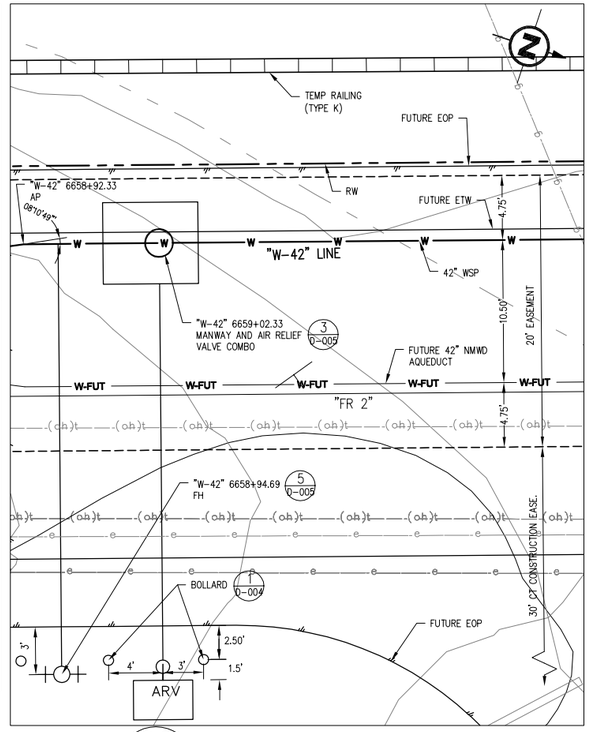
0' 2.5' 5' 7.5' 10'
SCALE: 1"=5'-0"

NOTES

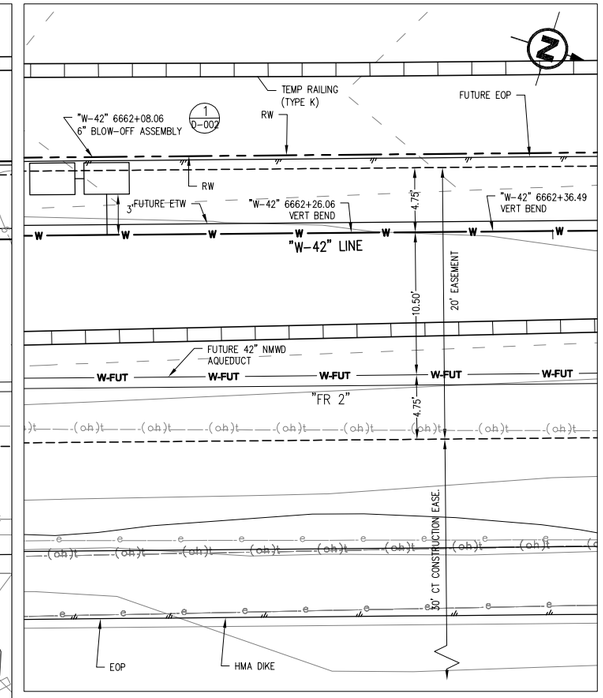
1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.
2. DIMENSIONS SHOWN INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES TO BE CONSTRUCTED PER APPLICABLE STANDARDS.



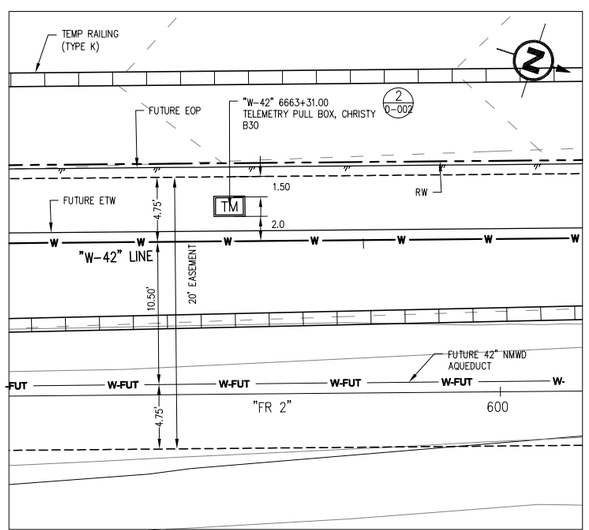
44 PLAN ENLARGEMENT
C-018 SCALE: 1"=5'



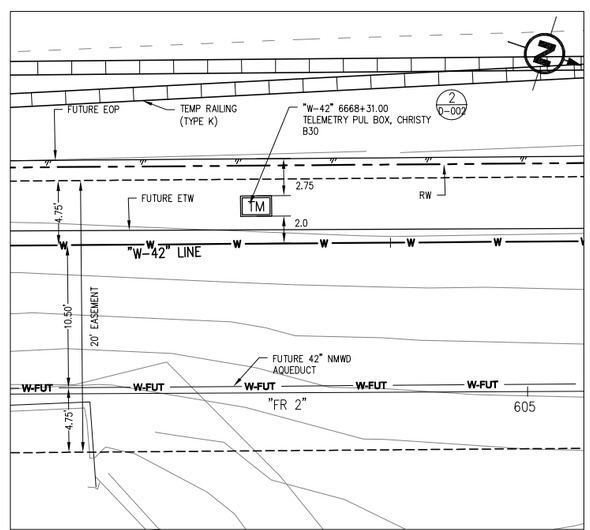
45 PLAN ENLARGEMENT
C-018 SCALE: 1"=5'



46 PLAN ENLARGEMENT
C-018 SCALE: 1"=5'



47 PLAN ENLARGEMENT
C-018 SCALE: 1"=5'



48 PLAN ENLARGEMENT
C-018 SCALE: 1"=5'

REDUCED SIZE:
NOT TO SCALE

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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fax: 415.883.9835

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES,
PLAN ENLARGEMENT

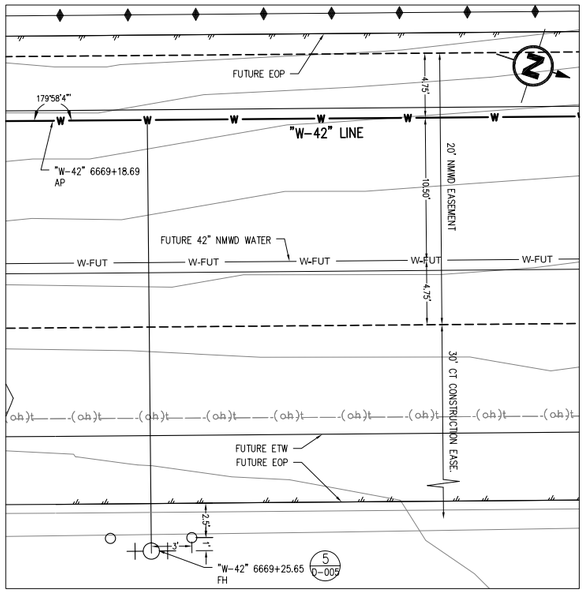
DES	DR	CH	SCALE 1" = 5'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 51 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 C-054

Dec 04, 2013 – 3:50pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C054.dwg User: BARCJ

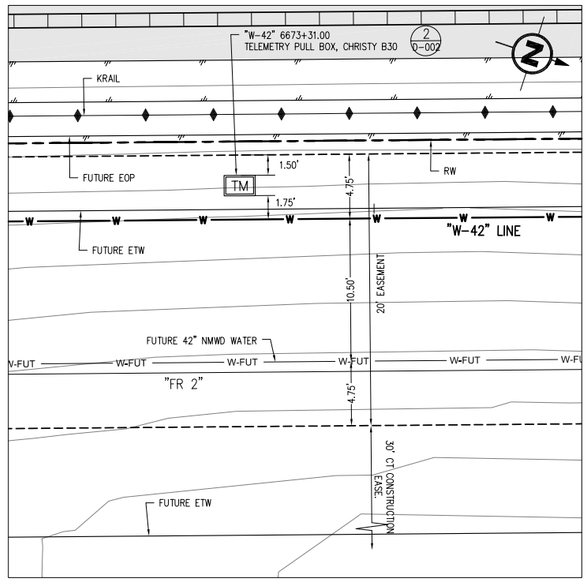
0' 2.5' 5' 7.5' 10'
SCALE: 1"=5'-0"

NOTES

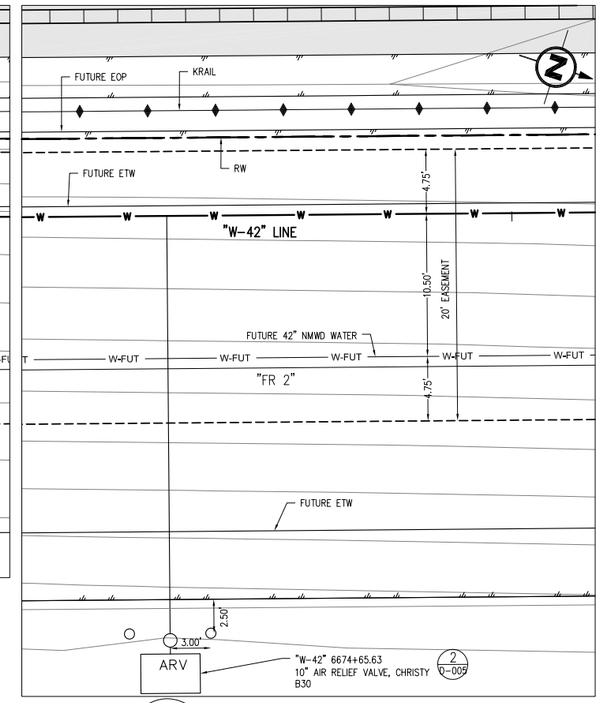
1. SEE PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION
2. DIMENSIONS SHOWN INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES TO BE CONSTRUCTED PER APPLICABLE STANDARDS.
3. SEE DRAWING D-014 FOR "NORTH CONNECTION" CONNECTION DETAILS.



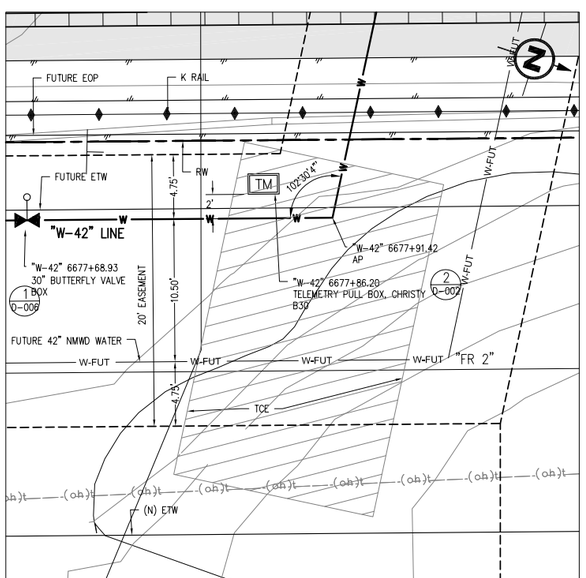
49 PLAN ENLARGEMENT
C-019 N.T.S.



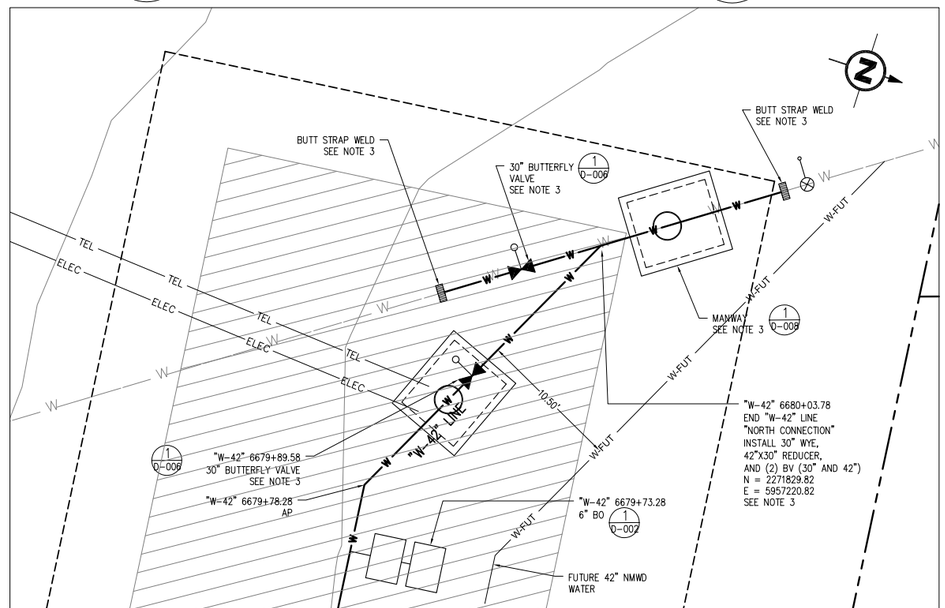
50 PLAN ENLARGEMENT
C-019 N.T.S.



51 PLAN ENLARGEMENT
C-019 N.T.S.



52 PLAN ENLARGEMENT
C-020 N.T.S.



53 PLAN ENLARGEMENT
C-020 N.T.S.

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Land Planning Construction Management Landscape Architecture

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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

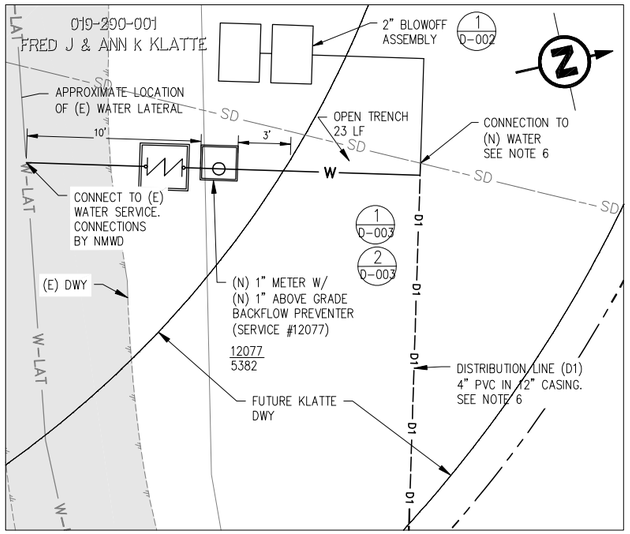
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN – APPURTENANCES, PLAN ENLARGEMENT

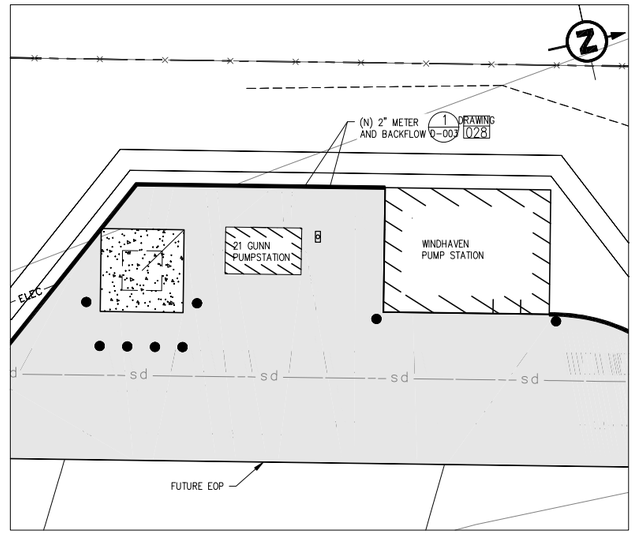
DES	DR	CH	SCALE NTS		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 52 OF 192		SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C-055

Dec 05, 2013 - 10:50am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C055.dwg User: BARCJ

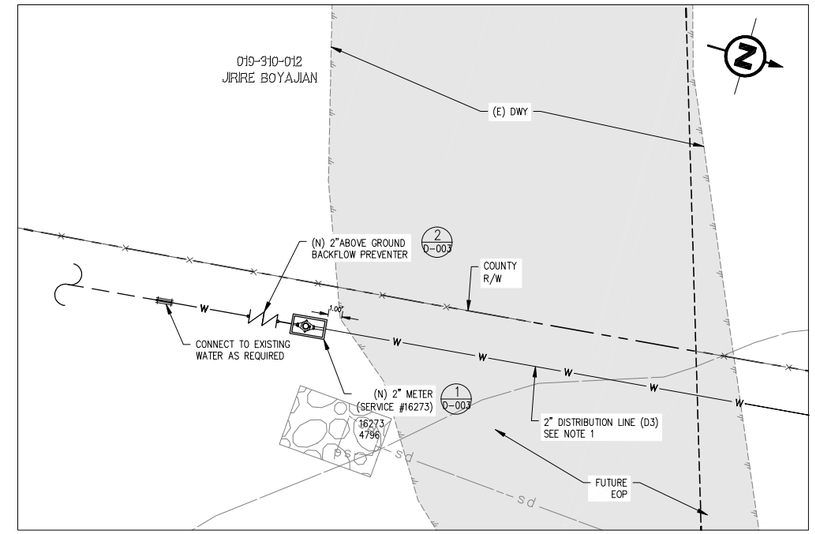
0' 2.5 5 7.5 10
SCALE: 1"=5'-0"



45 C-021 KLATTE -1" METER (SERVICE #12077)
SCALE: 1"= 5'-0"



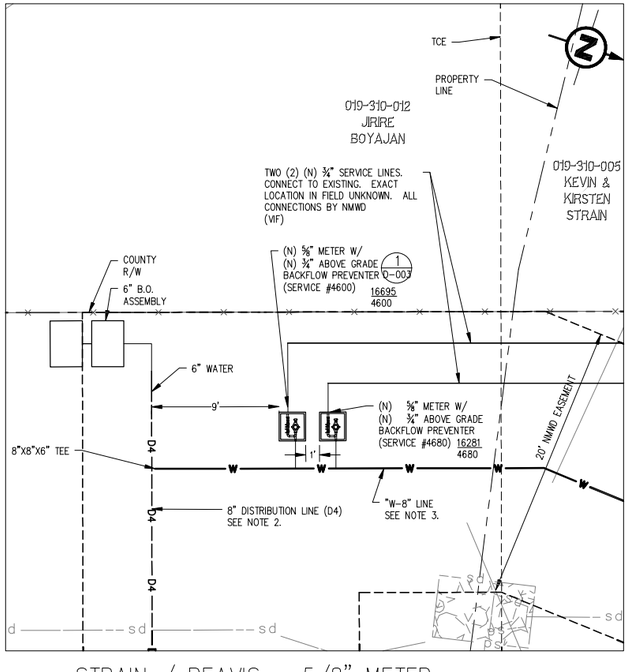
46 C-026 LYNCH - 2.0" METER (SERVICE #16276)
SCALE: 1"= 5'-0"



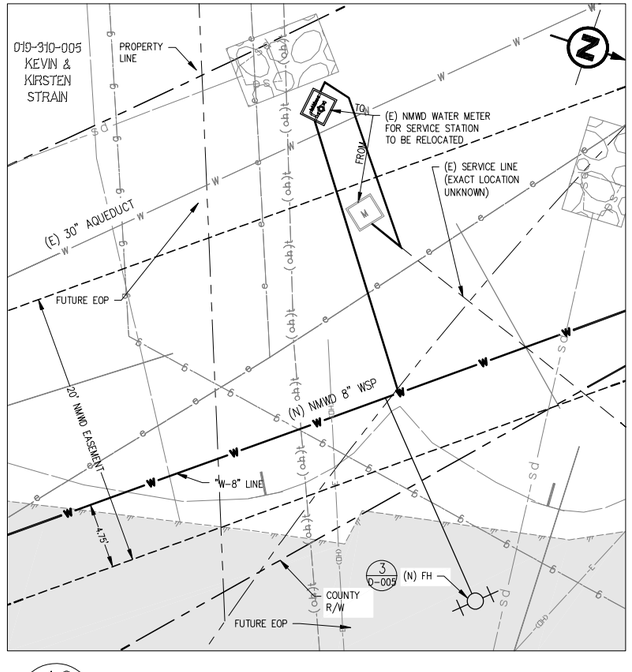
47 C-022 BOYAJIAN - 2" METER (SERVICE #16273)
SCALE: 1"= 5'-0"

NOTES:

1. SEE PLAN AND PROFILE DRAWINGS FOR ADDITIONAL (N) 42" NMWD AQUEDUCT INFORMATION
2. FOR PLAN AND PROFILE LINE OF DISTRIBUTION LINE D3, SEE DRAWING C-03
3. FOR PLAN AND PROFILE OF DISTRIBUTION LINE D4, SEE DRAWING C-024
4. FOR PLAN AND PROFILE OF W-8 LINE, SEE DRAWINGS C-015 AND C-016.
5. DIMENSIONS SHOWN INFORMATIONAL AND FOR REFERENCE ONLY. APPURTENANCES TO BE CONSTRUCTED PER APPLICABLE STANDARDS.
6. FOR PLAN AND PROFILE OF DISTRIBUTION LINE D1, SEE DRAWING C-021



48 C-024 STRAIN / REAVIS - 5/8" METER (SERVICE #16695, #16281)
SCALE: 1"= 5'-0"



49 C-015 METER FOR SERVICE STATION (SERVICE #16277)
SCALE: 1"= 5'-0"

REDUCED SIZE: NOT TO SCALE

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Exp. 12/31/13
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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
PLAN - APPURTENANCES, RELOCATED METERS

DES	DR	CH	SCALE 1"=5'		
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	53 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	C-056

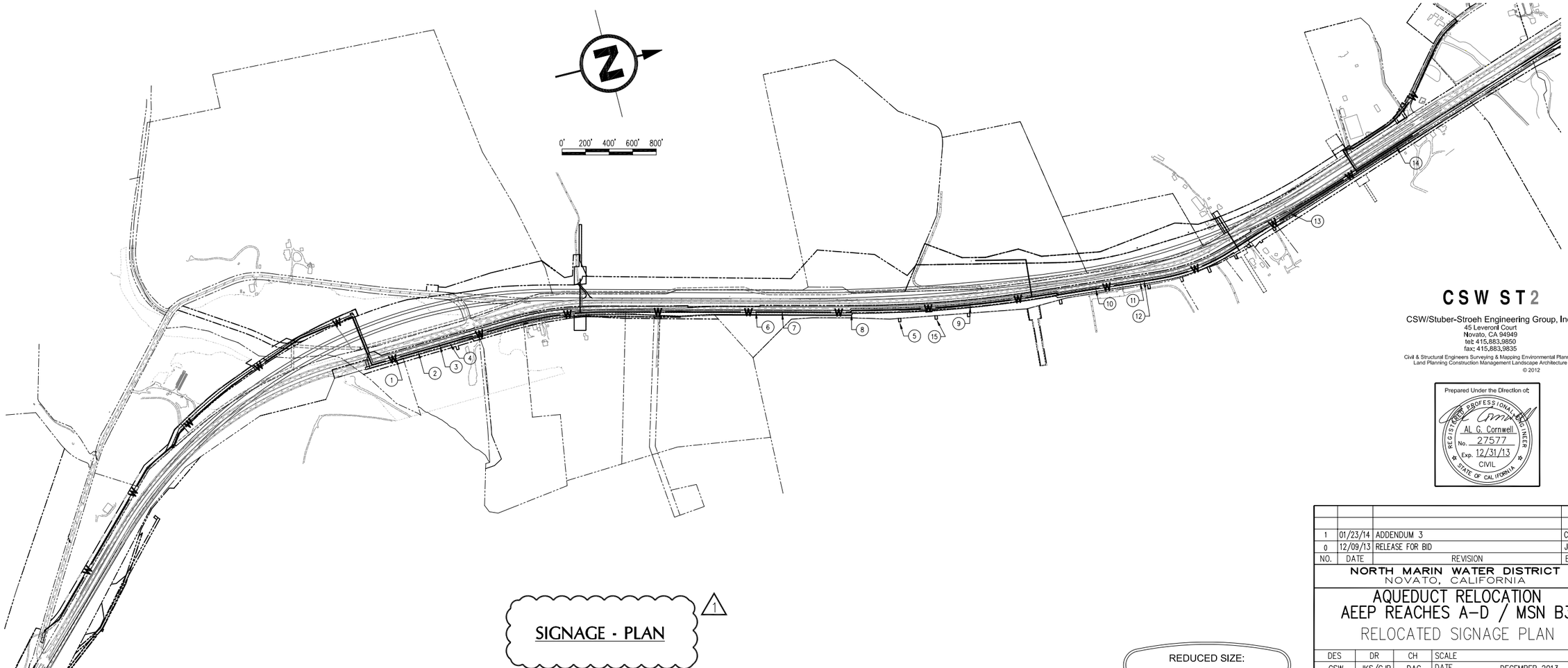
Dec 05, 2013 - 11:26am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C056.dwg User: BARCJ

STATIONARY MOUNTED TRAFFIC SIGNS

SIGN No. (X)	APPROX. STATION	APPROX. OFFSET FROM CENTERLINE (N) PIPE	SIGN MESSAGE	NUMBER OF POSTS
1	6567+86.77	0	SONOMA COUNTY VETERANS MEMORIAL HIGHWAY	2
2	6569+85.49	3.0L	$1000 FINE FOR LITTERING	1
3	6571+77.07	1.80L	CALL BOX AND SIGN	1
4	6572+61.29	4.75R	HIGHWAY SAFTEY	2
5	6611+21.26		HIGHWAY CONSTRUCTION SIGN	2
6	6598+94.85	4.0R	POST WITH SOLAR PANEL AND ELECTRICAL BOX	2
7	6601+17.64	0	CALIFORNIA WELCOME CENTER 19 MILES	2
8	6606+95.91	7.55R	REDWOOD HIGHWAY	2
9	6617+21.26	6.51R	CALL BOX AND SIGN	1
10	6628+03.09	2.48L	LEFT TURN SYMBOL	1
11	6631+84.20	0	PETALUMA BLVD SOUTH 1 MILE	2
12	6643+17.22	0	SPEED LIMIT	1
13	6645+99.41	2.3L	KASTANIA ROAD & GAS SYMBOL SIGN	2
14	6666+85.98	3.3L	PETALUMA NEXT 4 EXITS	2
15	6614+21.26		ROAD WORK AHEAD	2

1

NOTE:
FOR TYPICAL INSTALLATION DETAILS OF NEW TRAFFIC SIGN REFER TO ROADWAY SIGNS (RS#1–RS#4) IN THE CALTRANS STANDARD PLANS, DATED MAY 2006



SIGNAGE - PLAN 1

REDUCED SIZE:
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NO.	DATE	REVISION	BY	APP.
1	01/23/14	ADDENDUM 3	CJB	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
RELOCATED SIGNAGE PLAN

DES	DR	CH	SCALE		
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	54 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	C–057

Jan 23, 2014 – 12:40pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\C057.dwg User: BARCJ

ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
A/C	AIR CONDITIONING
AF	AMPERE FRAME, CKT. BKR. RATING
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AM	AMMETER
ANN	ANNUNCIATOR
AMP	AMPERES, AMPERAGE
APPD	APPROVED
AS	AMMETER SWITCH
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT
CAB	CABINET
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CO	CONDUIT ONLY
COND	CONDUIT
COMPT	COMPARTMENT
COMPR	COMPRESSOR
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DH	DATA HIGHWAY
DISC	DISCONNECT
DISTR	DISTRIBUTION
DPDT	DOUBLE POLE DOUBLE THROW
DWG	DRAWING
E	EMPTY, EXISTING
EF	EXHAUST FAN
ELEV	ELEVATION
EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EP	EXPLOSION PROOF
EQPT	EQUIPMENT
ER	CONDUCTANCE RELAY
ETM	ELAPSED TIME METER
EHU	ELECTRIC HEATING UNIT
EXH	EXHAUST
EXST	EXISTING
FDR	FEEDER
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FUT	FUTURE
FVR	FULL VOLTAGE REVERSING
FVNR	FULL VOLTAGE NON-REVERSING
FWD	FORWARD
GALV	GALVANIZED
GEN	GENERATOR
GND	GROUND
HH	HAND HOLE
HID	HIGH INTENSITY DISCHARGE
HG	MERCURY
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HTR	HEATER
HT TR	HEAT TRACED
HVAC	HEATING, VENTILATING, A/C
HZ	HERTZ - CYCLES PER SECOND
IMC	INTERMEDIATE METAL CONDUIT
INCAND	INCANDESCENT
IND	INDICATION, INDICATING
I/O	INPUT/OUTPUT
INST	INSTANTANEOUS
INSTR	INSTRUMENT
ISC	SHORT CIRCUIT CURRENT
INVT	INVERT
JB	JUNCTION BOX
J BOX	JUNCTION BOX
KVA	KILO VOLT AMPERES
KW	KILOWATTS
KWH	KILOWATT HOUR
KCM	1,000 CIRCULAR MILS
LC	LIGHTING CONTACTOR
LCB	LOCAL CONTROL BOARD
LCP	LOCAL CONTROL PANEL
LOC	LOCAL
LO	LOCKOUT
LOS	LOCKOUT STOP
LS	LEVEL SWITCH
LT	LIGHT
LTG	LIGHTING
LTS	LIGHTS
M	MOTOR CONTACTOR COIL
mA	MILLIAMPS
MAN	MANUAL
MAG	MAGNETIC
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MCB	MAIN CONTROL BOARD
MCP	MOTOR CIRCUIT PROTECTOR
MD	MOTORIZED DAMPER
MH	MANHOLE
MTG	MOUNTING
MIN	MINIMUM, MINUTES
MLO	MAIN LUGS ONLY
MOV	MOTOR OPERATED VALVE
MS	MOTOR STARTER
MSB	MAIN SWITCHBOARD
MMS	MANUAL MOTOR STARTER
MTD	MOUNTED
MTR	MOTOR
MUX	MULTIPLEXING PANEL
N	NEUTRAL
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NO	NUMBER
NOS	NUMBERS
NP	NAMEPLATE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
O	OPEN
OC	ON CENTER
CC	CENTER TO CENTER
OL	OVERLOAD RELAY
OSC	OSCILLATION
P	POLE
PB	PUSH BUTTON
PCM	PROCESS CONTROL MODULE
PCP	PROCESS CONTROL PANEL
PF	POWER FACTOR
PH, ø	PHASE
PL	PILOT LIGHT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PNLBD	PANELBOARD
POS	POSITION
PQM	POWER QUALITY MONITOR
POT	POTENTIOMETER
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
REC	RECEPTACLE
RECPTS	RECEPTACLES
REQ'D	REQUIRED
REV	REVERSE
RGS	RIGID GALVANIZED STEEL
RTU	REMOTE TERMINAL UNIT
RVNR	REDUCED VOLTAGE NON-REVERSING
RVSS	REDUCED VOLTAGE SOLID STATE
SCH	SCHEDULE
SEC	SECONDARY, SECONDS
SECT	SECTION
SS	SELECTOR SWITCH
SEQ	SEQUENCE
SHLD	SHIELDED
SHT	SHEET
SIG	SIGNAL
SP	SPARE
SPDT	SINGLE POLE DOUBLE THROW
SPECS	SPECIFICATIONS
SP HTR	SPACE HEATER
SPST	SINGLE POLE SINGLE THROW
SS	SOLID STATE
ST	SHUNT TRIP
STA	STATION
STD	STANDARD
STL	STEEL
STR	STARTER
SOV	SOLENOID OPERATED VALVE
SW	SWITCH
SYS	SYSTEM
SYM	SYMMETRICAL
TB	TERMINAL BOX
TC	TIME CLOCK
TACH	TACHOMETER
TEMP	TEMPERATURE
TERM	TERMINAL
T'STAT	THERMOSTAT
TR	TIMING RELAY
TD	TIME DELAY
TS	TEMPERATURE SWITCH
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLTAGE, VOLTS
VAR	VAR METER
VFD	VARIABLE FREQUENCY DRIVE
VP	VAPOR PROOF
VS	VOLTMETER SWITCH, VARIABLE SPEED
W	WATTS, WIRE
WHD	WATTHOUR DEMAND METER
WHM	WATTHOUR METER

ELECTRICAL COMPONENTS

	EARTH GROUND
	CHASSIS GROUND
	GROUNDED RECEPTACLE
	FUSE
	HORN
	TRANSFORMER
	SOLENOID
	OVERLOAD RELAY
	CIRCUIT BREAKER
10	MOTOR (NO. DENOTES HORSEPOWER)
X	COIL
	RELAY CONTACT, N.O.
	RELAY CONTACT, N.C.
	SHIELDED CABLE
	DIODE, SURGE SUPPRESSOR
	SURGE SUPPRESSOR
XX	TERMINAL BLOCK
	SEPARABLE CONNECTOR
	POTENTIOMETER

PRESSURE SWITCHES

	OPEN - CLOSES ON RISING PRESSURE
	CLOSED - CLOSES ON FALLING PRESSURE
	OPEN - OPENS ON RISING PRESSURE
	CLOSED - OPENS ON FALLING PRESSURE

LIMIT SWITCHES

	NORMALLY OPEN
	HELD OPEN
	NORMALLY CLOSED
	HELD CLOSED

LEVEL FLOAT SWITCHES

	CLOSES ON RISING LEVEL
	CLOSES ON FALLING LEVEL
	OPENS ON RISING LEVEL
	OPENS ON FALLING LEVEL

TEMPERATURE SWITCHES

	CLOSES ON RISING TEMPERATURE
	CLOSES ON FALLING TEMPERATURE
	OPENS ON RISING TEMPERATURE
	OPENS ON FALLING TEMPERATURE

TIME DELAY CONTACTS

	OFF DELAY TIMER	INST. CLOSE TIME OPEN
		INST. OPEN TIME CLOSE
	ON DELAY TIMER	TIME CLOSE INST. OPEN
		TIME OPEN INST. CLOSE

OPERATORS

	LOCKOUT STOP PUSH BUTTON
	PUSHBUTTON NORMALLY CLOSED
	PUSHBUTTON NORMALLY OPEN
OX	TWO POSITION SELECTOR SWITCH
1 2 3 X00 00X	THREE POSITION SELECTOR SWITCH X DENOTES CLOSED CONTACT IN THAT POSITION
	TOGGLE SWITCH
X	PILOT LIGHT - PUSH TO TEST, X DENOTES COLOR

DRAWING LEGEND

	EXISTING EQUIPMENT, WIRING, DEVICES
	NEW WORK
	DEMOLISH OR REMOVE
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
X	EQUIPMENT OR DEVICE TAG
X	SHEET NOTE TAG
X	TERMINAL FOR PLC CONNECTION
	DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	DOUBLE DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	FLUORESCENT LIGHTING FIXTURE
J	JUNCTION BOX, SIZE PER NEC
	WALL MOUNTED LUMINAIRE
Sa	LIGHT SWITCH. SUBSCRIPT "a" INDICATES LUMINAIRE CONTROLLED. MOUNT AT 48".
	3/4" x 10' CU CLAD GROUND ROD.
	UNDERGROUND CONDUIT OR DUCTBANK.
	INSTRUMENTATION DEVICE
△	MINI-POWER ZONE (COMBINATION TRANSFORMER & PANELBOARD)

SHORT HASH MARK INDICATES HOT WIRE
INDICATES GROUND CONDUCTOR
LONG HASH MARK INDICATES NEUTRAL WIRE
NOTE: NO HASH MARK INDICATES 3/4"C. 2#12+1#12G

GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR VERIFY EXISTING CONDITIONS AND ROUTE CONDUITS WITHOUT DISTURBING EXISTING UTILITIES. IN ADDITION, CONDUIT ROUTING MUST BE APPROVED BY A OWNERS REPRESENTATIVE. FEASIBILITY OF THE LOCATION OF THE EQUIPMENT SHALL BE FIELD VERIFIED. COORDINATE WITH ALL TRADES.
2. VERIFY, LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. REPAIR ALL UTILITIES DAMAGED DURING CONSTRUCTION TO OWNER'S SATISFACTION.
3. MINOR CHANGES IN WORK DUE TO EXISTING CONDITIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.
4. ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND VERIFY EXISTING CONDITIONS BEFORE BIDDING AND SHALL INCLUDE IN HIS BID THE NECESSARY COSTS TO CONSTRUCT THIS PROJECT IN ACCORDANCE WITH THE INTENT OF THE ELECTRICAL DRAWINGS, SPECIFICATIONS, AND ALL APPLICABLE CODES.
5. THE ELECTRICAL INSTALLATION SHALL COMPLY WITH ALL LOCAL, STATE, AND NATIONAL CODES, LAWS, AND ORDINANCES APPLICABLE TO ELECTRICAL WORK.
6. ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES.
7. THE WORD PROVIDE AS USED ON THE DRAWINGS SHALL BE DEFINED AS CONTRACTOR FURNISHED AND INSTALLED.
8. AT LEAST TWO WORKING DAYS PRIOR TO ANY EXCAVATION WORK, THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT AT 1-800-227-2600 FOR LOCATING AND MARKING UTILITIES IN THE AREAS OF THE WORK.
9. ALL UNDERGROUND CONDUITS SHALL BE PVC, SCHEDULE 40 OR BETTER.

NOTES - RACEWAYS

1. CONDUIT ROUTING SHOWN ON DRAWINGS IS DIAGRAMMATIC TO ILLUSTRATE DESIGN INTENT. CONTRACTOR SHALL FIELD DETERMINE THE MOST SUITABLE ROUTING TO FACILITATE INSTALLATION.
2. ALL CONDUIT RUNS SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS AND OFFSETS. GENERALLY, A RUN OF CONDUIT CONTAINING LOW VOLTAGE (600 VOLT MAXIMUM) WIRE SHALL HAVE A MAXIMUM PULLING DISTANCE OF 300 FEET AND CONTAIN NO MORE THAN THREE AND ONE-HALF QUARTER BENDS (315 DEGREES TOTAL), INCLUDING OFFSETS AND BENDS LOCATED IMMEDIATELY ADJACENT TO THE PULL LOCATION. ON RUNS OVER 300 FEET THIS SHALL BE REDUCED TO TWO QUARTER BENDS (180 DEGREES TOTAL).
3. FOR 600 VOLT CABLES, THE MINIMUM RADIUS OF CONDUIT BENDS SHALL BE SIX TIMES THE DIAMETER OF THE CONDUIT. WHERE BENDS OR OFFSETS ARE REQUIRED, THEY SHALL BE MADE WITH SUITABLE CONDUIT BENDING EQUIPMENT. A UNIFORM CIRCULAR CROSS SECTION OF THE CONDUIT SHALL BE MAINTAINED AT BENDS. NO SINGLE BEND SHALL BE GREATER THAN 90 DEGREES.
4. CONDUIT UNIONS SHALL BE INSTALLED AT REMOVABLE DEVICES SUCH THAT THE DEVICES CAN BE EASILY AND INDEPENDENTLY REMOVED.
5. NOT ALL FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM ARE SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL THE NUMBER AND TYPE OF FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM WHICH COMPLIES WITH ALL APPLICABLE CODES AND STANDARDS. THE THREADS OF FITTINGS, INCLUDING COVER SCREWS AND BOLTS, SHALL BE COATED WITH A CONDUCTIVE THREAD LUBRICANT PRIOR TO INSTALLATION TO PROTECT AGAINST CORROSION.
6. ALL CONDUIT FITTINGS AND JUNCTION BOXES SHALL BE INSTALLED SO THAT THEIR COVERS ARE EASILY REMOVED.
7. ALL METALLIC CONDUIT SHALL BE TERMINATED WITH INSULATED BUSHINGS TO PREVENT DAMAGE TO WIRE DURING PULLING OPERATIONS, EXCEPT IN ENCLOSURES WHERE HUB DESIGN IS ADEQUATE TO PREVENT INSULATION DAMAGE. GROUNDING CONNECTIONS SHALL BE PROVIDED ON ALL INSTALLED BUSHINGS FOR GROUND CONTINUITY.
8. CONDUITS SHALL NOT BE SUPPORTED FROM EQUIPMENT OR PIPING. CONDUITS SHALL BE SUPPORTED AT INTERVAL AS REQUIRED BY NEC 344.30, "SECURING AND SUPPORTS" AND TABLE 344.30(B)(2), TO PREVENT NOTICEABLE SAG. NO NOTICEABLE SAG SHALL BE ALLOWED. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SUPPORT REQUIRED TO PREVENT OBJECTIONABLE SAG. IF RIGID ALUMINUM CONDUIT IS USED, THE SUPPORT SYSTEM SHALL BE OF SUITABLE MATERIAL OR CONSTRUCTION TO PREVENT GALVANIC ACTION.
9. LIQUID-TITE FLEXIBLE CONDUIT WITH PVC JACKET SHALL BE USED WHERE VIBRATION IS PRESENT, WHERE FLEXIBILITY IS REQUIRED, AND AT ALL MOTOR CONDUIT BOXES. TERMINATIONS OF FLEXIBLE METALLIC CONDUIT SHALL BE MADE USING LIQUID-TIGHT CONNECTORS WITH INTEGRAL INSULATED BUSHINGS AND POSITIVE GROUND CONNECTIONS. THE MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL BE 24 INCHES FOR INSTRUMENTS AND EQUIPMENT, 18 INCHES FOR MOTORS, AND 48 INCHES FOR LIGHTING.

   RUNS OF ABOVE GROUND CONDUIT FOR ANY SERVICE SHALL NOT BE DIRECTLY SUPPORTED FROM OVERHEAD PIPING.

   ALL ABOVE GROUND, STRAIGHT CONDUIT RUNS OVER 200 FEET LONG SHALL HAVE EXPANSION FITTINGS, WITH PROVISION FOR 4 INCHES TOTAL EXPANSION. BONDING JUMPERS SHALL BE INSTALLED TO ASSURE GROUNDING CONTINUITY.

   THREADED JOINTS FOR CONDUITS SHALL BE MADE UP WITH A METAL OXIDE PAINT SUCH AS "T&B" KOPR-SHIELD, BURNDY PENETROX E OR APPROVED EQUAL.

   PROVIDE ABOVE GRADE CONDUIT SUPPORT AT LEAST EVERY 10 FEET. FASTEN CONDUIT WITHIN 3 FEET OF EACH OUTLET BOX OR FITTING.

   USE CABLE PULLING LUBRICANT, SUCH AS, POLYWATER OR EQUAL FOR CABLE PULLS IN CONDUIT GREATER THAN 10-FEET.

NOTES - LABELS

PROVIDE LAMINATED PLASTIC EQUIPMENT NAMEPLATE LABELS AT ALL FIELD DEVICES, DENOTING EQUIPMENT NAME, VOLTAGE AND FEEDER ORIGIN. PLASTIC NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS. ALL EXISTING PANELBOARD CIRCUIT DIRECTORIES SHALL BE UPDATED DENOTING NEW EQUIPMENT LOADS.

ALL JUNCTION BOX COVERPLATES SHALL BE LABELED WITH CIRCUIT NUMBERS IT CONTAINS.

NAMEPLATES AND TAGS SHALL BE PROVIDED FOR ELECTRICAL EQUIPMENT AND DEVICES, INCLUDING ALL PUSHBUTTONS, SELECTOR SWITCHES, CIRCUIT BREAKERS AND STARTERS. WHERE EQUIPMENT ALSO CAN BE STARTED FROM ANOTHER LOCATION, OR STARTED AUTOMATICALLY, A CAUTION NAMEPLATE SHALL BE PROVIDED.

THE NAMEPLATE DESCRIPTION SHALL SHOW THE EQUIPMENT NUMBER AND SERVICE OF THE CONTROLLED EQUIPMENT. ALL PANELBOARDS SHALL HAVE NAMEPLATES STATING THE APPROPRIATE DESIGNATION, VOLTAGE, CONTINUOUS RATING, AND NUMBER OF PHASES. LIGHTING AND POWER PANELS SHALL BE SUPPLIED WITH COMPLETED CIRCUIT DIRECTORIES.

ALL WIRING SHALL BE IDENTIFIED AT EACH TERMINATION WITH PERMANENT, PRINTED, HEAT-SHRINKABLE PLASTIC SLEEVES OR WITH CLEAR, HEAT-SHRINKABLE SLEEVES THAT COVER ADHESIVE WRAP-ON MARKERS. CONTRACTOR SHALL USE A 'BRADY' OR EQUAL TYPE WIRE MARKER. THE WIRE IDENTIFICATION NUMBER SHALL INCLUDE THE COMPLETE CIRCUIT OR INSTRUMENT NUMBER. THE WIRE IDENTIFICATION SHALL BE THE IDENTIFICATION SHOWN ON THE WIRING DIAGRAM. IF NONE IS SHOWN ON A WIRING DIAGRAM, THE OWNERS REPRESENTATIVE SHALL BE CONSULTED FOR PROPER IDENTIFICATION. ELECTRICAL CABLES SHALL BE LABELED WITH THE CIRCUIT NUMBER AND PHASE DESIGNATION AT EACH END OF CABLE. IF THE CABLE IS IN CONDUIT, THE CONDUIT TAG MAY SERVE AS AN INDICATION OF THE CIRCUIT NUMBER FOR POWER CIRCUITS.

NOTES - WIRING

1. SINGLE OR MULTICONDUCTOR CABLE MAY BE USED FOR CONTROL, INSTRUMENT, COMMUNICATION AND SIGNAL CIRCUITS. SINGLE-CONDUCTOR SHALL #14 AWG MINIMUM; SINGLE PAIRED CABLES SHALL BE #18 AWG MINIMUM; AND MULTICONDUCTOR CABLE SHALL BE #20 AWG MINIMUM. CIRCUITS CLASSIFIED AS CLASS I CIRCUITS BY NEC ARTICLE 725 SHALL BE #18 AWG MINIMUM.
2. • ALL FIELD POWER, CONTROL AND LIGHTING CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS UNLESS OTHERWISE SPECIFIED.
   - BLACK - ALL UNGROUNDED CONTROL CIRCUIT CONDUCTORS OPERATING AT THE SUPPLY VOLTAGE.
   - RED - UNGROUNDED AC CONTROL CIRCUITS OPERATING AT A VOLTAGE LESS THAN THE SUPPLY VOLTAGE.
   - BLUE - UNGROUNDED DC CONTROL CIRCUITS.
   - YELLOW OR ORANGE - UNGROUNDED CONTROL CIRCUITS OR OTHER WIRING.
   - WHITE - GROUNDED AC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR REGARDLESS OF VOLTAGE.
   - GREY - GROUNDED DC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR.
   - ALL INTERIOR CONTROL PANEL WIRING SHALL BE PER UL 508A, LATEST EDITION.
3. NO MORE THAN TWO CONDUCTORS SHALL BE CONNECTED TO ANY ONE TERMINAL ON A TERMINAL STRIP. IF MORE THAN TWO CONDUCTORS MUST BE TERMINATED AT THE SAME POINT, THE TERMINATIONS SHALL BE MADE ON AS MANY TERMINALS AS NECESSARY AND THE TERMINALS INTERCONNECTED WITH JUMPERS. THE JUMPERS SHALL BE PHYSICALLY SEPARATED FROM THE CONDUCTORS.
4. FOR POWER AND LIGHTING CIRCUITS, 600 VOLTS AND BELOW, THE SMALLEST WIRE SHALL BE #12 AWG. EXCEPT THAT #14 AWG SHALL BE USED FOR CONTROLS. WIRES SHALL BE SINGLE CONDUCTOR; COPPER, STRANDED, 600 VOLT HEAT AND MOISTURE RESISTANT THERMOPLASTIC INSULATED TYPE "THHN/THWN", UNLESS OTHERWISE NOTED.

NOTES - GROUNDING

1. ALL INSULATED GROUNDING CONDUCTORS SHALL BE MADE OF SOFT DRAWN, STRANDED COPPER WIRE, UTILIZING GREEN, FIRE RETARDANT INSULATION. ALL EXPOSED GROUNDING CONDUCTORS SHALL BE MINIMUM #6 AWG, RIGIDLY SUPPORTED, AND PROTECTED FROM MECHANICAL INJURY.
2. ALL UN-INSULATED GROUNDING CONDUCTORS (STRANDED OR SOLID) SHALL BE TINNED COPPER.
3. ALL CONNECTIONS SHALL BE COATED WITH A CONDUCTIVE, CORROSION PREVENTIVE COMPOUND BEFORE JOINING.
4. ALL COPPER BUS BARS MUST BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION.

ELECTRICAL DRAWING INDEX

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E-002	SINGLE LINE DIAGRAM
E-003	WINDHAVEN P.S. CONTROL DIAGRAMS
E-004	WINDHAVEN P.S. CONTROL DIAGRAMS
E-005	WINDHAVEN P.S. RTU ENCLOSURE
E-006	WINDHAVEN P.S. MCP ENCLOSURE
E-007	21 GUNN LANE P.S. PEDESTAL DETAILS AND CONTROL DIAGRAM
E-008	MISCELLANEOUS DETAILS
E-009	WINDHAVEN P.S. PLAN AND SECTION
E-010	21 GUNN LANE P.S. PLAN AND SECTION

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NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL
LEGEND, ABBREVIATIONS AND NOTES

DES	DR	CH	SCALE	NO SCALE
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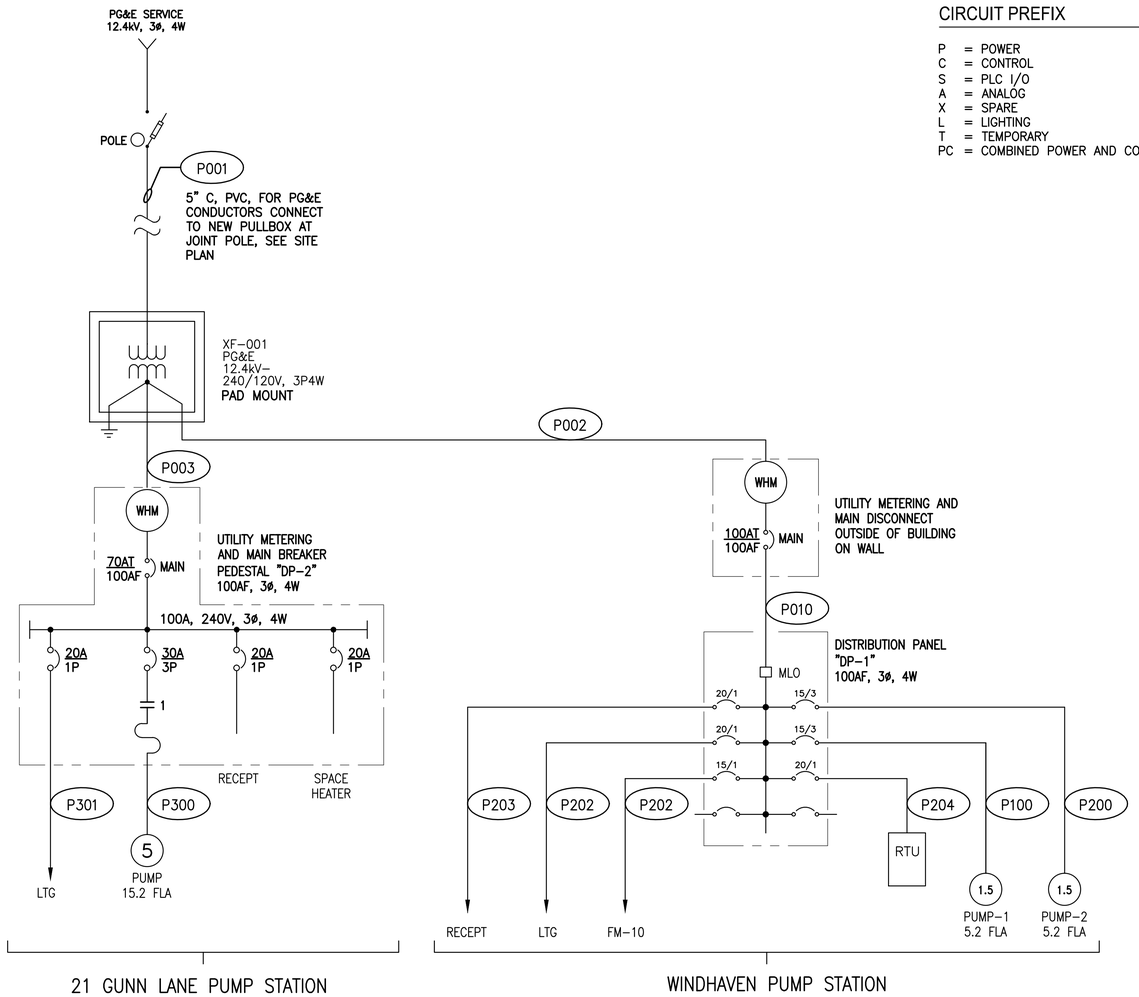

CIRCUIT PREFIX

P = POWER
C = CONTROL
S = PLC I/O
A = ANALOG
X = SPARE
L = LIGHTING
T = TEMPORARY
PC = COMBINED POWER AND CONTROL

CIRCUIT SCHEDULE

CODE	POWER	NEUTRAL	GROUND	CONDUIT	FROM	TO	COMMENTS
P001	--	--	--	5"PVC	UTILITY POLE TOP TRANSFORMER	UTILITY PAD MOUNT TRANSFORMER	BY UTILITY (PG&E) ALUMINUM CONDUCTORS
P002	3#3	1#3	1#8	1½"PVC	UTILITY PAD MOUNT TRANSFORMER	UTILITY METERING WINDHAVEN PUMP STATION	
P003	3#3	1#3	1#8	1½"PVC	UTILITY PAD MOUNT TRANSFORMER	UTILITY METERING 21 GUNN LANE PEDESTAL	
P010	3#3	1#3	1#8	1½"PVC	UTILITY METERING WINDHAVEN PUMP STATION	DISTRIBUTION PANEL DP-1	
P100	3#12	–	1#12	¾"PVC	MOTOR CONTROL PANEL MCP	PUMP NO.1	
P200	3#12	–	1#12	¾"PVC	MOTOR CONTROL PANEL MCP	PUMP NO.2	
P201	1#12	1#12	1#12	½"EMT	DISTRIBUTION PANEL DP-1	FLOW METER FM-10	120VAC POWER
P202	1#12	1#12	1#12	½"EMT	DISTRIBUTION PANEL DP-1	BLDG LIGHTING	
P203	1#12	1#12	1#12	½"EMT	DISTRIBUTION PANEL DP-1	BLDG RECEPTACLE	
P204	1#12	1#12	1#12	½"EMT	DISTRIBUTION PANEL DP-1	RTU POWER	
S205	2/c#16TSP	–	–	¾"PVC	PIT-11	RTU	0-100 PSI
S206	2/c#16TSP	–	–	¾"PVC	PIT-21	RTU	0-200 PSI FIELD POWERED
S207	–	–	–	¾"PVC	FM-10	FLOW ELEMENT FE-10	VENDOR CABLE
S208	2/c#16TSP	–	–	¾"PVC	LIT-10	RTU	
S209	2/c#16TSP	–	–	¾"PVC	RTU	FM-10	
S210	1#14	1#14	–	½"EMT	RTU	BLDG INTRUSION ALARM	
P300	3#10	–	1#12	¾"PVC	21 GUNN LANE PEDESTAL DP-2	PUMP NO.1	
P301	1#12	1#12	1#12	¾"PVC	21 GUNN LANE PEDESTAL	ENCLOSURE LIGHT	
TELECO	–	–	–	2"		CONDUIT ONLY	
S401	–	–	–	2"	PULLBOX	RTU	

NOTE: CONDUIT SIZES SHOWN ARE MINIMUM. SOME CIRCUITS HAVE BEEN COMBINED INTO A SHARED HOMERUN. REFER TO PLAN DRAWINGS FOR SIZES.

1 SINGLE LINE DIAGRAM
ref: scale: none

PANEL NO: DP-2 | VOLTS: 240 | MAIN BUS FRAME: 100A
LOCATION: 21 GUNN LANE P.S. | PHASE: 3 | BRACING (SYMM):
REF. DWG. NO: C-028 | WIRE: 4 | NEUTRAL BUS: 100%

CKT NO	LOAD DESCRIPTION	LOAD IN VA A	LOAD IN VA B	LOAD IN VA C	CB Amp/Pole	A B C	CB Amp/Pole	LOAD IN VA A	LOAD IN VA B	LOAD IN VA C	LOAD DESCRIPTION	CKT NO
1	PUMP NO.1	1,685	\	\	30A		20A/1P	500	\	\	RTU CONTROL POWER	2
3		\	1,685	\			20A/1P	\	180	\	RECEPT - ENCLOSURE	4
5		\	\	1,685	3P		20A/1P	\	\	300	LTG - ENCLOSURE	6
		1,685	1,685	1,685				500	180	300	SUB-TOTAL	

PHASE VA TOTALS: 2,185 | 1,865 | 1,985
TOTAL LINE-UP AMPERES: 5.3 | 4.5 | 4.8
TOTAL KVA: 6.0

FEEDER ENTRY: BOTTOM
FEEDER SIZE: 3#3 & 1#8 GROUND
FEEDER CONDUIT: 1 1/2"PVC

PANEL NO: DP-1 | VOLTS: 240 | MAIN BUS FRAME: 100A
LOCATION: WINDHAVEN P.S. | PHASE: 3 | BRACING (SYMM):
REF. DWG. NO: C-028 | WIRE: 4 | NEUTRAL BUS: 100%

CKT NO	LOAD DESCRIPTION	LOAD IN VA A	LOAD IN VA B	LOAD IN VA C	CB Amp/Pole	A B C	CB Amp/Pole	LOAD IN VA A	LOAD IN VA B	LOAD IN VA C	LOAD DESCRIPTION	CKT NO
1	PUMP NO.1	576.4	\	\	15A		20A/1P	500	\	\	RTU CONTROL POWER	2
3		\	576.4	\			20A/1P	\	180	\	RECEPT - BUILDING	4
5		\	\	576.4	3P		20A/1P	\	\	300	LTG - BUILDING	6
7	PUMP NO.2	576.4	\	\	15A		15A/1P	500	\	\	FLOW METER FM-10 POWER	8
9		\	576.4	\			20A/1P	\	500	\	SPARE	10
11		\	\	576.4	3P		20A/1P	\	\	500	SPARE	12
13	SPACE ONLY		\	\			20A/1P		\	\	SPACE ONLY	14
15	SPACE ONLY	\		\			20A/1P	\		\	SPACE ONLY	16
17	SPACE ONLY	\	\				20A/1P	\	\		SPACE ONLY	18
		1,153	1,153	1,153				1,000	680	800	SUB-TOTAL	

PHASE VA TOTALS: 2,153 | 1,833 | 1,953
TOTAL LINE-UP AMPERES: 5.2 | 4.4 | 4.7
TOTAL KVA: 5.9

FEEDER ENTRY: BOTTOM
FEEDER SIZE: 3#3 & 1#8 GROUND
FEEDER CONDUIT: 1 1/2"PVC

FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP QTY	LAMP TYPE	TOTAL VA	VOLT	LUMENS LAMP	MTG	LUMINAIRE MANUFACTURER
F1	1'x4' Fluorescent fixture, dust and moisture-resistant, gasketed, full body housing,electronic ballast, white enamel finish, pendant mounted, 2-T5 lamps, 120 volt.	2	28T5L	65	120	2418	PENDANT	LITHONIA#VAP-228T5L-WD-VALF-GLR METALUX#VT2-232-LEX-120V-GL-EBT-WL-TH
F2	LED wall fixture, black powder coat finish, round eyelid, rough service, vandal resistant, 2 electronic drivers, polycarbonate lens, surface conduit backbox, 120 volt.	1	LED	50	120	1255	WALL	LITHONIA#VGR2C-50LED-120-DBLB-SF-LPI
F3	LED wall fixture, black power coat finish, round open face, rough service, vandal resistant, 2 electronic drivers, polycarbonate lens, surface conduit backbox, 120 volt.	1	LED	40	120	1320	WALL	LITHONIA#VGR5C-40LED-120-DBLB-SF-LPI
OS1	Wall switch Occupancy Sensor, 1800W@120V, 30 minute time delay, auto-on/auto-off	~	~	~	120	~	WALL	SQUARE D #SLSPWSI277UI HUBBELL #WSZP3PW

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NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL
SINGLE LINE DIAGRAM

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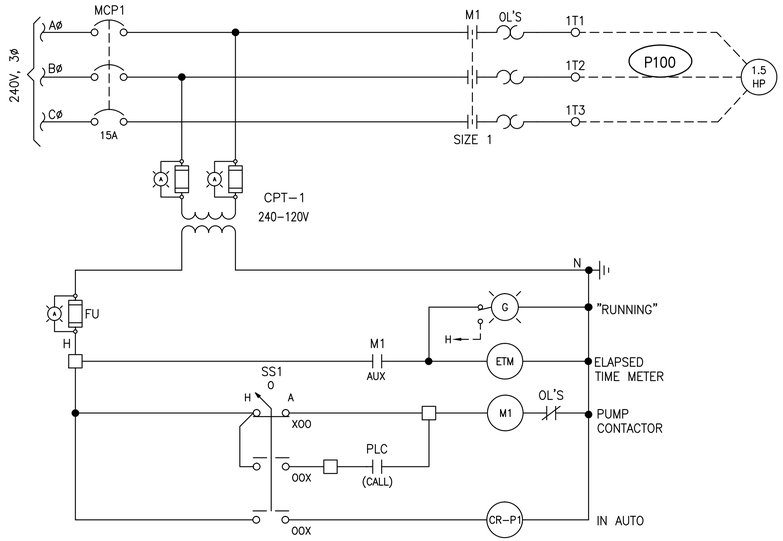

1 PUMP P-1 CONTROL DIAGRAM
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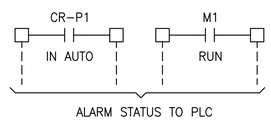

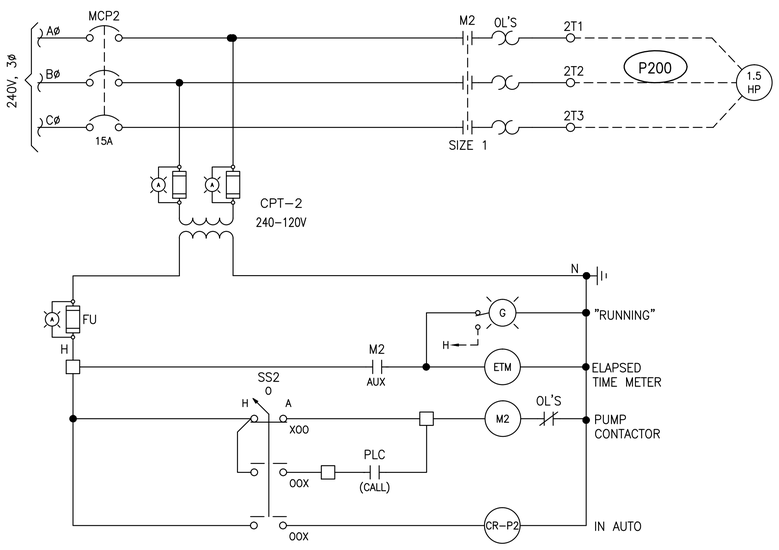

2 PUMP P-2 CONTROL DIAGRAM
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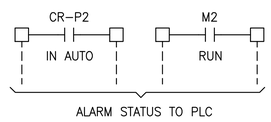

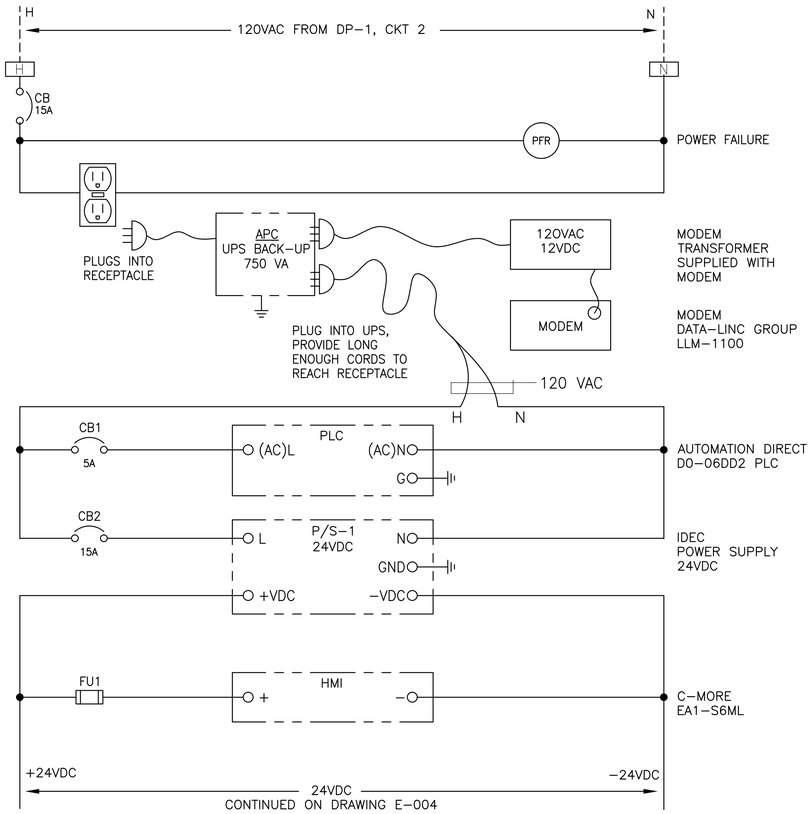

3 RTU POWER DISTRIBUTION WIRING
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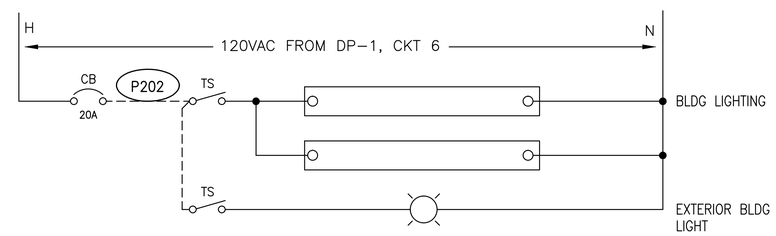

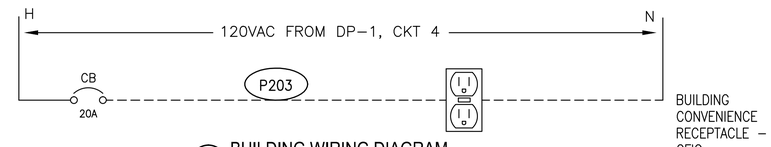

4 BUILDING WIRING DIAGRAM
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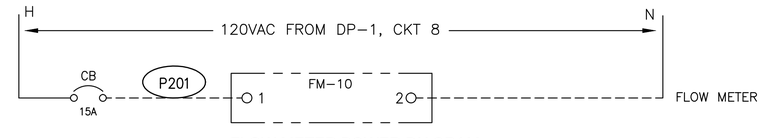

5 FLOW METER POWER DIAGRAM
ref: scale: none

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL
WINDHAVEN P.S. CONTROL DIAGRAMS

DES	DR	CH	SCALE	NO SCALE
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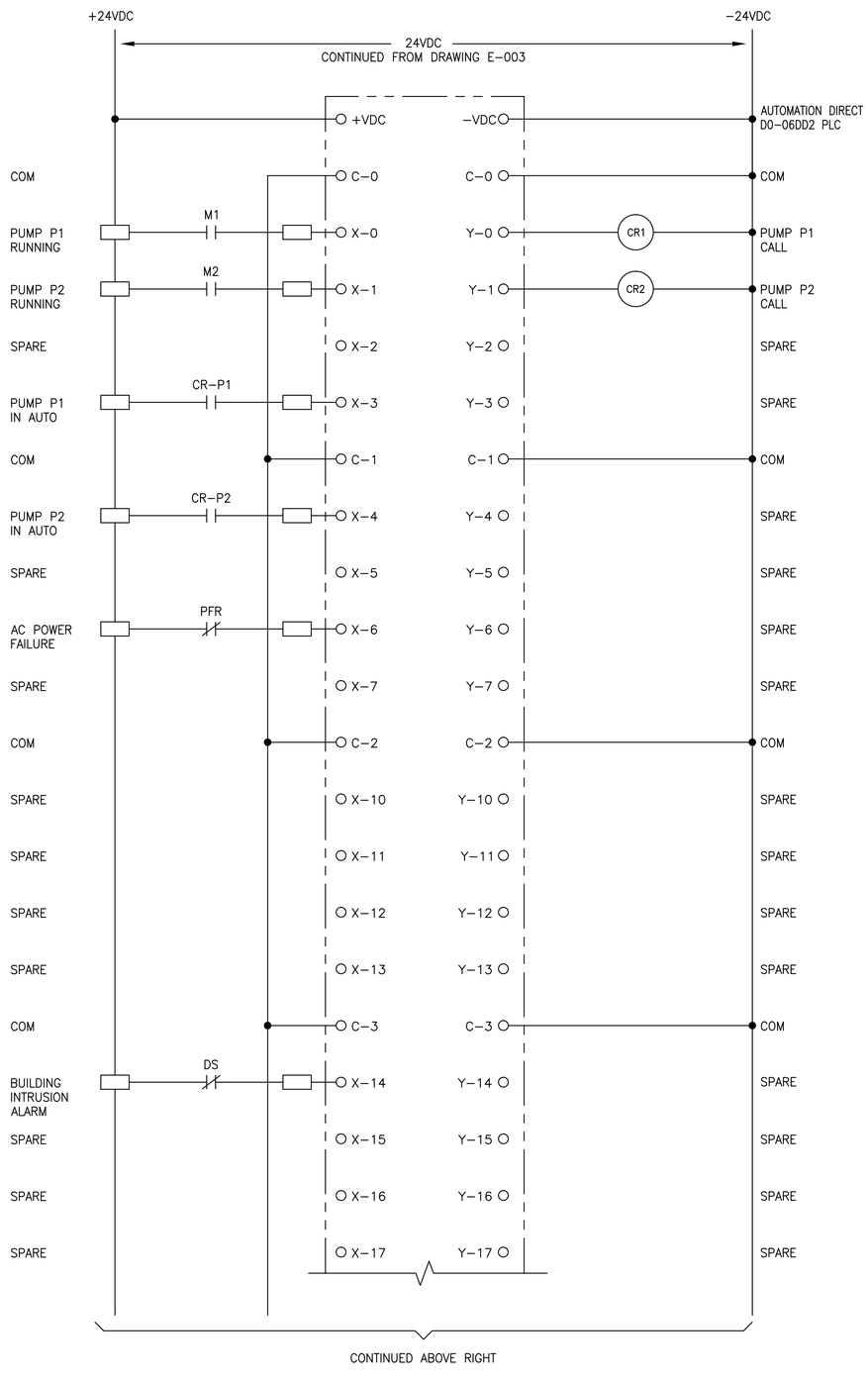

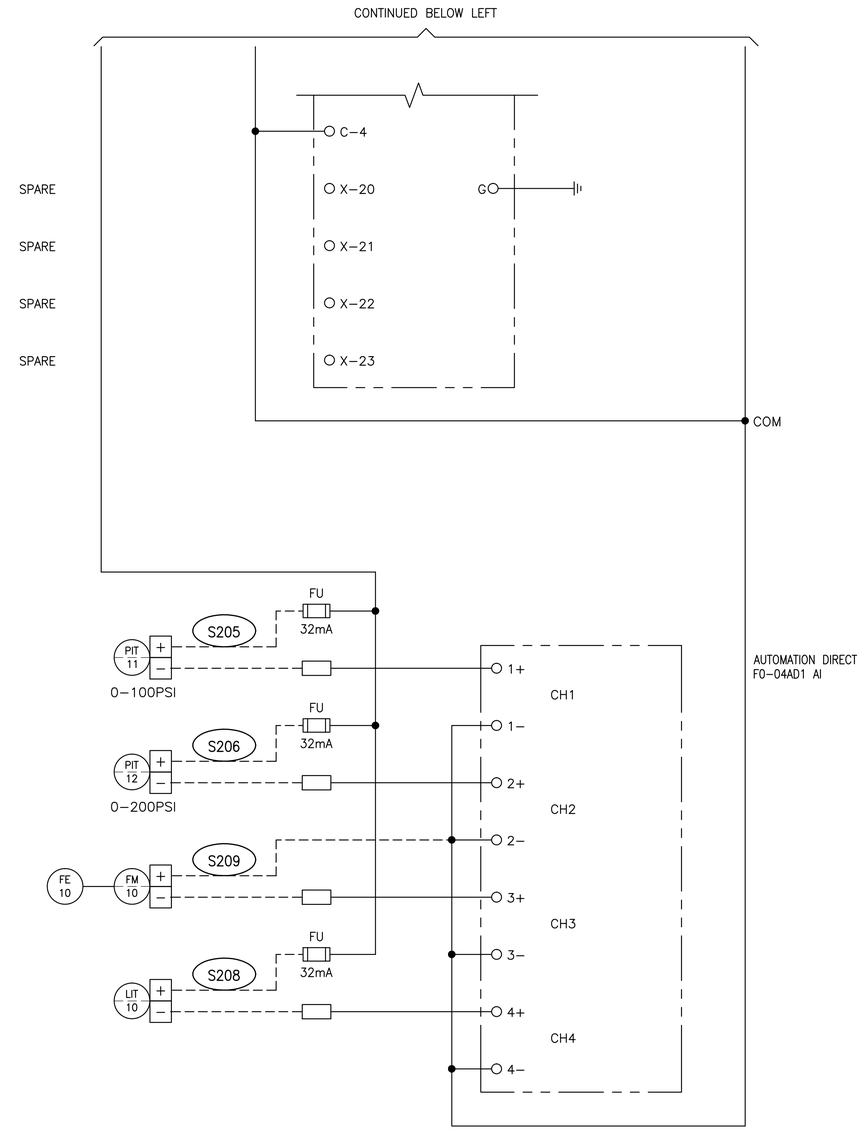

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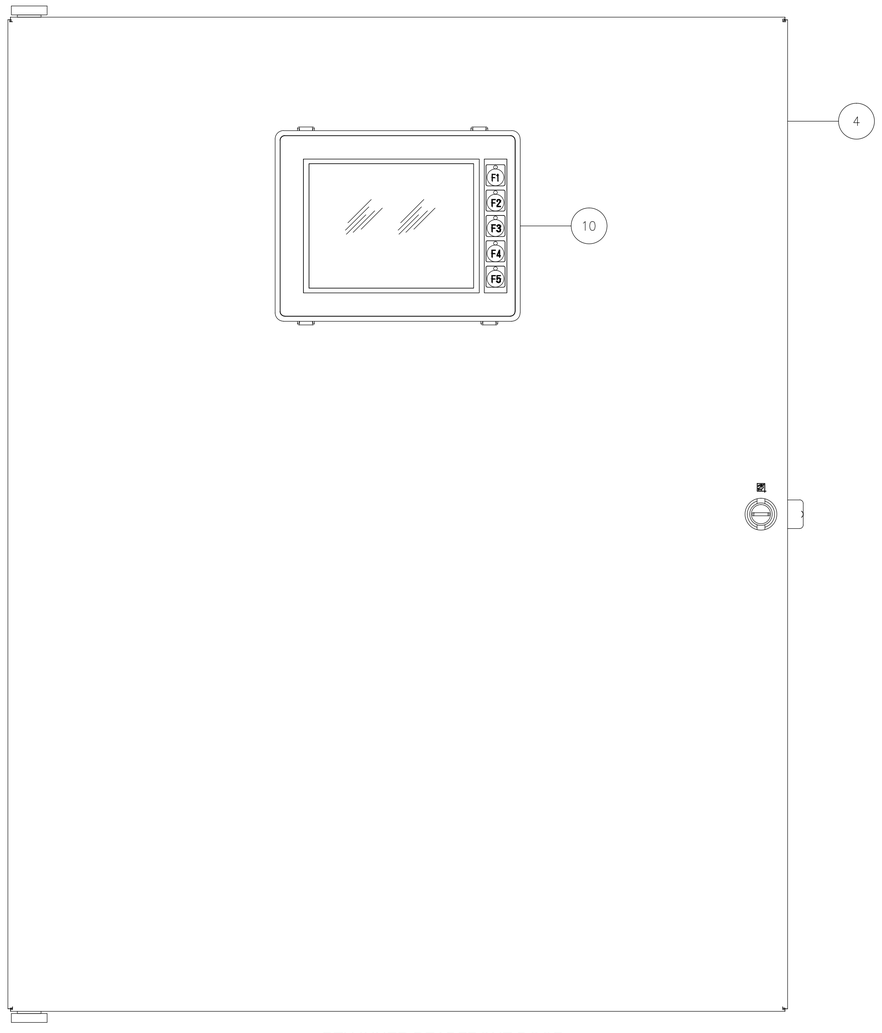

1 RTU INNER DEADFRONT DOOR
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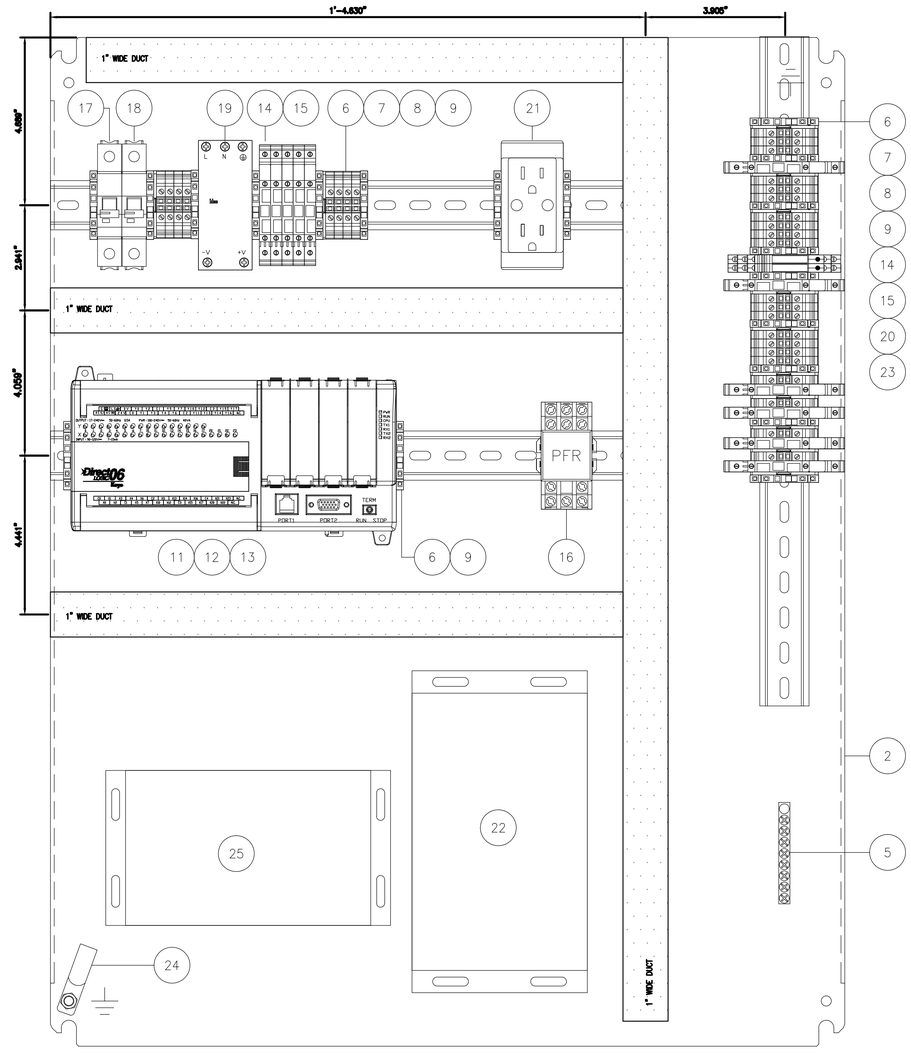

2 RTU BACK PANEL
ref: C-028 scale: none

BILL OF MATERIAL

ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION	ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION	ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION
1	EN	1	HOFFMAN	C-SD302412	ENCLOSURE	11	PLC	1	DIRECT LOGIC	D0-06DD2	CENTRAL PROCESSOR UNIT	21	RECPT	1	PHOENIX	56.00.46.1	120VAC RECEPTACLE
2	EN	1	HOFFMAN	C-P3024	BACK PANEL	12	AI	1	DIRECT LOGIC	F0-04AD1	ANALOG INPUT MODULE	22	MODEM	1	DATA LINC GROUP	LLM-1100	MODEM w/12VDC TRANSFORMER
3	EN	2	HOFFMAN	C-WHPTO	PADLOCKING HANDLE	13	COM	1	DIRECT LOGIC	D0-DCM	DATA COMMUNICATION ADAPTER	23	FU	4	LITTLEFUSE	0217.032HXP	FUSE, 0.32A, 250V
4	EN	1	HOFFMAN	CSP3024	SWING OUT PANEL	14	FU	11	ENTRELEC	M4/8.D2.SF-BE	FUSE HOLDER, 120VAC	24	GLUG	1	T&B	ADR-11	GROUND LUG #14-#1/0
5	GBAR	1	SQD	PK7GTA	GROUND BAR	15	FU	2	BUSSMANN	GMA-100-R	FUSE, 0.1A, 250VAC	25	UPS	1	APC	ES 750 - BE750G	BACKUP POWER SUPPLY
6	DIN	A/R	OMRON	PFP-100N	DIN RAIL	16	PFR	1	IDEC	RR2P-UL-AC120V	CONTROL RELAY, 10A, 120VAC, DPDT, 8-PIN w/SOCKET	26					
7	TB	29	PHOENIX	30.44.10.2	TERMINAL BLOCK, UT4	17	CB15A	1	ABB	S201-K15	CIRCUIT BREAKER, 120VAC, 15A	27					
8	TB	11	PHOENIX	30.47.02.8	TERMINAL END COVER, UT4	18	CB2A	1	ABB	S201-K2	CIRCUIT BREAKER, 120VAC, 2A	28					
9	TB	20	PHOENIX	30.22.27.6	TERMINAL END STOP, UT4	19	P/S	1	IDEC	PS5R-D24	24VDC POWER SUPPLY	29					
10	HMI	1	C-MORE	EA1-S6ML	GRAPHIC DISPLAT PANEL	20	CR1 CR2	2	PHOENIX	29.66.17.1	CONTROL RELAY, SPDT, 24VDC	30					

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JOB NO. 528-12

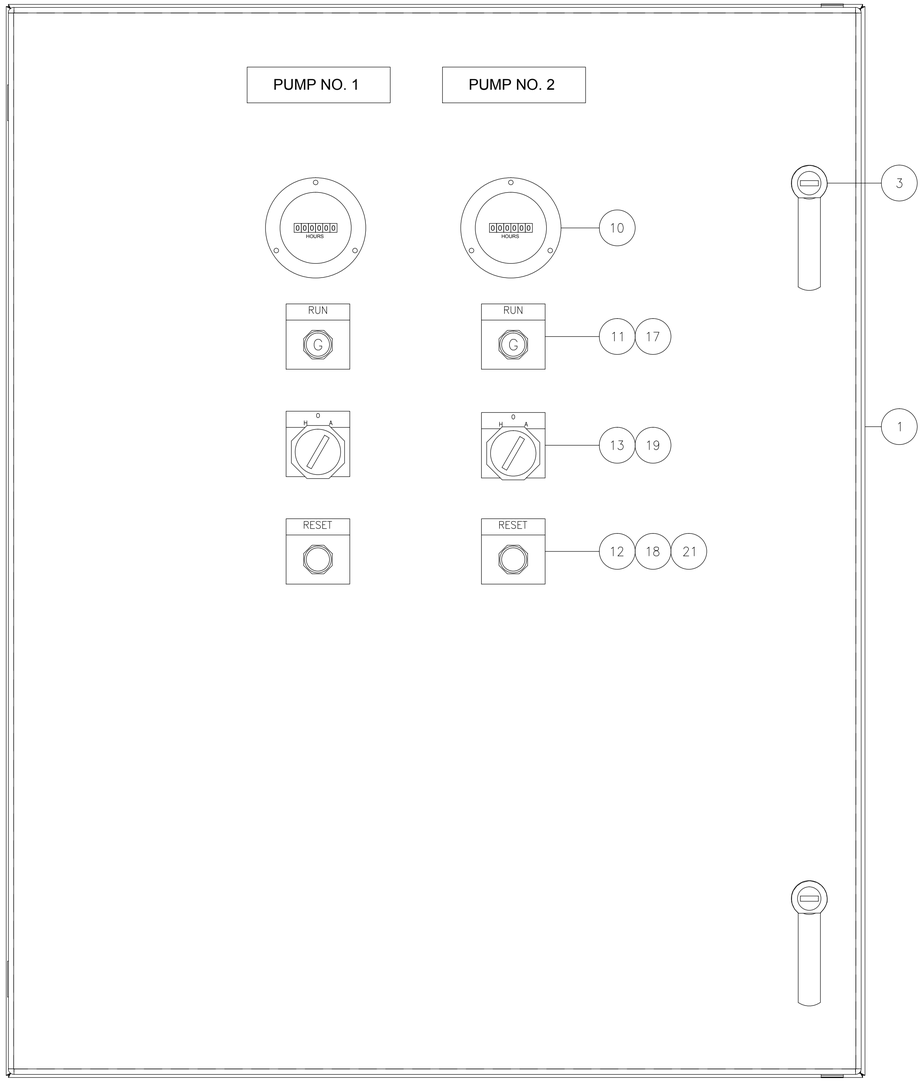
NO.	DATE	REVISION	BY	APP.

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

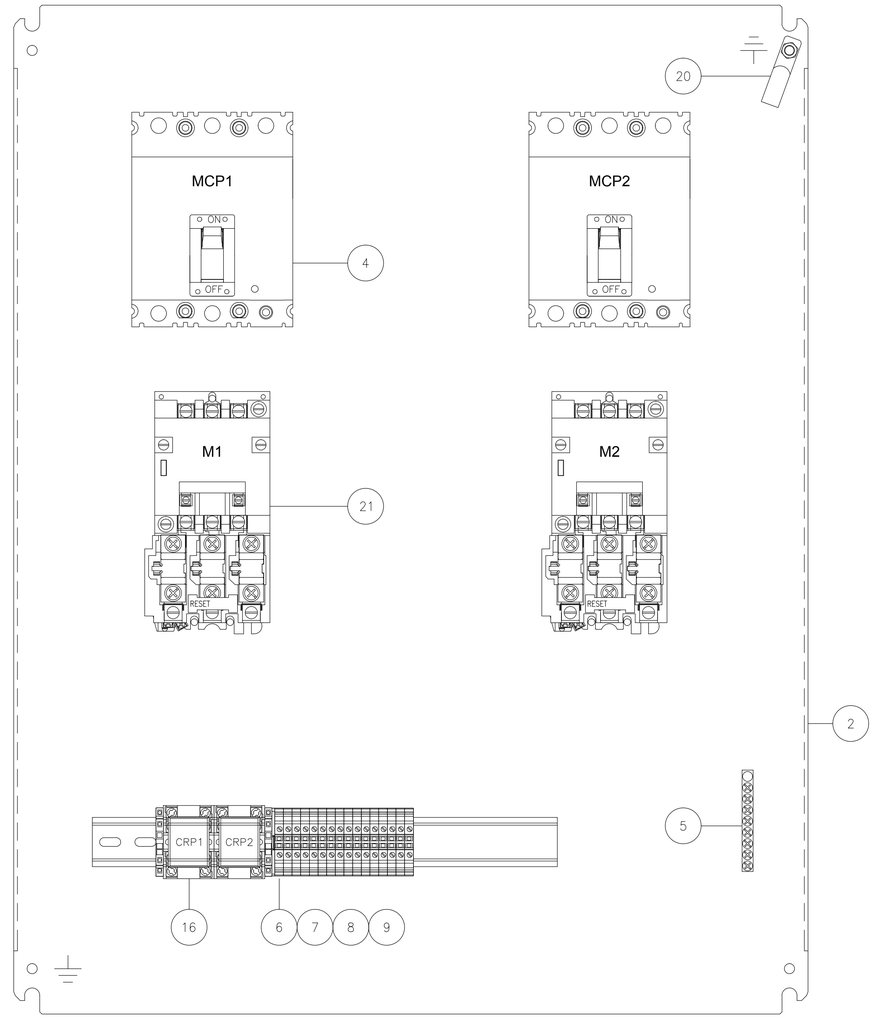
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL
RTU ENCLOSURE

DES	DR	CH	SCALE	NO SCALE
DJP	PM	DMT	DATE	NOVEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	OF SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 E-005

Nov 14, 2013 - 10:07pm L:\DMT\528-12 Windhaven and Gunn Lane\528-12 diagrams 100% E-001 thru E-008.dwg User: PRISCILLA



1 MCP FRONT ELEVATION
ref: C-028 scale: none



2 MCP BACK PANEL
ref: C-028 scale: none

BILL OF MATERIAL

ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION	ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION	ITEM	TAGS	QTY	MFGR	CATALOG NO.	DESCRIPTION
1	EN	1	HOFFMAN	C-SD302412	ENCLOSURE	11	LT	2	AB	800T-PT16R	PILOT LIGHT, P-T-T, 120VAC, GREEN	21	M1 M2	2	SIEMENS	ESPg00	COMBO STARTER, FVNR, NEMA SIZE 1, W/ SS OL
2	EN	1	HOFFMAN	C-P3024	BACK PANEL	12	PB	2	AB	800T-____	PUSH BUTTON SWITCH	22					
3	EN	2	HOFFMAN	C-WHPTO	PADLOCKING HANDLE	13	SS1 SS2	–	AB	800T-J2B	3-POS SELECTOR SWITCH, 120VAC	23					
4	MCP1 MCP2	2	SQD	FAL32015	CIRCUIT BREAKER, 240V, 15A, 3-POLE	14	FU	2	ENTRELEC	–	FUSE HOLDER, 120VAC	24					
5	GBAR	1	SQD	PK7GTA	GROUND BAR	15	FU	2	BUSSMANN	–	FUSE, 120VAC	25					
6	DIN	1	OMRON	PFP-100N	DIN RAIL	16	CR-P1 CR-P2	2	IDEC	RR2P-UL-AC120V	CONTROL RELAY, 10A, 120VAC, DPDT, 8-PIN w/SOCKET	26					
7	TB	A/R	PHOENIX	30.44.10.2	TERMINAL BLOCK, UT4	17	LT	2	AB	800T-X540	LEGEND PLATE 'RUN'	27					
8	TB	A/R	PHOENIX	30.47.02.8	TERMINAL END COVER, UT4	18	PB	2	AB	800T-X540	LEGEND PLATE 'RESET'	28					
9	TB	2	PHOENIX	30.22.27.6	TERMINAL END STOP, UT4	19	SS1 SS2	2	AB	800T-X511	LEGEND PLATE 'HAND-OFF-AUTO'	29					
10	ETM1 ETM2	2	REDINGTON	722-0004	ELASPED TIME METER	20	GLUG	1	T&B	ADR-11	GROUND LUG, #14-#1/0	30					

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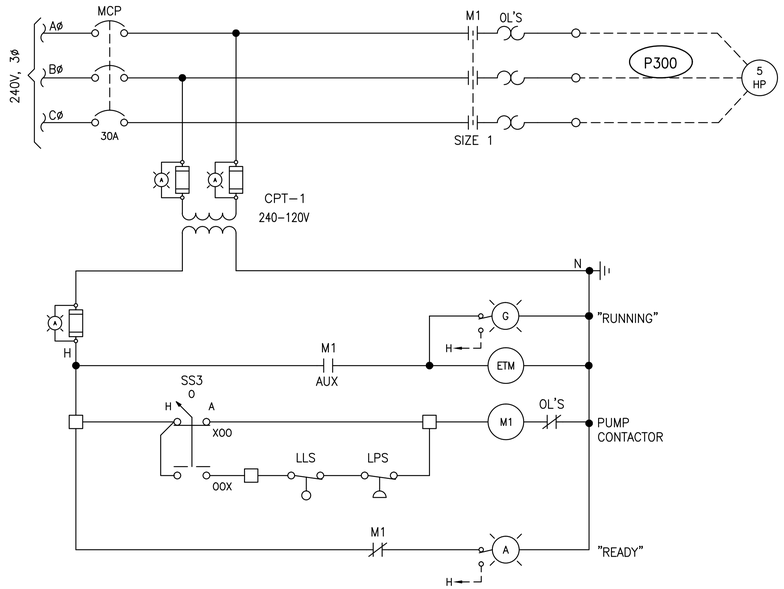
NO.	DATE	REVISION	BY	APP.

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL
WINDHAVEN P.S. MCP ENCLOSURE

DES	DR	CH	SCALE	NO SCALE
DJP	PM	DMT	DATE	NOVEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	OF SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 E-006

Nov 14, 2013 - 10:07pm L:\DMT\528-12 Windhaven and Gunn Lane\528-12 diagrams 100% E-001 thru E-008.dwg User: PRISCILLA



1 PUMP CONTROL DIAGRAM
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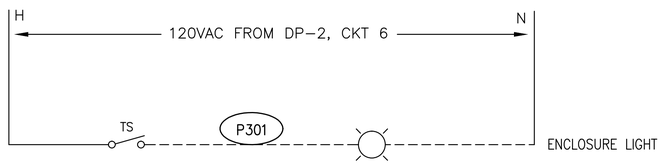

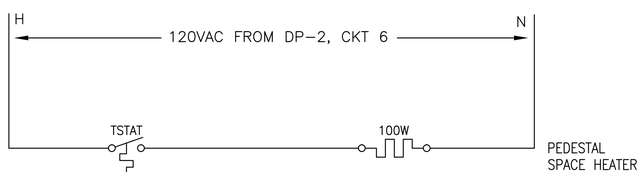

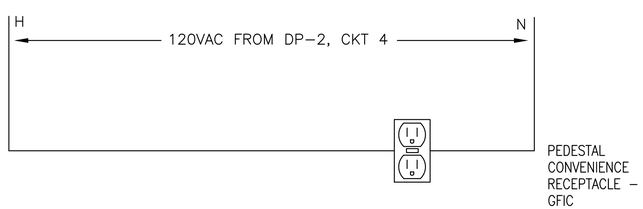

2 AUX WIRING DIAGRAMS
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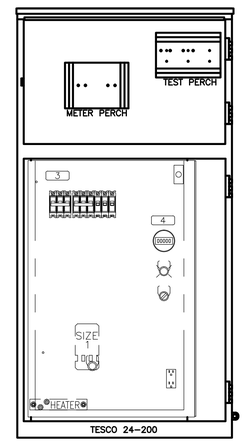
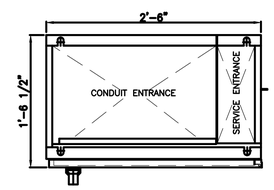
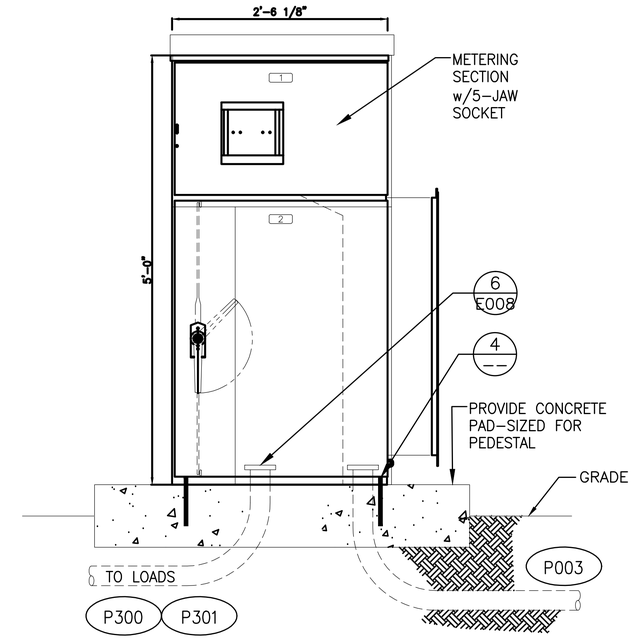


INNER DEADFRONT DOORS
(SHOWN WITH OUTER DOORS REMOVED)

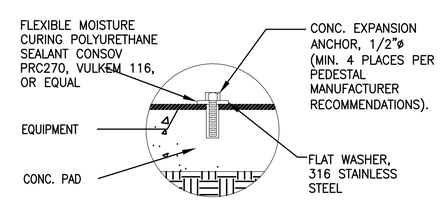


PANEL BASE PLAN



PANEL FRONT ELEVATION

3 DISTRIBUTION PANEL DP-2 PEDESTAL DETAIL
ref: scale: none



4 CONTROL PEDESTAL EQUIPMENT ANCHORING
ref: scale: none

ENCLOSURE CONSTRUCTION NOTES

1. EXTERIOR STAINLESS STEEL AND INTERIOR 14 GA. COLD ROLLED STEEL ELECTRICALLY WELDED AND REINFORCED WHERE REQUIRED.
2. CONSTRUCTION WILL BE NEMA 3RX.
3. ALL NUTS, BOLTS, SCREWS AND HINGES WILL BE STAINLESS STEEL.
4. NUTS, BOLTS & SCREWS WILL NOT BE VISIBLE FROM OUTSIDE OF ENCLOSURE.
5. PLASTIC NAMEPLATES WILL BE PROVIDED AS REQUIRED.
6. CONTROL WIRING WILL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS.
7. A PLASTIC COVERED WIRING DIAGRAM WILL BE ATTACHED TO THE INSIDE OF THE FRONT DOOR.
8. ENCLOSURE WILL BE FACTORY WIRED AND CONFORM TO REQUIRED NEMA STANDARDS.
9. COLOR TO BE: RANCH GREEN
10. COATING SYSTEM SHALL BE TESCO'S POLY-PORC COATING SYSTEM.

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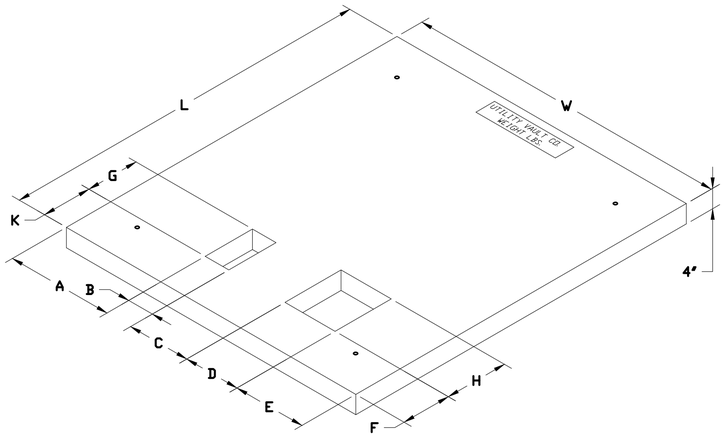
NO.	DATE	REVISION	BY	APP

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
ELECTRICAL - 21 GUNN LANE P.S.
PEDESTAL DETAILS AND CONTROL DIAGRAM

DES	DR	CH	SCALE	NO SCALE
DJP	PM	DMT	DATE	NOVEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	OF SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 E-007

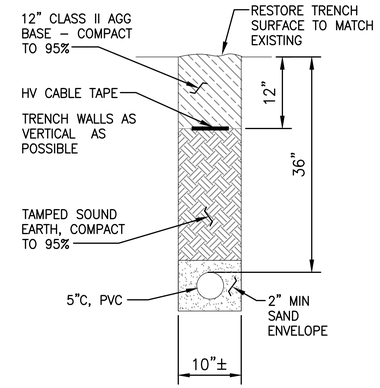
Nov 14, 2013 - 10:07pm L:\DMT\528-12 Windhaven and Gunn Lane\528-12 diagrams 100% E-001 thru E-008.dwg User: PRISCILLA



STYLE	KVA SIZE	LBS	A	B	C	D	E	F	G	H	K	L	W	CODE No.
II D And II E	75	2,375	17"	16"	15"	19"	13"	10"	8"	17"	14"	61"	80"	04–0291
	112.5													
	150													
	225													
II B And II F	225	3,100	23"	8"	19"	17"	13"	15"	16"	19"	15"	78"	80"	04–3538
	300	3,100	23"				13"					78"	80"	04–3538
	500	4,895	29"				23"					100"	96"	04–0242
	750	5,630	32"				22"					112"	98"	04–0243
	1,000	6,390	36"				26"					117"	106"	04–0244

XF001
NEW XFMR

1 PG&E THREE PHASE TRANSFORMER PAD DETAIL
ref: scale: none



2 PRIMARY SERVICE TRENCH DETAILS
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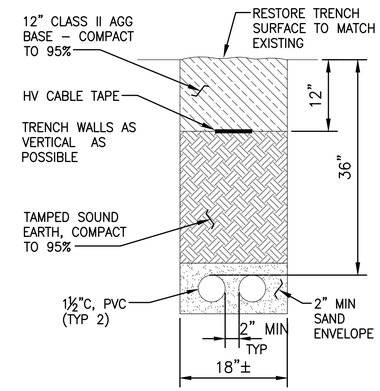

3 SECONDARY SERVICE TRENCH DETAILS
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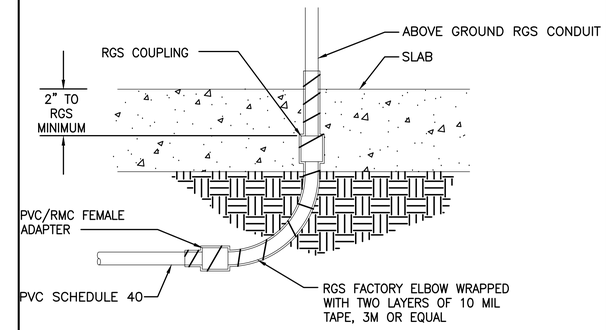
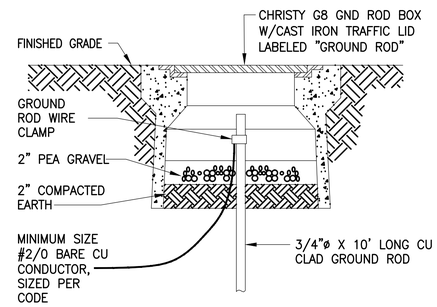
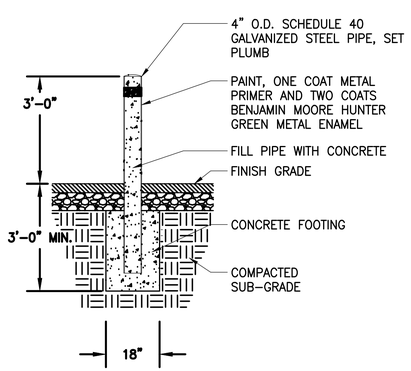


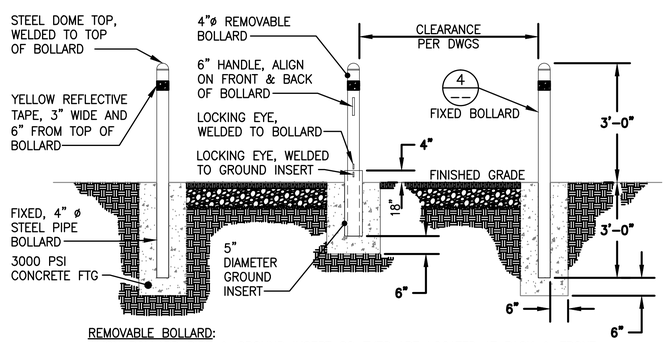
6 CONDUIT STUBUP IN EXPOSED LOCATIONS TYPICAL FOR INDOORS AND OUTDOORS
ref: scale: none



7 GROUND ROD BOX
ref: scale: none



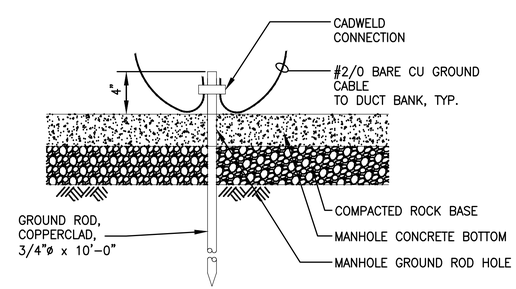
4 STEEL PIPE BOLLARD (FIXED)
ref: E-8 scale: none



REMOVABLE BOLLARD:
ALIGN BOLLARD PIPE & GROUND INSERT SO EYES ARE LOCATED AT BACK & FRONT OF BOLLARD, NOT STICKING OUT INTO TRAVEL WAY.

ALL METAL SHALL BE GALVANIZED PAINT, ONE COAT METAL PRIMER AND TWO COATS BENJAMIN MOORE HUNTER GREEN METAL ENAMEL.

5 STEEL PIPE BOLLARD (REMOVABLE)
ref: E-8 scale: none



8 GROUND ROD DETAIL
ref: scale: none

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JOB NO. 528–12

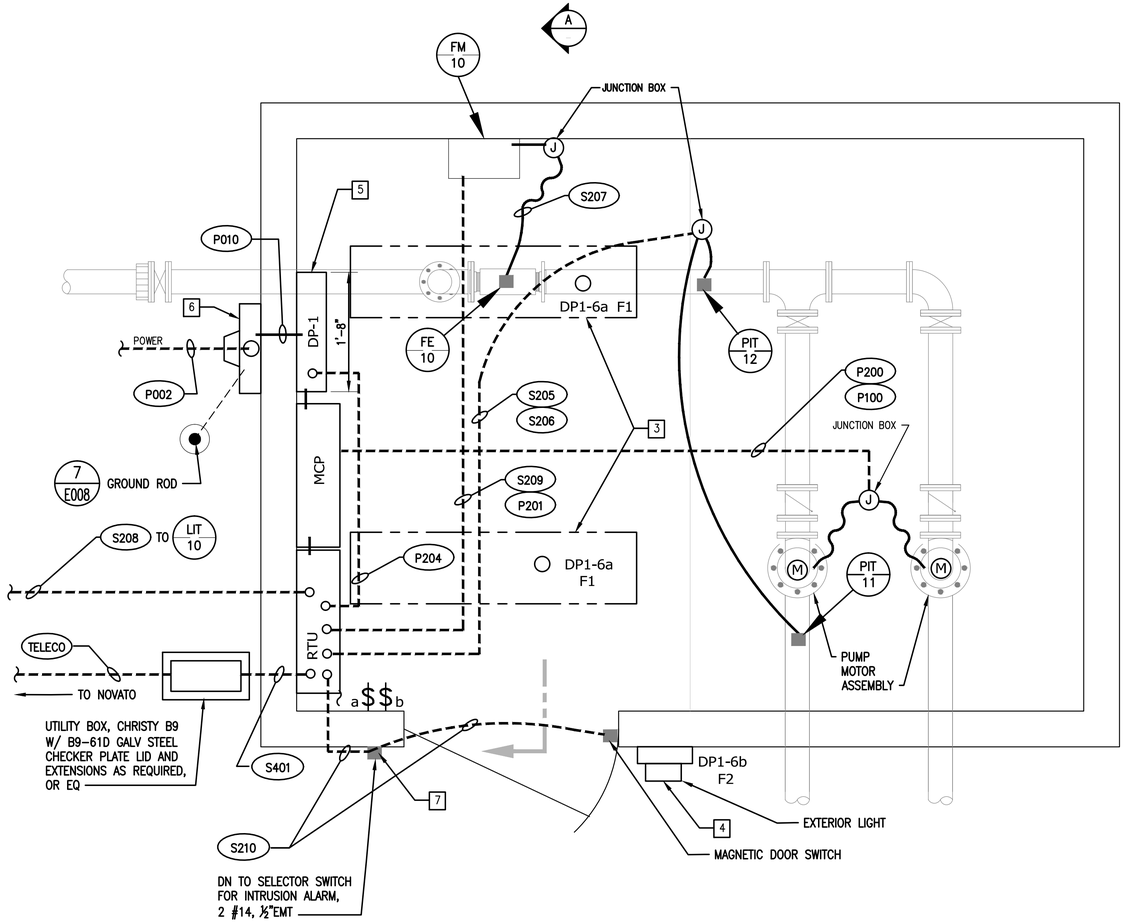
NO.	DATE	REVISION	BY	APP.

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

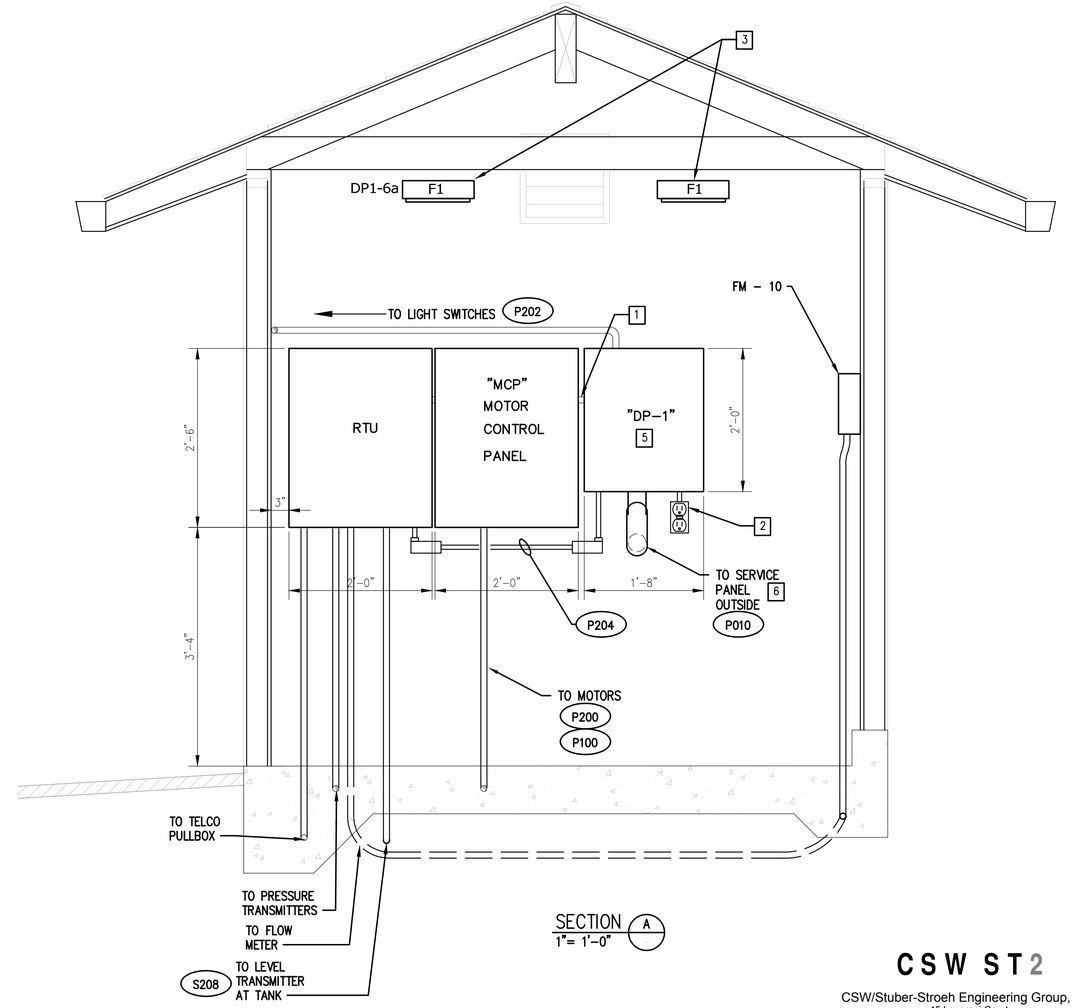
AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
ELECTRICAL
MISCELLANEOUS DETAILS

DES	DR	CH	SCALE	NO SCALE
DJP	PM	DMT	DATE	NOVEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	OF SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 E–008

Nov 14, 2013 – 10:07pm L:\DMT\528–12 Windhoven and Gunn Lane\528–12 diagrams 100% E–001 thru E–008.dwg User: PRISCILLA



1 ELECTRICAL PLAN
ref: scale: 1" = 1'-0"



SECTION A
1" = 1'-0"

NOTES:

1. SEE SHEET C-027 FOR MECHANICAL EQUIPMENT CALLOUT LABELS.

KEYED NOTES:

1. PROVIDE CONDUIT P204 BETWEEN "DP-1" AND "MCP".
2. PROVIDE 120VAC, GFCI, CONVENIENCE RECEPTACLE BELOW "DP-1".
3. PROVIDE NEW LIGHT FIXTURES - "F1".
4. PROVIDE NEW LIGHT FIXTURE - "F2".
5. PROVIDE A NEW 100A DISTRIBUTION PANEL "DP-1" 100A, 3P4W, 18 CIRCUIT, WITH NEUTRAL AND GROUND BUSES - EATON POW-R-LINE2a, OR APPROVED EQUAL.
6. PROVIDE A NEW METER MAIN PANEL 240V, WITH 100AT/100AF MAIN CIRCUIT BREAKER, 3P4W - B-LINE #U1M1R7, OR APPROVED EQUAL.
7. DOOR INTRUSION ALARM SEQUENCE OF OPERATION

   WHEN DOOR SWITCH MAGNETIC FIELD IS BROKEN, THERE IS A ONE MINUTE TIME DELAY BEFORE PLC SENDS A SIGNAL TO THE ANNUNCIATOR FOR ALERT. NMWD PERSONNEL MAY OVERRIDE THE ALERT BY OPERATING THE UNLABELED TWO POSITION SELECTOR SWITCH MOUNTED ON THE WALL BY THE DOOR AT ±60" AFF.

   WHEN NMWD PERSONNEL ARE VACATING THE PREMISES, THE SELECTOR SWITCH WILL BE PLACED INTO THE ENABLE POSITION. THERE WILL BE A ONE MINUTE TIME DELAY BEFORE THE INTRUSION ALARM SYSTEM IS REACTIVATED.

   IF AFTER 8 HOURS THE SELECTOR SWITCH IS NOT ENABLED, THE PLC WILL SEND A SIGNAL TO THE ANNUNCIATOR FOR ALARM TO NMWD IN NOVATO.

   CONTRACTOR TO DEVELOP AND INSTALL REQUIRED CONTROL SCHEME.

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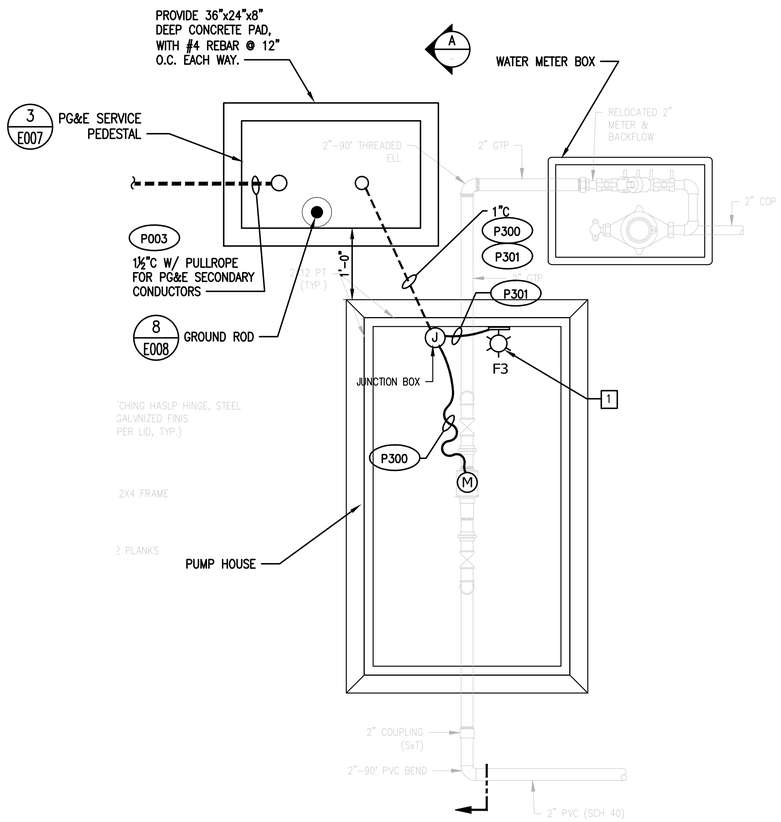
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
WINDHAVEN PUMP STATION DETAIL
ELECTRICAL - CONTROL PANELS

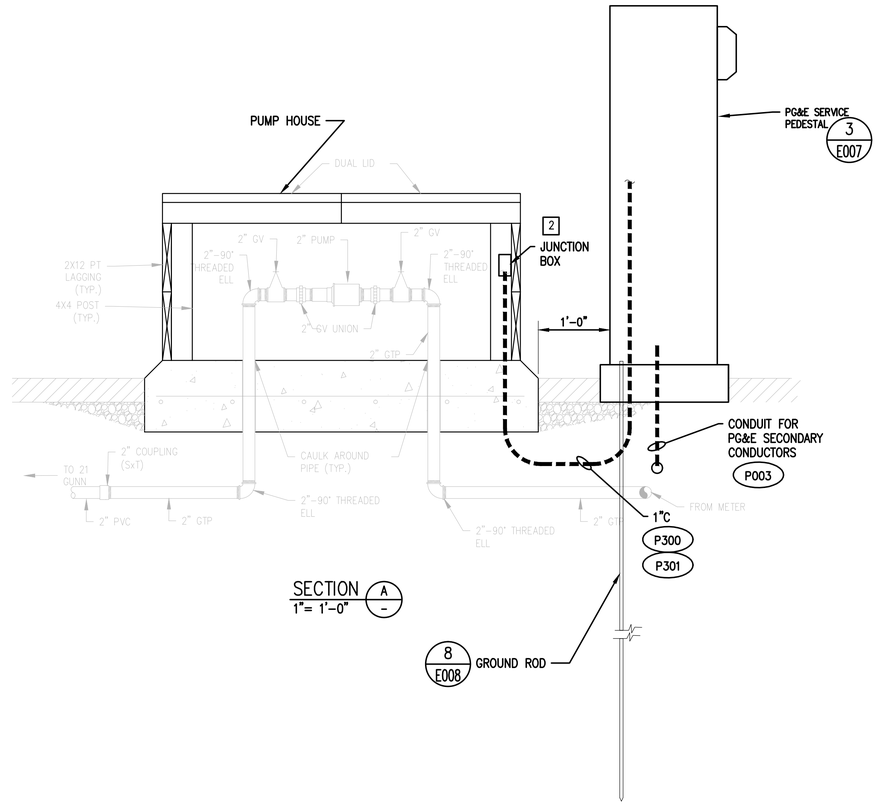
DES	DR	CH	SCALE	AS SHOWN
DJP	PM	DMT	DATE	NOVEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	OF SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 E-009

Dec 03, 2013 - 9:54pm L:\DMT\528-12 Windhaven and Gunn Lane\528-12 100% E-009 and E-010.DWG User: PRISCILLA



1 ELECTRICAL PLAN

ref: scale: 1" = 1'-0"



SECTION A / - 1"= 1'-0"

NOTES:

1. SEE SHEET C-029 FOR MECHANICAL EQUIPMENT CALLOUT LABELS.

KEYED NOTES:

1. PROVIDE NEW LIGHT FIXTURE – "F3".
2. PROVIDE JUNCTION BOX, NEMA 4, WEATHERPROOF, 6" x 6" MINIMUM.

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NO.	DATE	REVISION	BY	APP.

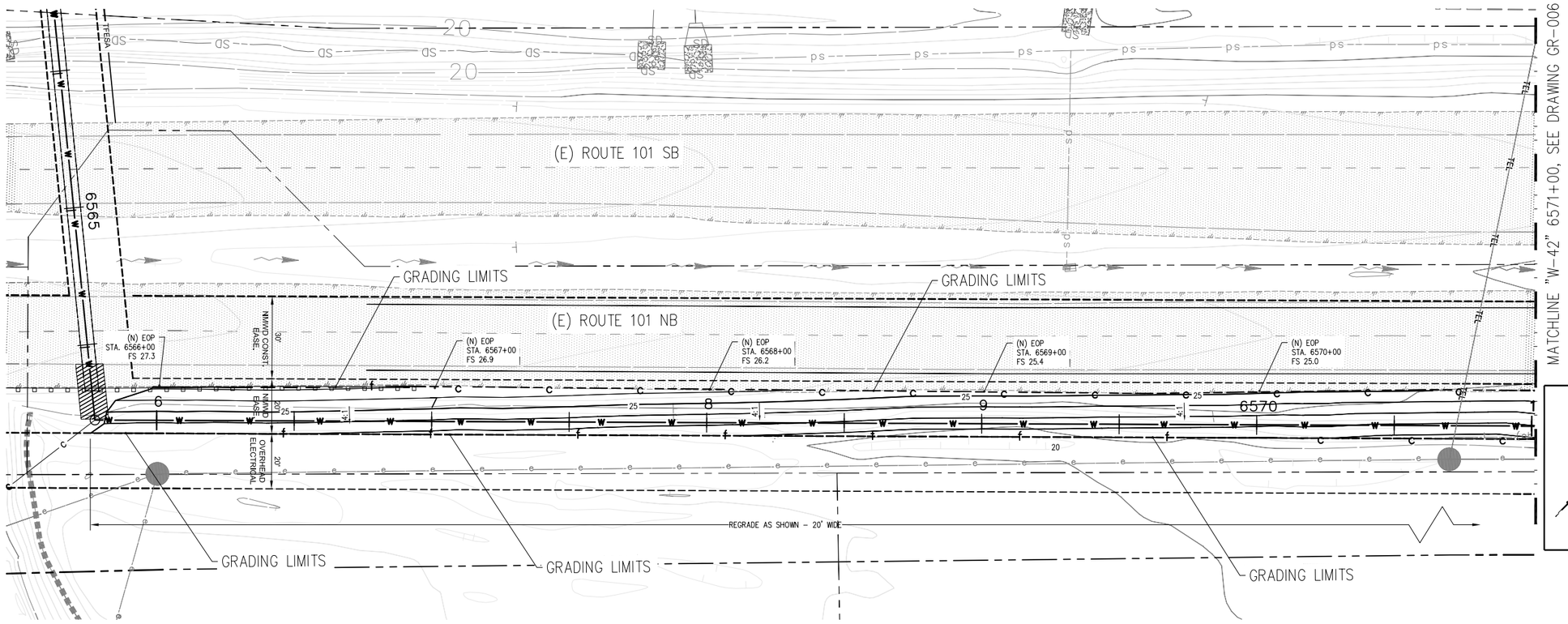
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
21 GUNN LANE PUMP STATION DETAIL
ELECTRICAL – CONTROL PANELS

DES	DR	CH	SCALE	AS SHOWN	
DJP	PM	DMT	DATE	NOVEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	OF	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	E-010

Nov 14, 2013 – 10:08pm L:\DMT\528-12 Windhaven and Gunn Lane\528-12 100% E-009 and E-010.DWG User: PRISCILLA

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

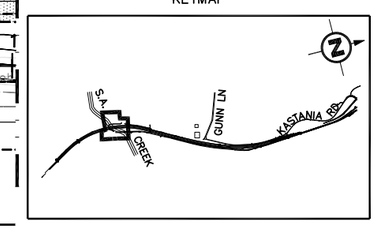


PLAN
SCALE: 1"= 20'-0"

NOTES:

1. SEE TYPICAL SECTIONS FOR MORE INFORMATION, DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

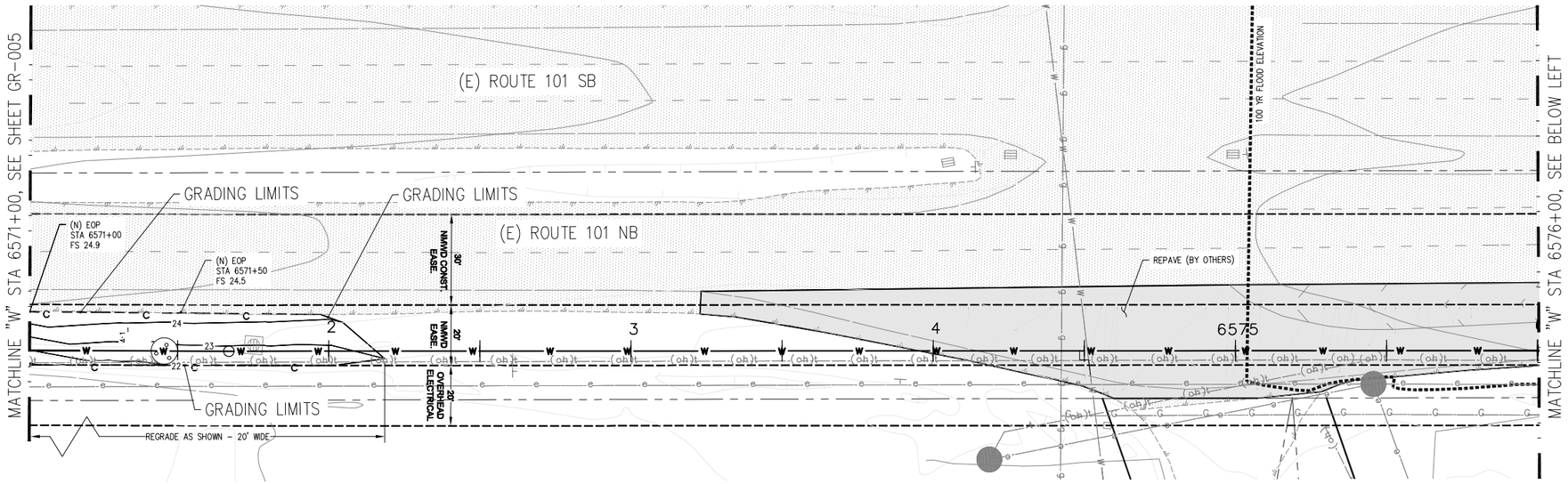
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
GRADING
STA 6565+75–STA 6571+00

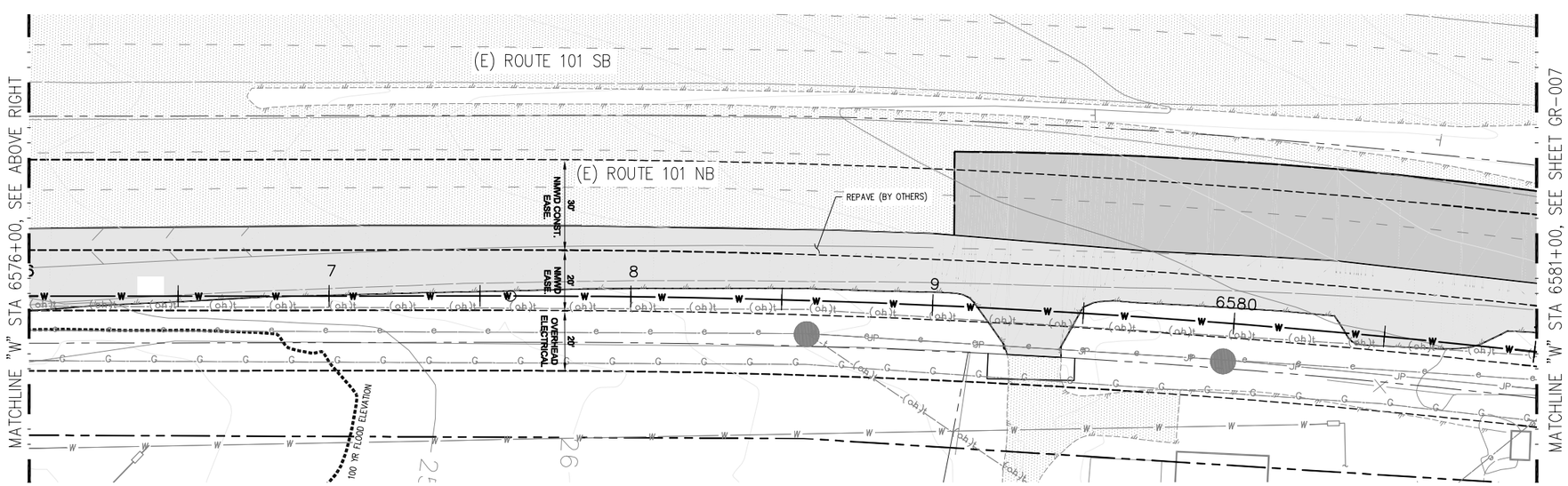
DES	DR	CH	SCALE 1": 40' HORIZ. 1": 8' VERT.	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 65 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-005

REDUCED SIZE:
NOT TO SCALE

Dec 04, 2013 – 3:19pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\GR05.dwg User: SHUJK



PLAN
SCALE: 1"= 20'-0"



PLAN
SCALE: 1"= 20'-0"

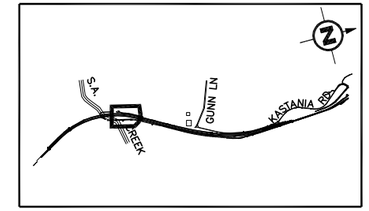
REDUCED SIZE:
NOT TO SCALE

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES:

1. SEE TYPICAL SECTIONS FOR MORE INFORMATION, DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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tel: 415.883.9850
fax: 415.883.9835

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REGISTERED PROFESSIONAL ENGINEER
AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6571+00-STA 6581+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 66 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	GR-006

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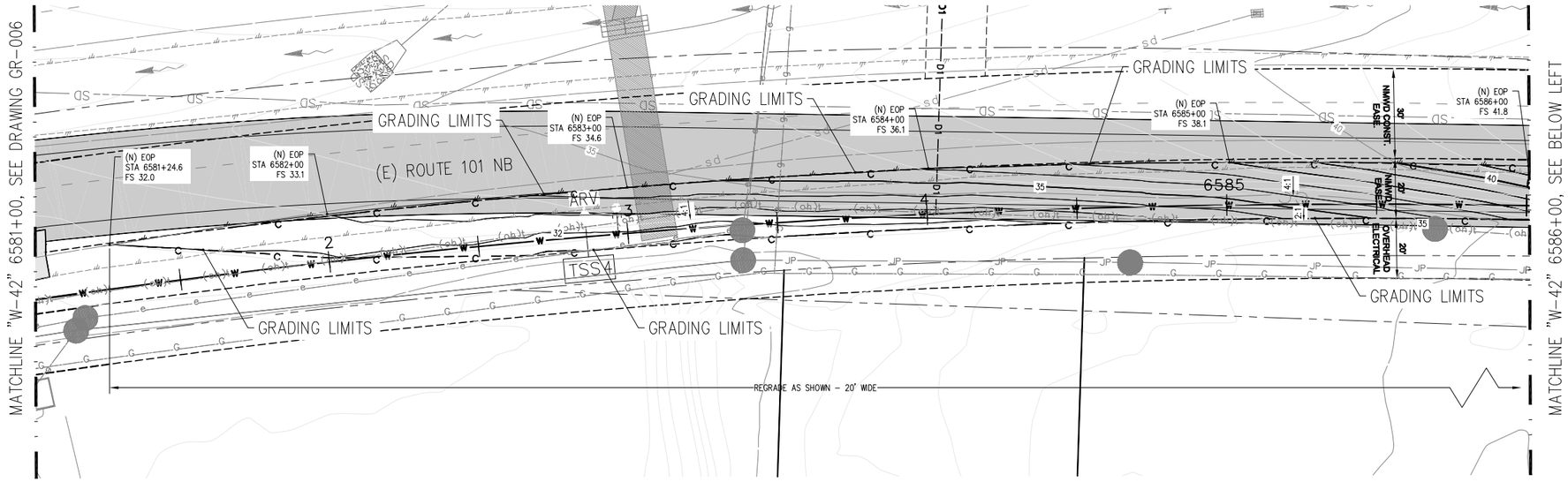
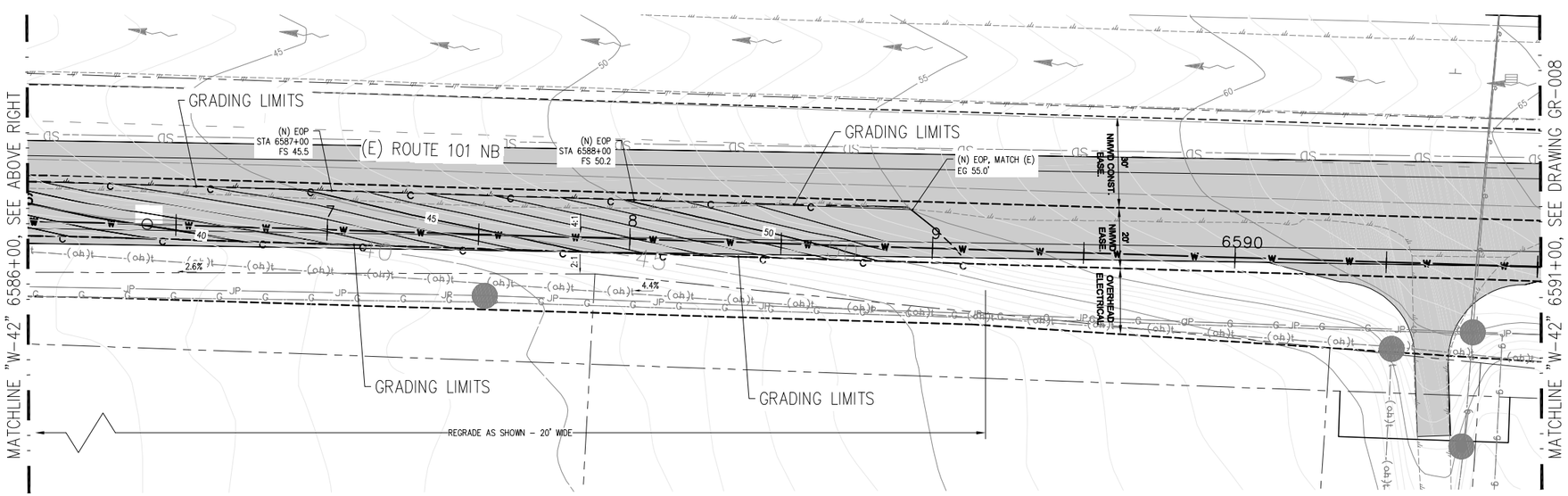


PLAN
SCALE: 1"= 20'-0"



PLAN
SCALE: 1"= 20'-0"

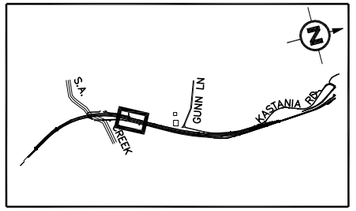
REDUCED SIZE:
NOT TO SCALE

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES

1. SEE TYPICAL SECTIONS FOR MORE INFORMATION, DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6581+00-STA 6591+00

DES	DR	CH	SCALE 1":40' HORIZ. 1":8' VERT.
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 67 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 GR-007

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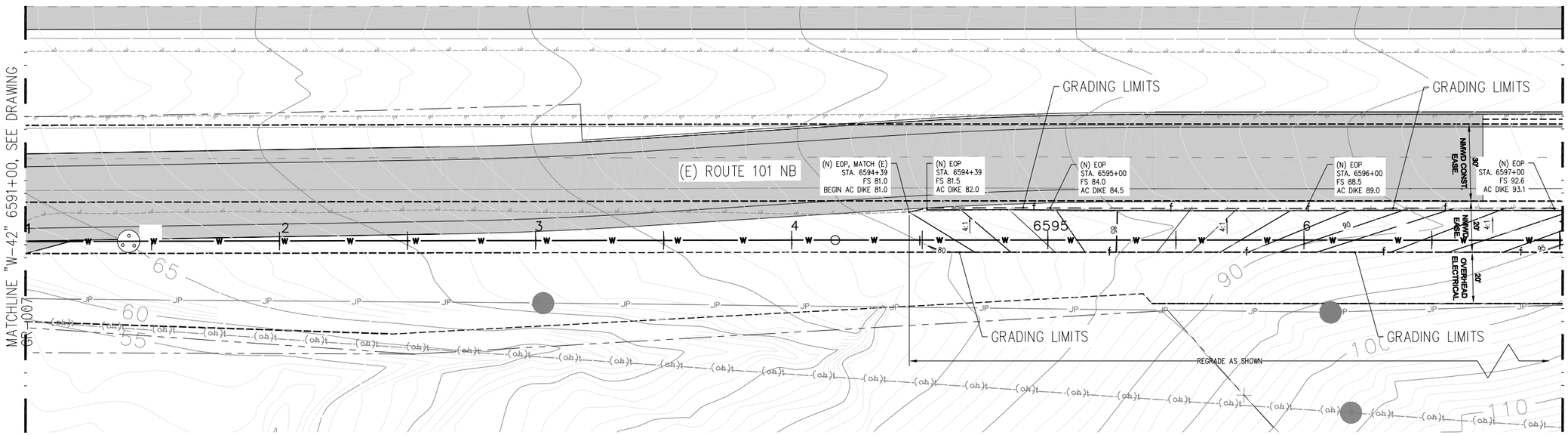


PLAN

SCALE: 1"= 20'-0"

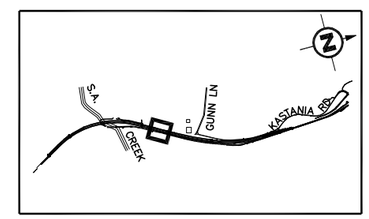
0' 10' 20' 30' 40'

SCALE: 1"=20'-0"

NOTES:

1. SEE TYPICAL SECTIONS FOR MORE INFORMATION, DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



REDUCED SIZE: NOT TO SCALE

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6591+00-STA 6597+00

DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 68 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-008

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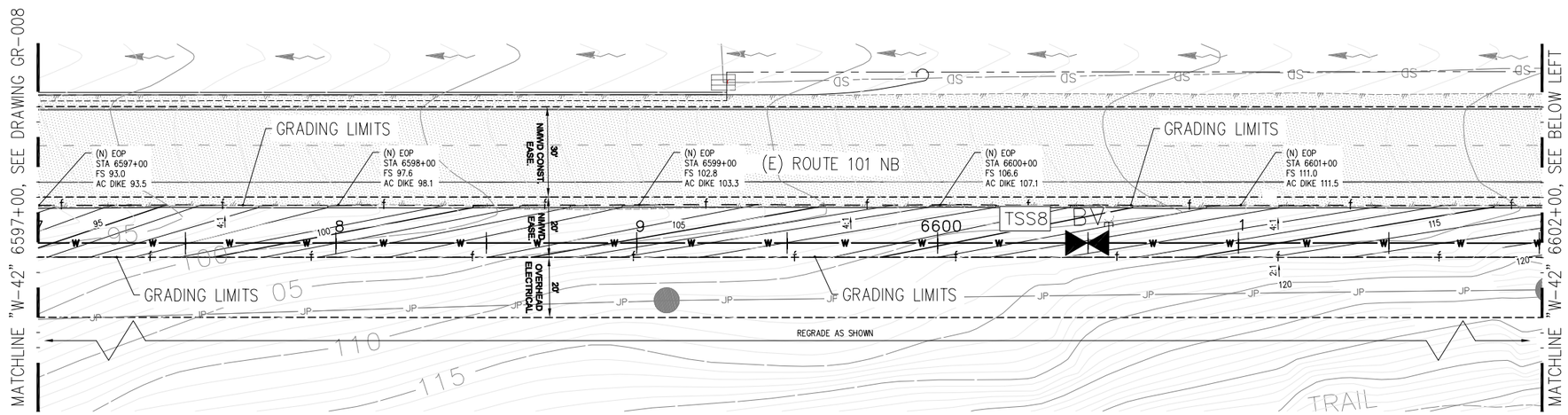
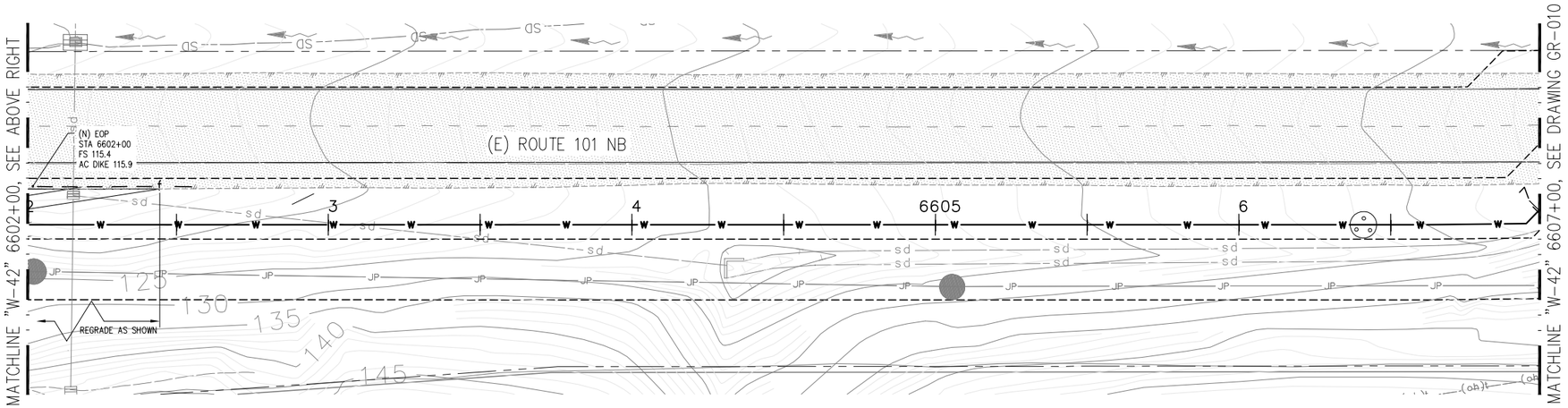


PLAN
SCALE: 1"= 20'-0"



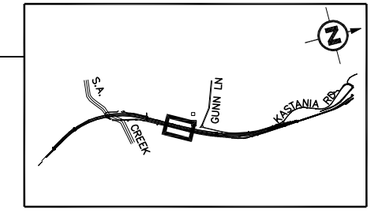
PLAN
SCALE: 1"= 20'-0"

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES

1. FOR TYPICAL SECTIONS, SEE DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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REDUCED SIZE:
NOT TO SCALE

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6597+00-STA 6607+00

DES	DR	CH	SCALE 1"=20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 69 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-009

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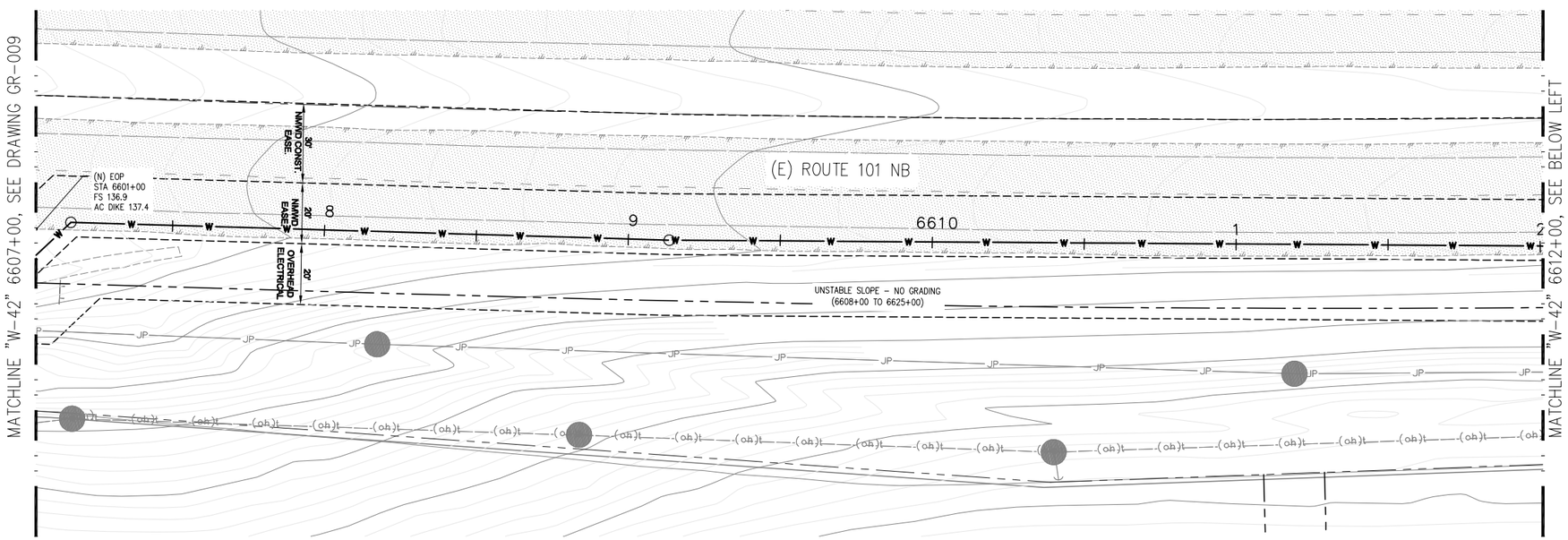
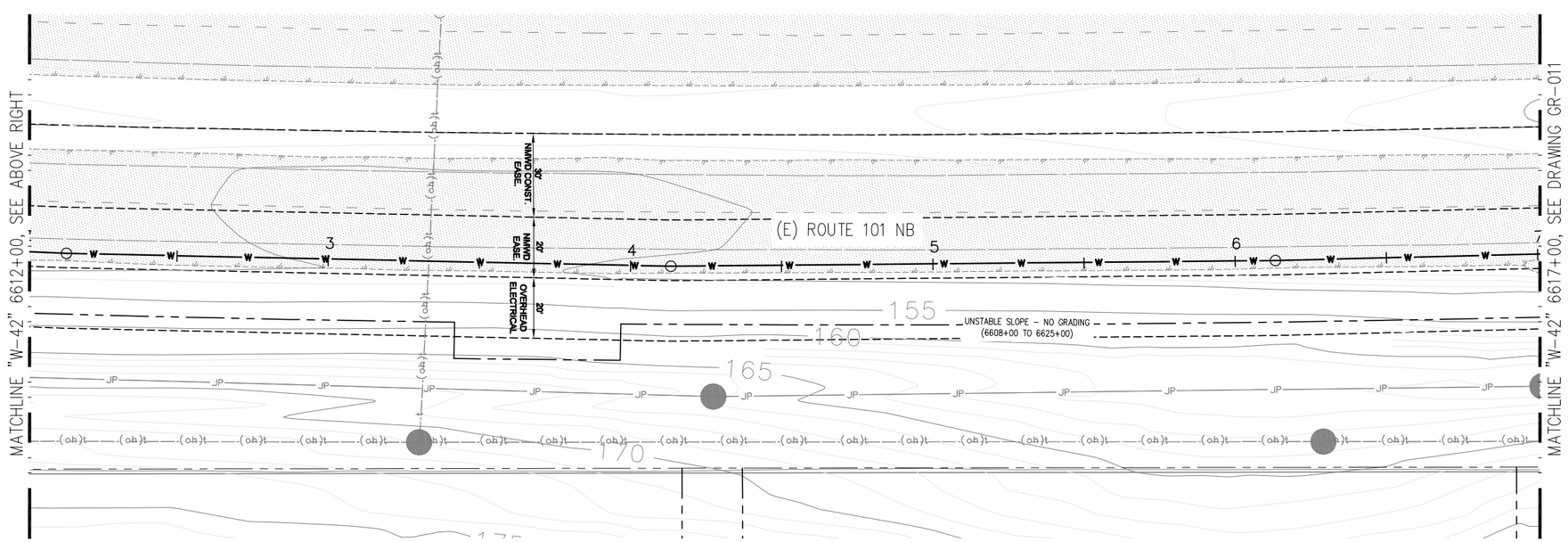


PLAN
SCALE: 1"= 20'-0"



PLAN
SCALE: 1"= 20'-0"

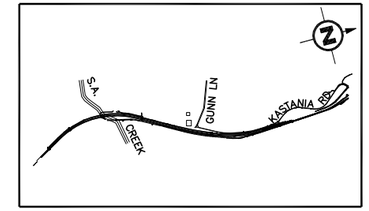
REDUCED SIZE:
NOT TO SCALE

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES

1. SEE TYPICAL SECTIONS DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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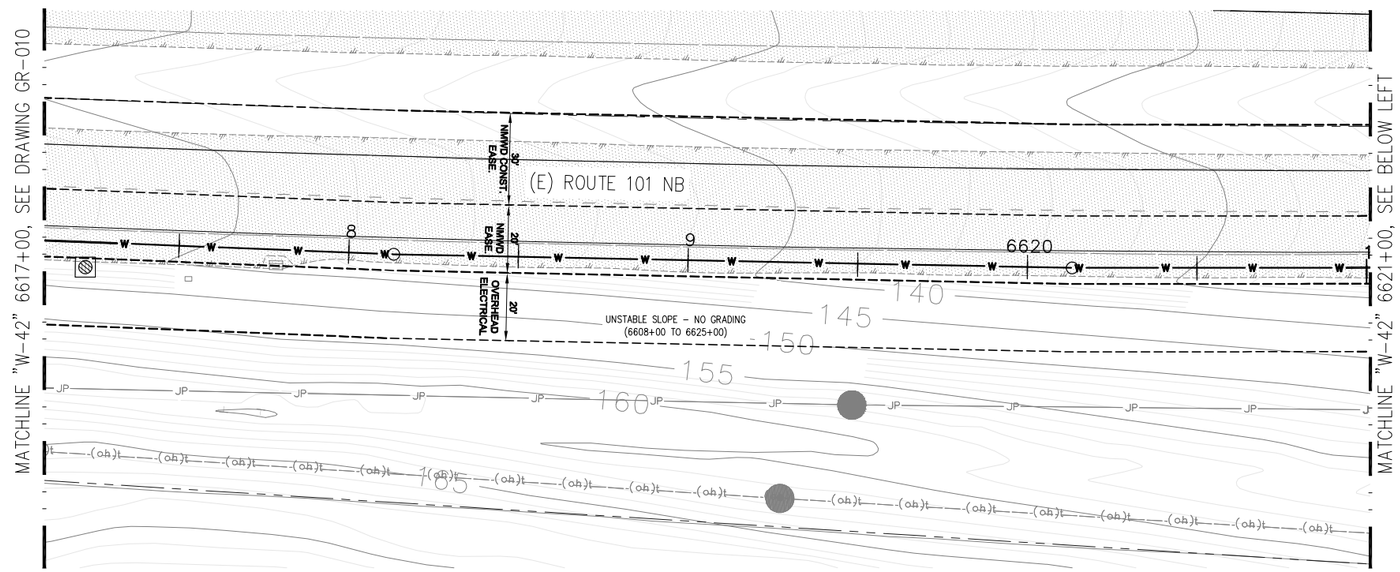
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6607+00-STA 6617+00

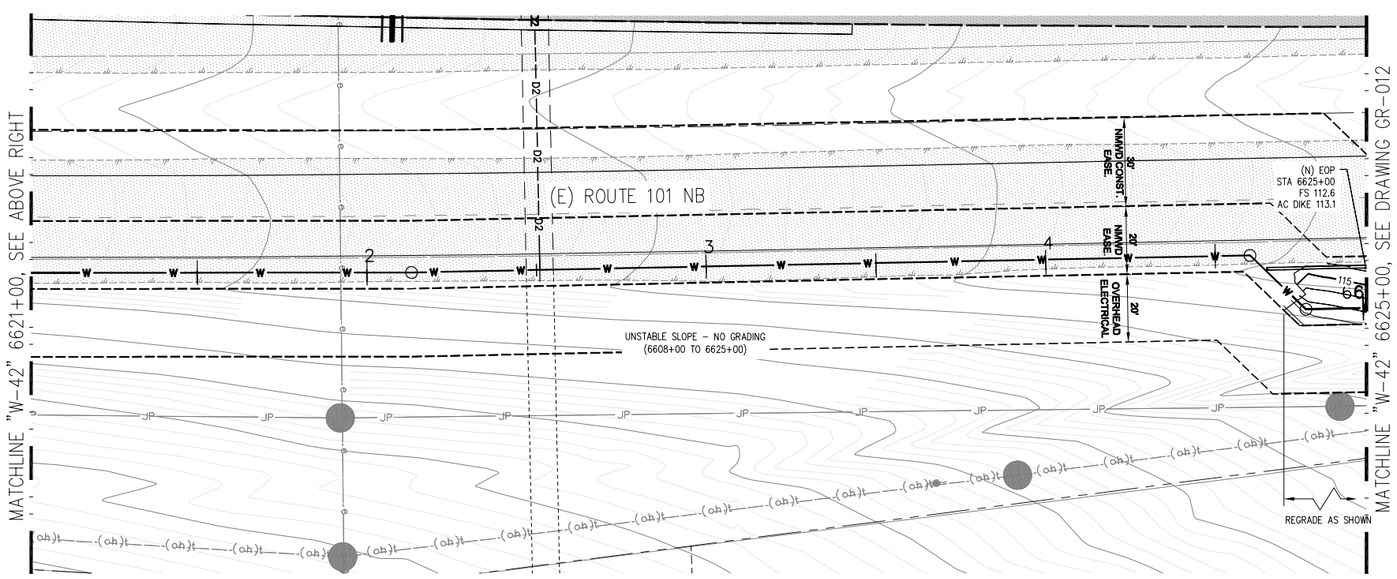
DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 70 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-010

Dec 04, 2013 - 3:16pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\GR10.dwg User: SHUJK



PLAN

SCALE: 1"= 20'-0"



PLAN

SCALE: 1"= 20'-0"

REDUCED SIZE:
NOT TO SCALE

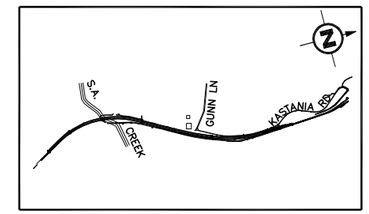
0' 10' 20' 30' 40'

SCALE: 1"=20'-0"

NOTES:

1. SEE TYPICAL SECTIONS DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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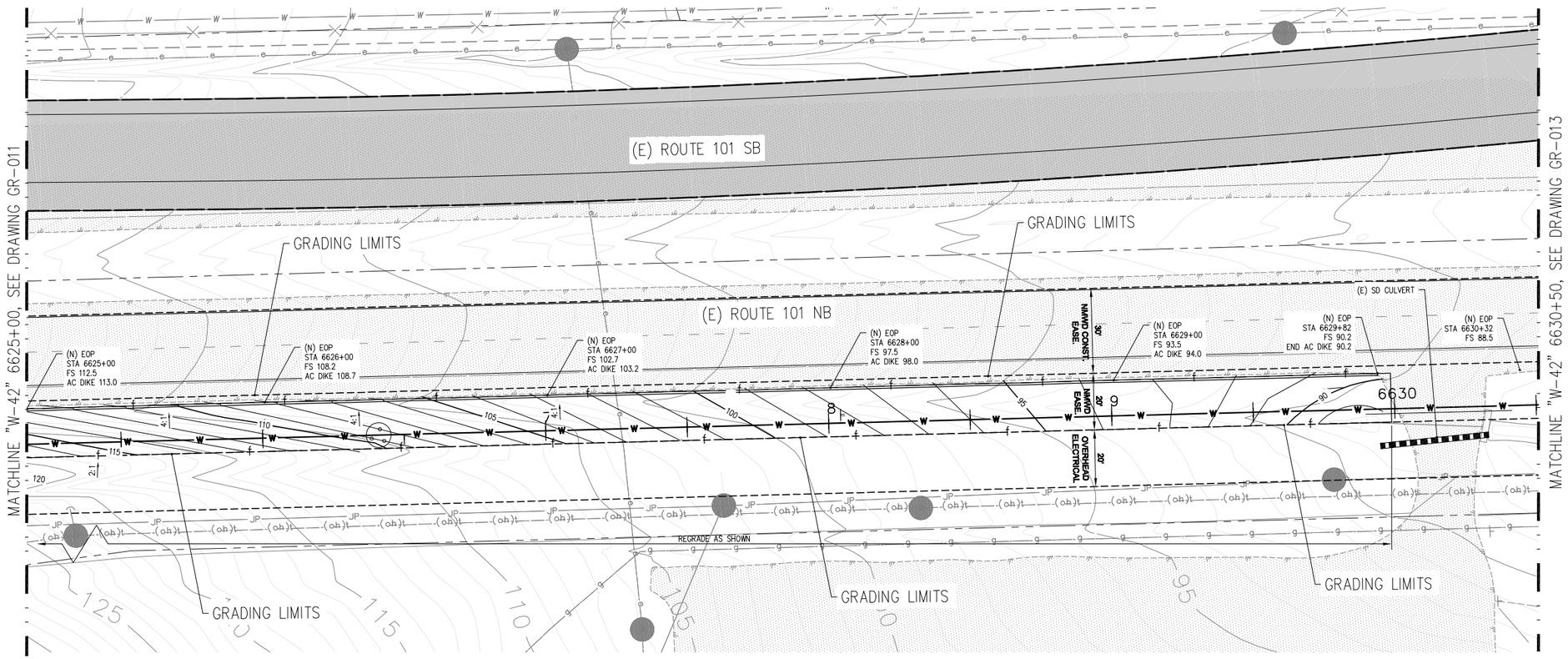
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6617+00-STA 6625+00

DES	DR	CH	SCALE 1":20'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 71 OF 192 SHEETS
			SERVICE AREA / JOB.NO. 1.7118.09 / GR-011

Dec 04, 2013 - 3:13pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\GR11.dwg User: SHUJK



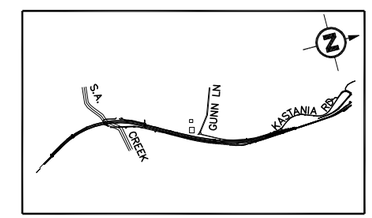
PLAN
SCALE: 1"= 20'-0"

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES:

1. FOR TYPICAL SECTIONS, SEE DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6625+00-STA 6630+50

DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 72 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-012

REDUCED SIZE:
NOT TO SCALE

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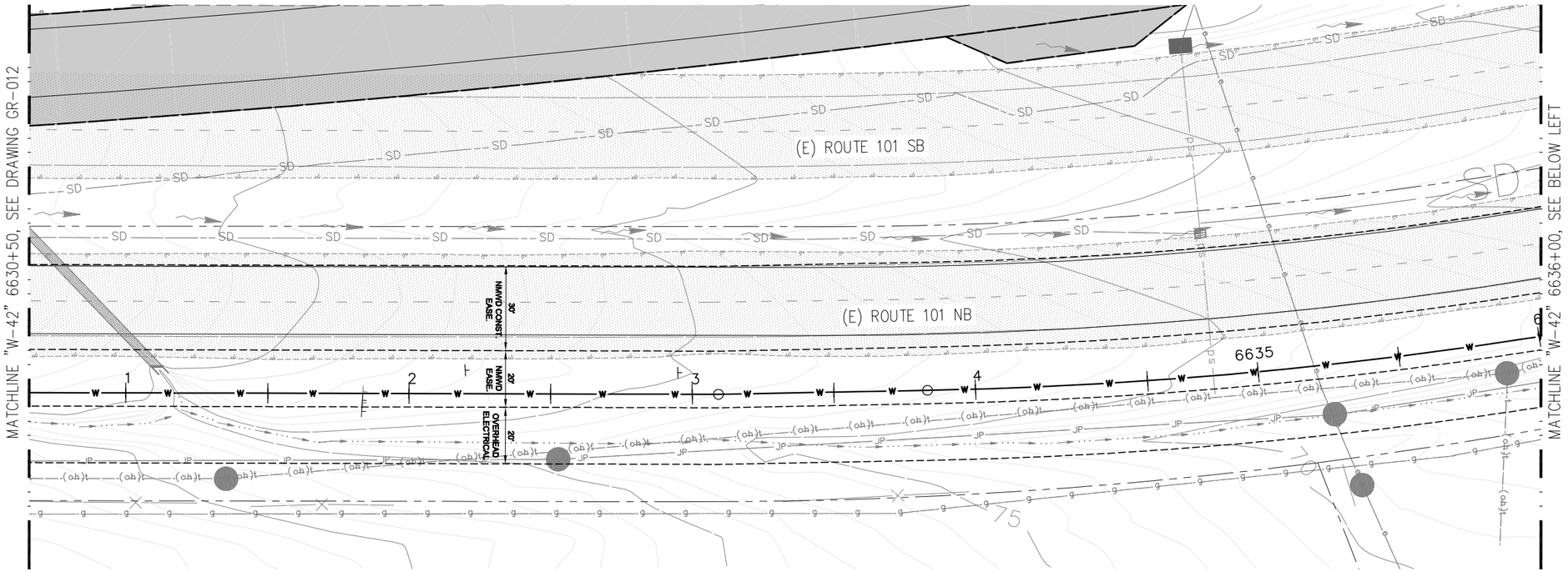
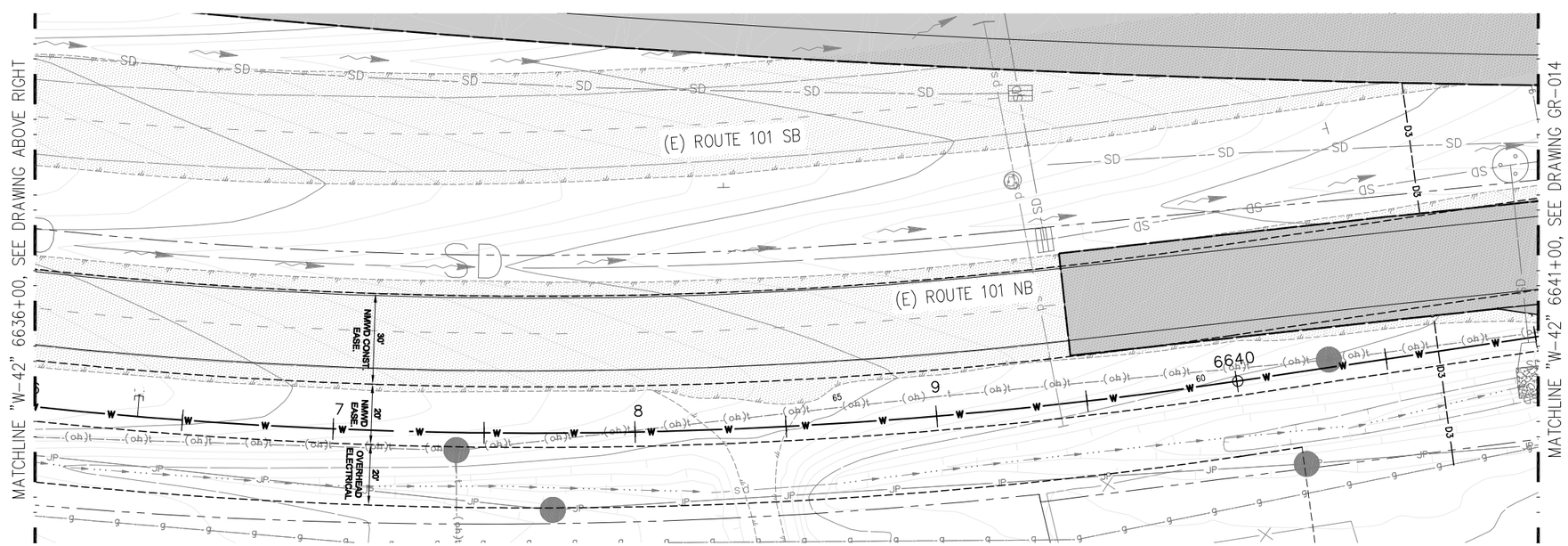


PLAN

SCALE: 1"= 20'-0"



PLAN

SCALE: 1"= 20'-0"

REDUCED SIZE:
NOT TO SCALE

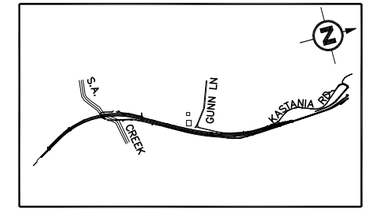
0' 10' 20' 30' 40'

SCALE: 1"=20'-0"

NOTES:

1. FOR TYPICAL SECTIONS, SEE DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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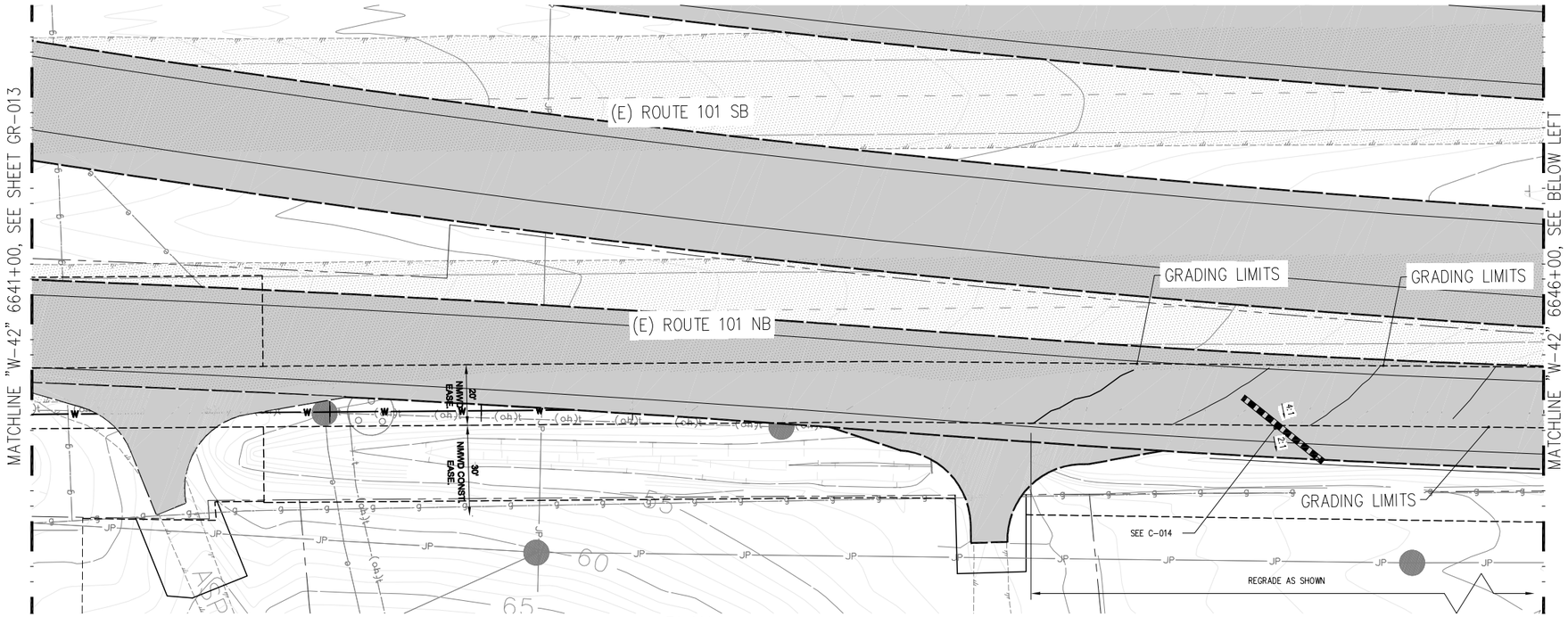
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

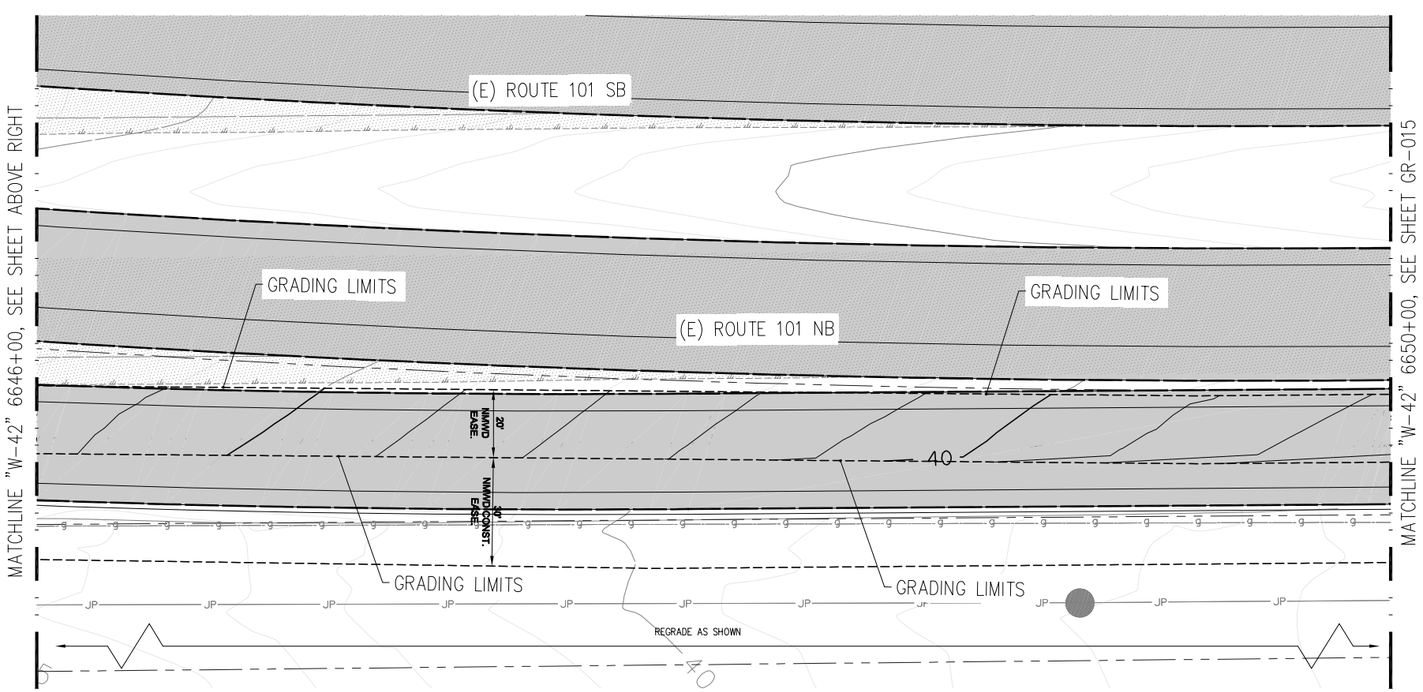
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6630+50-STA 6641+00

DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 73 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 GR-013

Dec 04, 2013 - 3:10pm N:\CIVIL\4\413100\Dwg\Sheet Dwgs\GR13.dwg User: SHUJK



PLAN
SCALE: 1"= 20'-0"



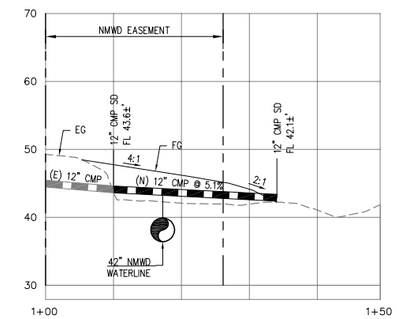
PLAN
SCALE: 1"= 20'-0"

REDUCED SIZE:
NOT TO SCALE

NOTES:

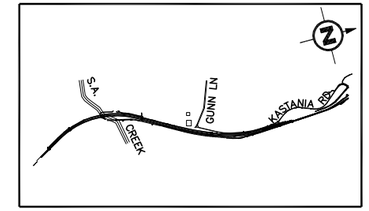
1. FOR TYPICAL SECTIONS, SEE DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"



SD PROFILE (FACING NORTH)
SCALE: 1"= 10'-0"

KEYMAP



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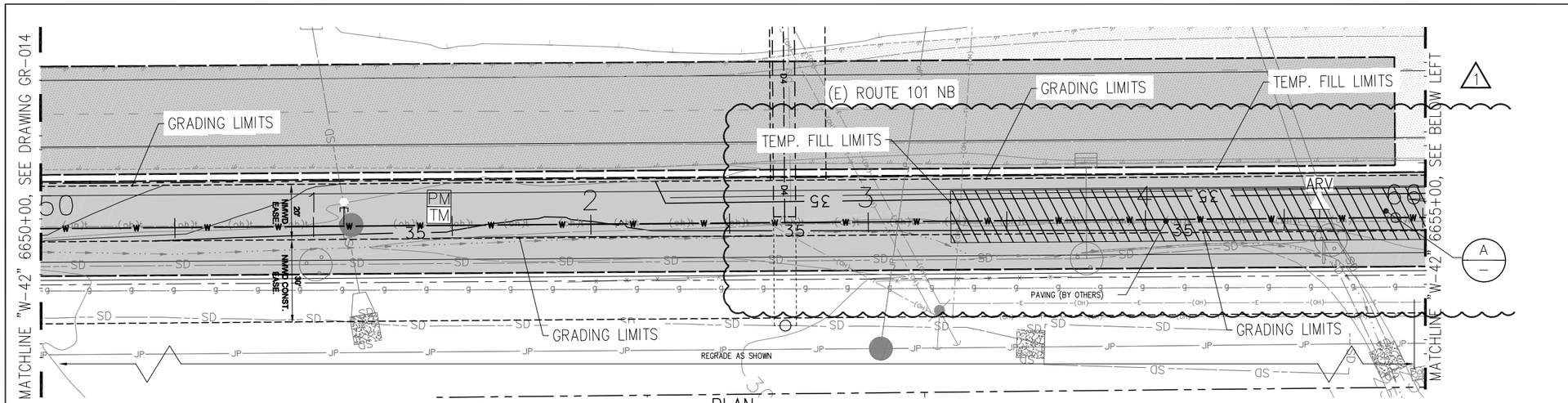
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6641+00-STA 6650+00

DES	DR	CH	SCALE 1":20'		
CSW	JKS/CJB	DAC	DATE DECEMBER 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 74 OF 192		SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09	GR-014

Dec 04, 2013 - 3:09pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\GR14.dwg User: SHUJK



PLAN
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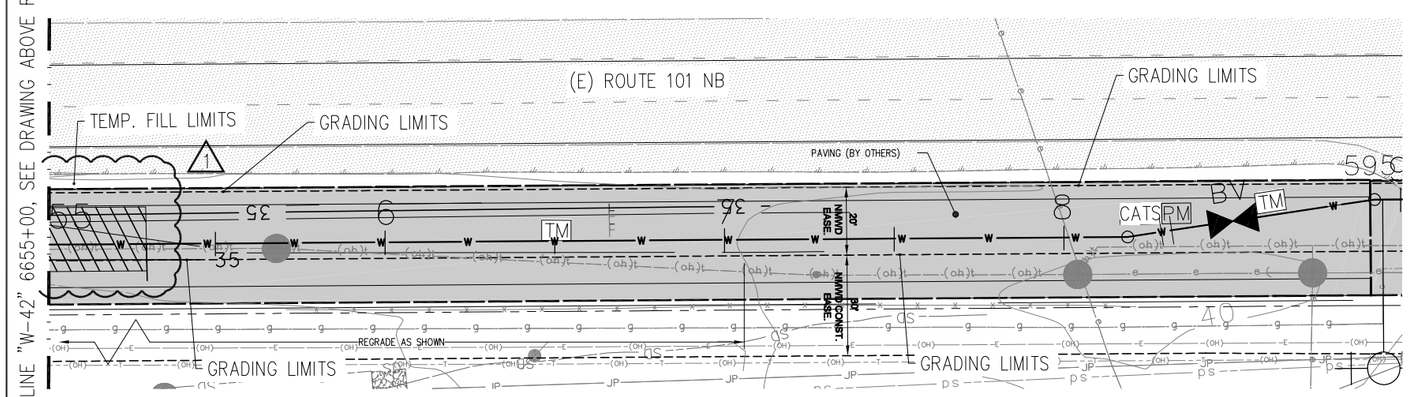

PLAN
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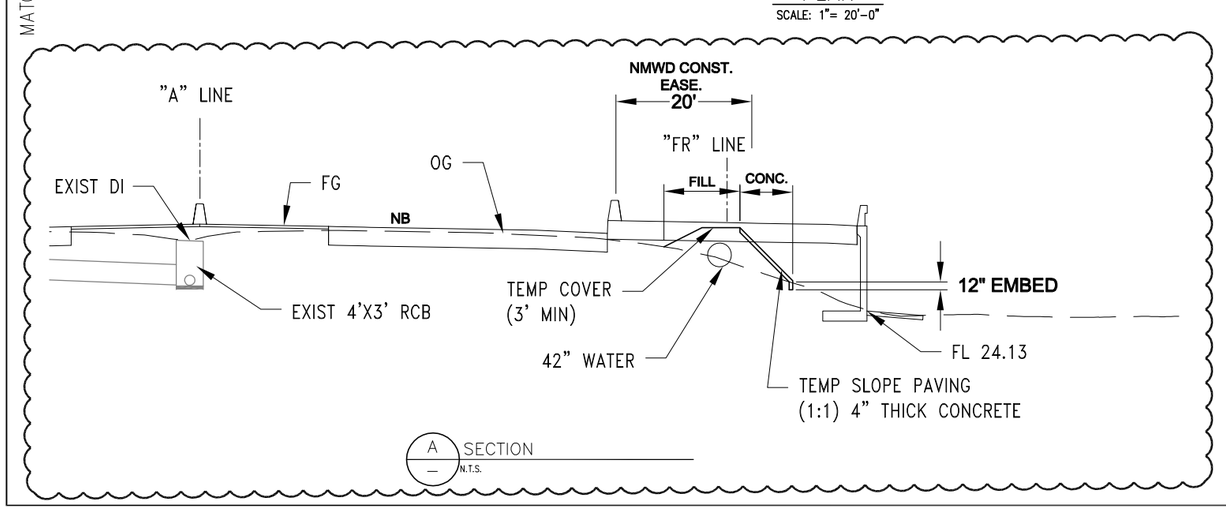


A — SECTION
N.T.S.

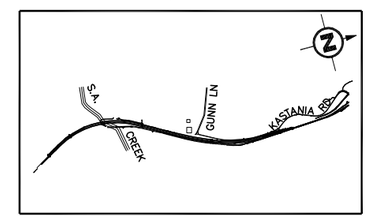
REDUCED SIZE:
NOT TO SCALE

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

NOTES:

1. FOR TYPICAL SECTIONS, SEE DRAWINGS C-033 THROUGH C-036
2. ALL AC CURBS SHALL BE HMH CURB; TYPE D MODIFIED

KEYMAP



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Civil & Structural Engineers Surveying & Mapping Environmental Planning
Land Planning Construction Management Landscape Architecture

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Prepared Under the Direction of:
REGISTERED PROFESSIONAL ENGINEER
Al G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
1	01/23/14	ADDENDUM 3	CJB	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
GRADING
STA 6650+00-STA 6660+00

DES	DR	CH	SCALE 1":20'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 75 OF 149 SHEETS
R.E. 40936			SERVICE AREA / JOB.NO. 1.7118.09 / GR-015

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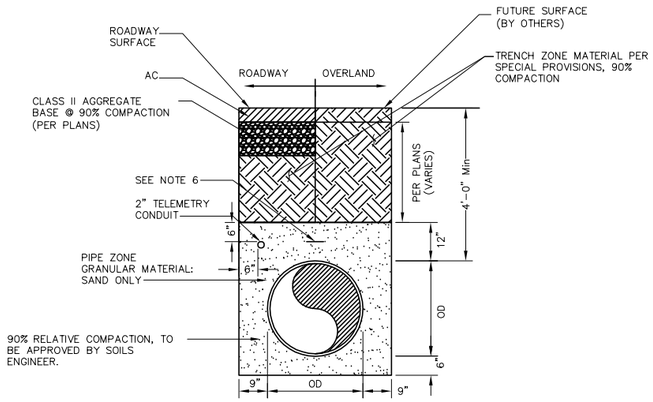
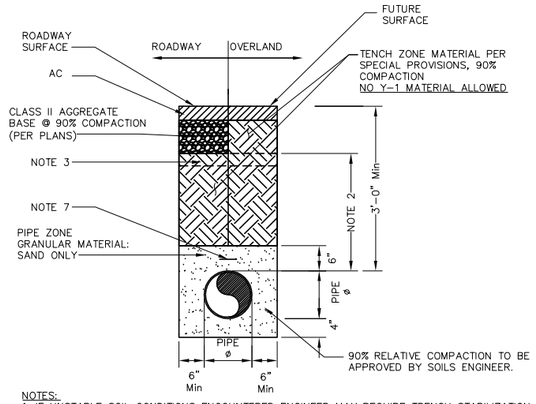


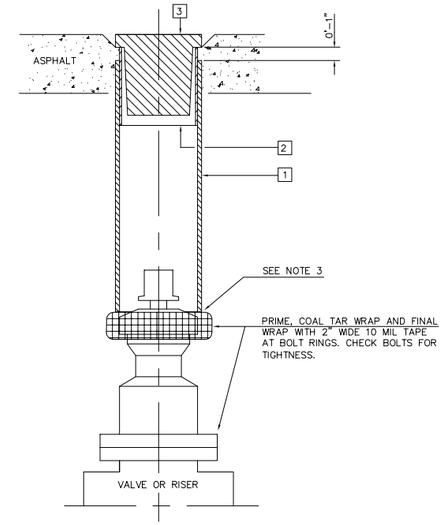
NOTES:
1. IF UNSTABLE SOIL CONDITIONS ENCOUNTERED ENGINEER MAY REQUIRE TRENCH STABILIZATION.
2. FOR DISTRICT APPROVED BEDDING AND BACKFILL MATERIAL AND COMPACTION REQUIREMENTS SEE SPECIFICATIONS
3. 2'-0" Min COVER DURING CONSTRUCTION.
4. PROVIDE 3" THICK LIFT OF CLASS II AGGREGATE BASE WHERE THE TRENCH WILL BE OPEN FOR EXTENDED PERIODS OF TIME AND THE TRENCH BACKFILL MAY DETERIORATE DUE TO CONSTRUCTION TRAFFIC.
5. NO PIPELINES, VALVES, OR STRUCTURES SHALL BE BACKFILLED WITHOUT ENGINEER'S APPROVAL.
6. 6-INCH WIDE BLUE WARNING / IDENTIFICATION TAPE
7. TRENCH RESTORATION AT EXISTING PAVEMENT TO BE IN ACCORDANCE WITH DETAIL 1 SHEET D-007
8. MAINTAIN MINIMUM POTABLE WATER, RECYCLED WATER AND SEWER LINE SEPARATION REQUIREMENTS PER FA. ADMIN CODE 64630, TITLE 22. FOR ALL OTHER UTILITIES (EG STORM DRAIN, PRIVATE MAINS, GAS, EXT) MAINTAIN 5'-0" HORIZONTAL AND 1'-0" VERTICAL SEPARATION IN SEPARATE TRENCHES
9. SEE DETAILS 4 AND 5, THIS SHEET, FOR TRENCH SECTIONS WITHIN 100-YEAR FLOOD PLAIN.

1 / — TYPICAL 36" OR 42" TRENCH SECTION
N.T.S.



NOTES:
1. IF UNSTABLE SOIL CONDITIONS ENCOUNTERED ENGINEER MAY REQUIRE TRENCH STABILIZATION.
2. FOR APPROVED BEDDING AND BACKFILL MATERIAL AND COMPACTION REQUIREMENTS SEE SPECIFICATIONS
3. 1'-8" Min COVER DURING CONSTRUCTION.
4. PROVIDE 3" THICK LIFT OF CLASS II AGGREGATE BASE WHERE THE TRENCH WILL BE OPEN FOR EXTENDED PERIODS OF TIME AND THE TRENCH BACKFILL MAY DETERIORATE DUE TO CONSTRUCTION TRAFFIC.
5. NO PIPELINES, VALVES, OR STRUCTURES SHALL BE BACKFILLED WITHOUT ENGINEERS APPROVAL.
6. #10 AWG TW-SOLID LOCATION WIRE TAPED AT 10 FOOT INTERVALS ON NON METALLIC PIPE
7. 6-INCH WIDE BLUE WARNING / IDENTIFICATION TAPE
8. TRENCH RESTORATION AT EXISTING PAVEMENT TO BE IN ACCORDANCE WITH DETAIL 1 SHEET D-007
9. MAINTAIN MINIMUM POTABLE WATER, RECYCLED WATER AND SEWER LINE SEPARATION REQUIREMENTS PER FA. ADMIN CODE 64630, TITLE 22. FOR ALL OTHER UTILITIES (EG STORM DRAIN, PRIVATE MAINS, GAS, EXT) MAINTAIN 5'-0" HORIZONTAL AND 1'-0" VERTICAL SEPARATION IN SEPARATE TRENCHES

2 / — SMALL WATERLINE TRENCH SECTION (2"-12" DIA.)
N.T.S.

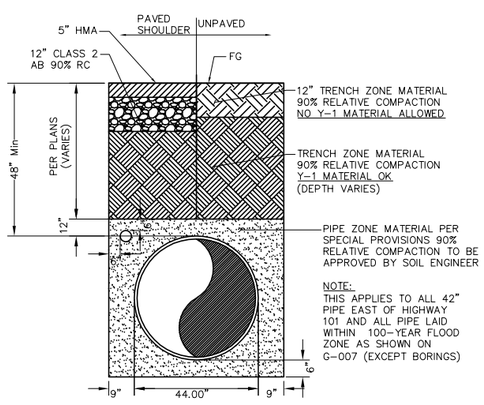


NOTES:
1) IN NON PAVED AREAS PLACE 24"DIA x 4" THICK CONCRETE AROUND VALVE RISER. TWO NOTCHES SHALL BE MADE IN CONCRETE FOR EASY REMOVAL OF COVER.
2) FOR VALVE RISER EXTENSION USE 6" PVC COUPLING.
3) FOR 2" GATE VALVES RISER SHOULD BE RAISED AND NOT CONTACT THE BOLT RING OR PIPE.
4) REMOVE ALL DEBRIS FROM VALVE OPERATING NUT.
5) FOR COLOR CODING OF VALVE COVERS, SEE DETAIL 2, SHEET D-004.

PARTS LIST

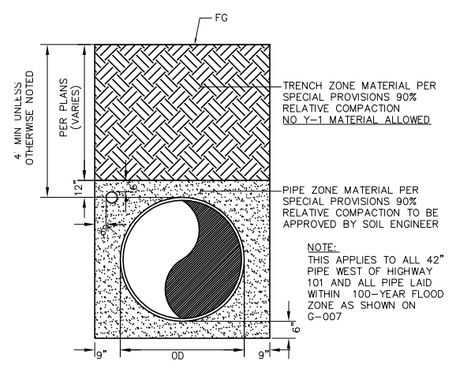
1	6" PVC PIPE CLASS 160, SDR-26
2	6"DIA x 0'-6" ALUMINIUM PIPE
3	6" CAST IRON VALVE COVER, MARKED "NMWD". SEE NOTE 5

3 / — VALVE RISER
N.T.S.



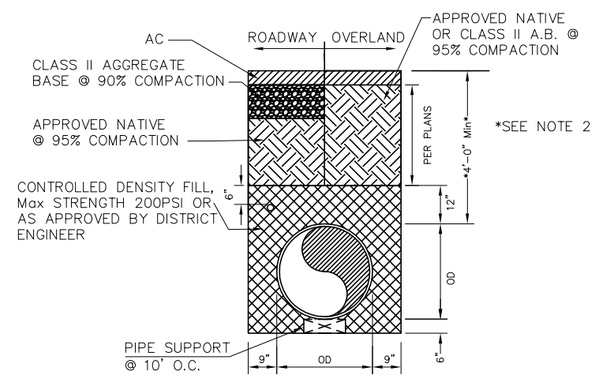
TYPICAL 42" TRENCH
EAST OF HIGHWAY WITHIN 100 YEAR FLOOD
STA 6561+10.00± THROUGH 6577+00±

4 / — N.T.S.



TYPICAL 42" TRENCH
WEST OF HIGHWAY AND WITHIN 100 YEAR FLOOD
"W-42" 6546+63± THROUGH 6561+10.00±

5 / — N.T.S.



6 / — TRENCH PLUG
N.T.S.

NOTE:
1. TRENCH PLUG TO EXTEND 10' ALONG LENGTH OF PIPE UNLESS INDICATED OTHERWISE ON PLANS
2. IN AREAS WHERE PIPE COVER IS LESS THAN 4'-0", BACKFILL THE ENTIRE LENGTH W/CDF 18" ABOVE TOP OF PIPE
3. TRENCH PLUGS SHALL BE PLACED ON SLOPES GREATER THAN 12%. FIRST PLUG SHALL BE PLACED 200 LF DOWN SLOPE FROM TOP OF SLOPED SECTION OF PIPE RUN AND PLACED THEREAFTER AT 200' O.C. UNTIL SLOPE IS BELOW 12%
4. CONTRACTOR SHALL SUBMIT A PROCEDURE FOR PRE-APPROVAL THAT ENSURES PIPE WILL NOT FLOAT BEFORE START OF CDF PLACEMENT

REDUCED SIZE:
NOT TO SCALE

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	76 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-001

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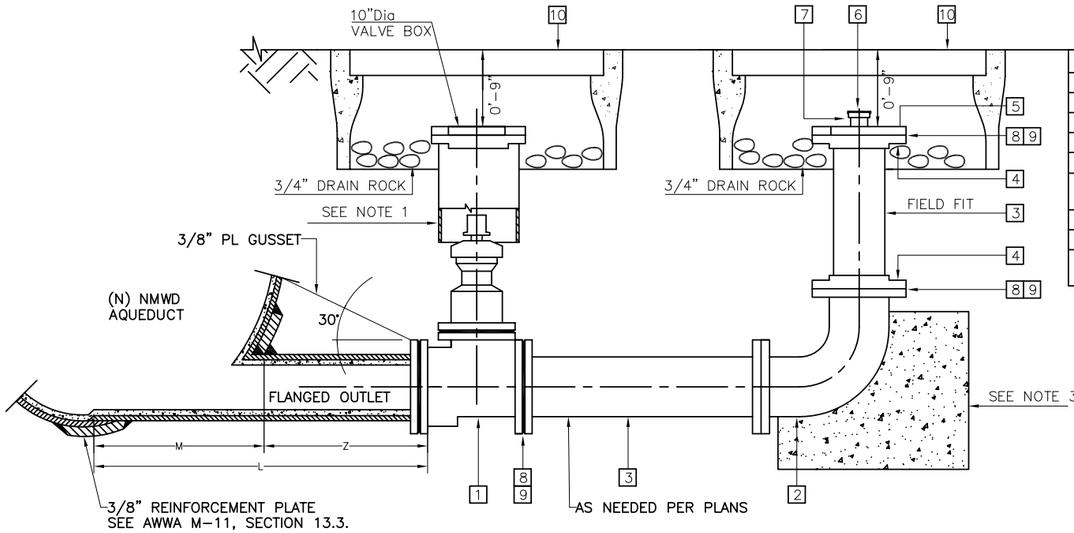
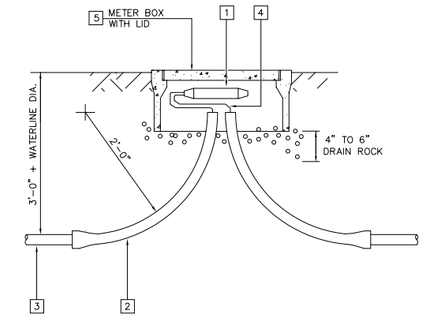


PARTS LIST		8" BO	6" BO	12" TAP
1	GATE VALVE FF	8"	6"	12"
2	90° ELBOW FF	8"	6"	–
3	STEEL PIPE, CEMENT MORTAR LINED	8"	6"	12"
4	SLIP-ON WELD FLANGE	8"	6"	12"
5	BLIND FLANGE THREADED 4"	8"	6"	
6	DUST CAP	–	–	–
7	4" BRASS NIPPLE W/ 4" FEMALE QUICK COUPLING			
8	GASKET	8"	6"	12"
9	3/4"x3-1/2" 316 S.S. BOLTS & NUTS	–	–	–
10	3" METER BOX WITH LID, CHRISTY B40 OR EQUAL	–	–	–
	M	17.5	15.7	18
	Z	15.2	16.9	18
	L	32.6	32.6	36

NOTES:

1) FOR VALVE RISER REFER TO DETAIL 3, D-001
2) FOR CONCRETE THRUST BLOCKING REFER TO DETAIL 4 AND 5, SHEET D-007
3) BEFORE BACKFILLING, PRIME AND COAL TAR WRAP FLANGES, BOLT RINGS AND EXPOSED STEEL PIPE.

1 — 6"& 8" BLOW-OFF ASSEMBLY AND 12" TAP
N.T.S.



PARTS LIST:

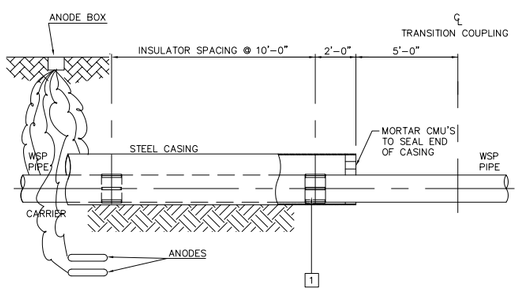
5	CHRISTY B30 W/FLD30 LID
4	TELEMETRY CABLE, SIX PAIR, PE-22 SOLID COPPER
3	2" PVC SCH40 CONDUIT
2	2" PVC SCH40 CONDUIT LONG RADIUS BEND (90°)
1	SPLICING KIT, SCOTCH CAST 78-R1 OR EQUAL.

NOTES:

1) SEAL CONDUIT ENDS AGAINST MOISTURE ENTRY WITH EXPANSIVE FOAM.
2) INSTALL PULL BOX EVERY 500 FEET AND AT ALL ABRUPT DIRECTION CHANGES, NOT TO EXCEED 360° TOTAL BENDS PER NEC.
3) FOR TRENCH SECTION REFER TO DETAILS 1 & 2, SHEET D-001.
4) INSTALL 1/2" MULE TAPE #WP1250P OR EQUIVALENT IN CONDUIT.

1

2 — TELEMETRY CABLE CONDUIT AND PULL BOX (TM)
N.T.S.



MINIMUM SIZE CASING REQUIRED

PIPE SIZE	42"
CASING SIZE I.D.	60"
CASING WALL	0.75
SKIDS	3"

NOTES:

1) CARRIER PIPE SHALL BE PRESSURE TESTED PRIOR TO SEALING CASING
2) STEEL CASING AND WSP CARRIER PIPE SHALL INCLUDE AN ANODE PER DETAIL 1, SHEET CP-002. (USE ONE TERMINAL BOX FOR ALL TEST LEADS)

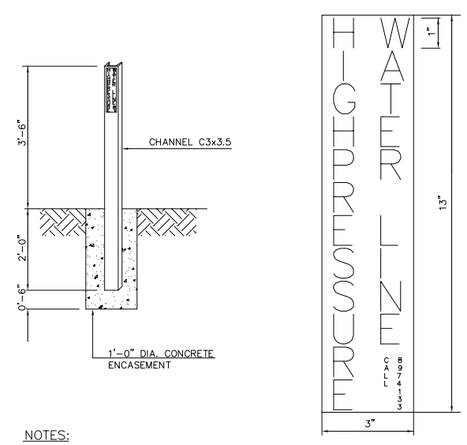
PARTS LIST:

1	INSULATOR, CALPICO INC. MODEL M-12 OR EQUAL

ANNULAR SPACE FILL

1	"W-42" 6551+68± TO 6556+24±	NONE
2	"W-42" 6561+45± TO 6565+67±	NONE
3	"W-42" 6677+97± TO 6679+47±	SAND

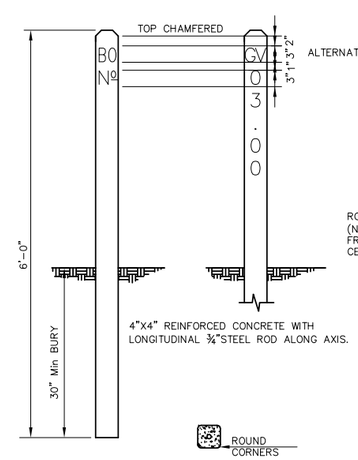
3 — WATERLINE INSTALLATION THROUGH CASING
N.T.S.



NOTES:

1) POST SHALL BE PAINTED WHITE AND SHALL BE SET IN CONCRETE. AFFIX ADHESIVE "HIGH PRESSURE WATERLINE" STICKER AS SHOWN ABOVE.
2) THE ENTIRE SIGN SHALL BE FURNISHED BY THE NORTH MARIN WATER DISTRICT.
3) THIS SIGN SHALL BE INSTALLED IN OPEN SPACE LOCATIONS, OR IN EASEMENTS, TO ASSIST IN THE LOCATING OF WATER MAINS AND TO SERVE AS A WARNING TO ANYONE EXCAVATING IN THIS AREA.
4) REFER TO NMWD TECHNICAL SPECIFICATION C-3 FOR CONCRETE REQUIREMENTS

4 — SIGN FOR HIGH PRESSURE WATERLINE
N.T.S.



ALTERNATE ARRANGEMENT FOR NUMERALS

LETTERS	FACILITY
BO	BLOW OFF
BFV	BUTTERFLY VALVE
AV	AIR VALVE
(BLANK)	ANGLE POINT

ROMAN NUMERAL REPRESENTS THE DISTANCE (NEAREST FOOT), MEASURED PERPENDICULAR, FROM THE FACE OF THE MARKER POST TO THE CENTER OF FACILITY.

NOTES:

1. ALL MARKER POST MUST BE SET TRUE (FACING FACILITY)
2. MARKERS SHALL BE SET AS LOCATED IN DETAIL PLAN VIEWS
3. CONCRETE SHALL BE CLASS 2 AND MEET REQUIREMENTS OF SECTION 90 "PORTLAND CEMENT CONCRETE" OF THE STANDARD SPECIFICATIONS

5 — CONCRETE PIPE MARKER (PM)
N.T.S.

REDUCED SIZE:
NOT TO SCALE

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	77 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-002

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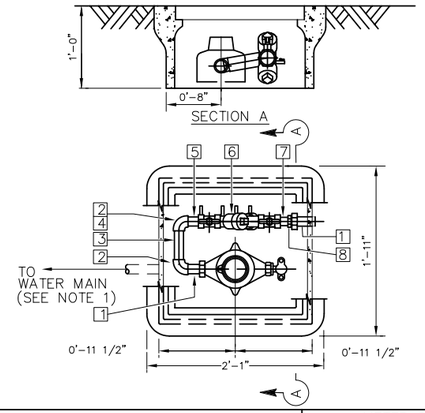
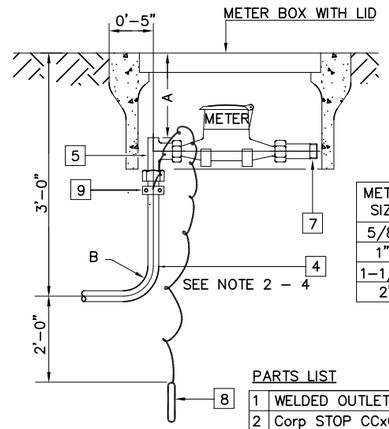


PARTS LIST		METER SIZE	
1	METER COUPLING (BRASS)	3/4"	1"
2	90° ELBOW (BRASS)	3/4"	1"
3	LONG NIPPLE (BRASS)	6" LONG	6" LONG
4	90° STREET ELBOW (BRASS)	N/A	1"
5	NIPPLE (BRASS)	3" LONG	N/A
6	DOUBLE CHECK BACKFLOW PREVENTER (FEBCO MODEL 850 OR EQUAL)		
7	CLOSE NIPPLE (BRASS)	1 1/2"LONG	2" LONG
8	BUSHING (BRASS)	3/4"x1"	1"x1-1/4"

NOTES:
1) FOR WATER SERVICE INSTALLATION REFER TO DETAIL 2, THIS SHEET
2) BELOW GRADE BACKFLOW PREVENTER ASSEMBLY TO BE INSTALLED BY NMWD.

1 / — BELOW GRADE BACKFLOW PREVENTER
N.T.S.



	METER SIZE	
	5/8" & 1"	1-1/2" & 2"
A	0'-7"	0'-9"
B	1'-0"	1'-6"
ø	45°	0°

METER SIZE	METER BOX	METER LID	DESCRIPTION
5/8"	B09X	B09-61D	STEEL CHECKER PLATE LID
1"	B16	B16-61D	STEEL CHECKER PLATE LID
1-1/2"	B30	B30-61D	STEEL CHECKER PLATE LID
2"	B36	B36E	CEMENT LID

PARTS LIST		METER SIZE		
		5/8"	1"	1-1/2" & 2"
1	WELDED OUTLET	1"x3" LG	1"x3" LG	2"x3" LG
2	Corp STOP CCxCOMP	1"x1"	1"x1"	2"x2"
3	INSULATING COUPLING	1"	1"	2"
4	COPPER PIPE, TYPE K	1"	1"	2"
5	METER STOP COMPxFIP	1"	1"	2"
6	COUPLING	1"	1"	2"
7	METER COUPLING	1"W/1x3/4" ADAP.	1"	2"
8	4# ZINC ANODE (USE 12# FOR SERVICE RUNS > TO 20 FT.)			
9	BRASS CLAMP AND SCREWS			

2 / — WATER SERVICE INSTALLATION
N.T.S.

NOTES:

1) SEE NMWD TECHNICAL SPECIFICATION 15000 FOR MATERIAL REQUIREMENTS
2) BEFORE BACKFILLING, PRIME AND TAPE WRAP COPPER LATERAL FROM CORPORATION STOP TO POINT OF CONTACT WITH NATIVE SOIL. IF ENTIRE LATERAL IS BACK FILLED WITH PEA AND SAND WRAPPING IS NOT NECESSARY. SEE TECHNICAL SPECIFICATIONS 02223 FOR TRENCHING & BACKFILLING REQUIREMENTS.
3) NMWD WILL BEND COPPER PIPE
4) METER BOX SHALL BE LOCATED PER PLAN DETAILS
5) METER TO BE INSTALLED BY NMWD.
6) SERVICE SADDLE SHALL NOT BE INSTALLED WITHIN 18" OF VALVE, JOINT, OR FITTING
7) SEE DETAIL 4 ON SHEET D-004 FOR CONNECTION TO MAINS 18" AND SMALLER.
8) CONNECTION TO MAINS GREATER THAN 18" TO BE MADE VIA OUTLET CONNECTION DETAIL 1, D-005 OR PER PLANS
9) NO BOXES WITHIN TRAVELED ROADWAY

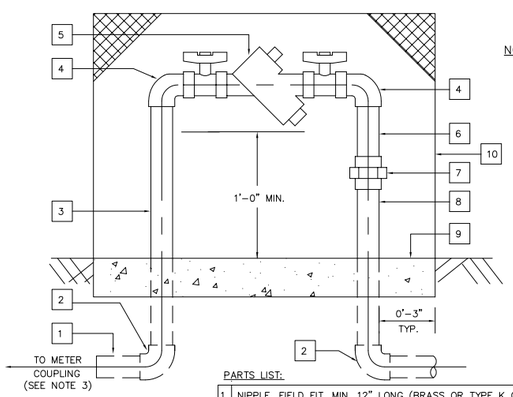
EXISTING WATER SERVICES

PIPELINE ID	STA	SERVICE # / ADDRESS	SIZE	NOTES	REACH
W2	6544+35	9184 / 5493	1"	CORDA	C / D
W8	7+46	16277 / 4550	1"	GAS STATION	A
D1	2+21.52	12077 / 5382	1"	KLATTE	B
D2	21 GUNN LN PS	16276 / 21	1 1/2"	21 GUNN LN	B
D3	1+54.54	16273 / 4796	2"	BOYAJIAN	B
D4	1+53.02	16695 / 4600	5/8"	STRAIN	B
D4	1+53.02	16281 / 4680	5/8"	STRAIN	B

NOTES:

1. SERVICE 16276 INCLUDED IN BID ITEM C-2
2. EXISTING SERVICES ON KASTANIA ROAD ARE TAPPED OFF THE EXISTING 6" ACP. NO RETAPS ANTICIPATED IN THE B-3 PROJECT
3. THERE ARE SIX (6) SERVICES TAPPED OFF THE EXISTING 12" AND 2" WATER LINES ON THE EAST SIDE OF THE HIGHWAY BETWEEN STATIONS 6574+00 TO 6642+00. NO RETAPS ANTICIPATED IN THE B-3 PROJECT.

1



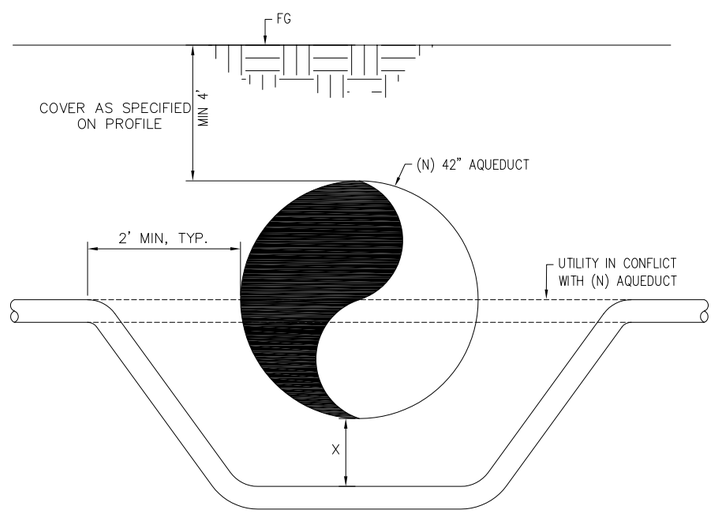
NOTES:

1) REFER TO SECTION 15112 OF THE SPECIFICATIONS.
2) NO OUTLET, TAP, TEE OR ANY OTHER TYPE OF CONNECTION WILL BE ALLOWED BETWEEN THE METER AND THE BACKFLOW ASSEMBLY. THE BACKFLOW DEVICE SHOULD BE INSTALLED AS CLOSE AS POSSIBLE TO THE METER. INSPECTION BY THE DISTRICT SHALL TAKE PLACE PRIOR TO BACKFILL (IF POSSIBLE).
3) FOR WATER SERVICE INSTALLATION REFER TO DETAIL 2, THIS SHEET

PARTS LIST:

1	NIPPLE, FIELD FIT, MIN. 12" LONG (BRASS OR TYPE K COPPER)
2	90° ELBOW (BRASS)
3	PIPE, FIELD FIT (BRASS), 10 ML TAPE AROUND PIPING IN CONTACT WITH CONCRETE SLAB
4	90° STREET ELBOW (BRASS)
5	DOUBLE CHECK (WILKINS 350XL OR APPROVED EQUAL) OR REDUCED PRESSURE PRINCIPLE (WILKINS 975XL2 OR APPROVED EQUAL) BACKFLOW PREVENTER. REFER TO APPROVED MATERIALS LIST.
6	6" NIPPLE (BRASS)
7	UNION FEMALE (BRASS)
8	NIPPLE, FIELD FIT (BRASS)
9	CONCRETE SLAB, 4" THICK BY 18" WIDE (MINIMUM)
10	ENCLOSURE CAGE OR INSULATION BLANKET

3 / — ABOVE GROUND BACKFLOW PREVENTER
N.T.S.



UTILITY TYPE	X (FT)
POTABLE WATER	1' MIN
NATURAL GAS, ELECTRICAL CONDUIT	2' MIN

NOTES:

1. FOR SEWER OR STORM DRAIN CONFLICTS CONTACT ENGINEER
2. UTILITY MAY BE RELOCATED ABOVE AQUEDUCT WITH APPROVAL OF ENGINEER
3. PROVIDE SUPPORT FOR UTILITIES AT 10 INTERVALS, WHERE EXPOSED
4. CONTACT UTILITY OWNER AT LEAST 14 DAYS PRIOR TO COMMENCING WORK

4 / — STANDARD UTILITY RELOCATION
N.T.S.

REDUCED SIZE:
NOT TO SCALE

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NOVATO, CALIFORNIA

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STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	78 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-003

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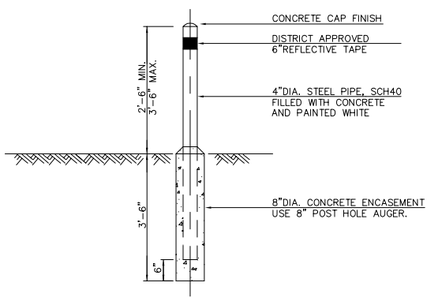

1 PROTECTION BARRIER
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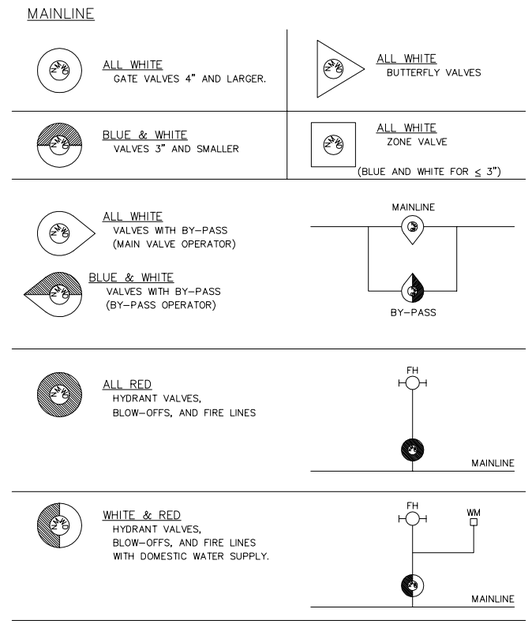
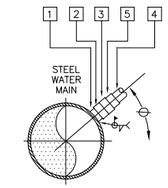


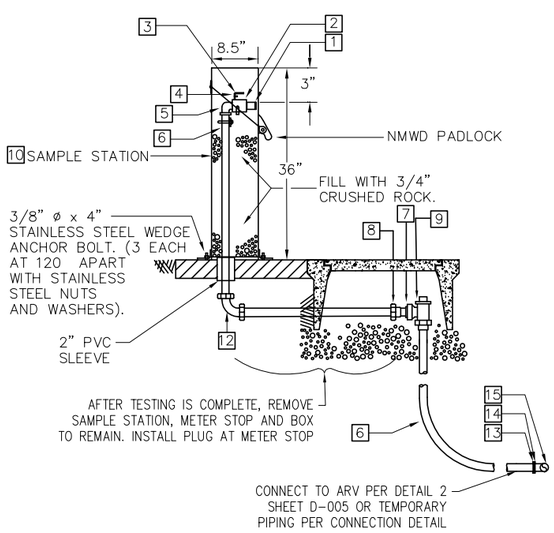
2 VALVE MARKINGS
N.T.S.



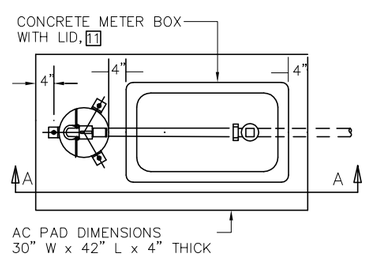
PARTS LIST		METER SIZE		
		5/8"	1"	1-1/2" & 2"
1	WELDED OUTLET	1"x3" LG	1"x3" LG	2"x3" LG
2	CORP STOP CCxCOMP	1"x1"	1"x1"	2"x2"
3	INSULATING COUPLING	1"	1"	2"
4	COPPER PIPE, TYPE K	1"	1"	2"
6	COUPLING	1"	1"	2"

NOTE:
1. BEFORE BACKFILLING, PRIME AND COAL TAR WRAP COPPER LATERAL FROM CORPORATION STOP TO POINT OF CONTACT WITH NATIVE SOIL. IF ENTIRE LATERAL IS BACK FILLED WITH PEA AND SAND WRAPPING IS NOT NECESARY. SEE NMWD TECHNICAL SPECIFICATION 02223 FOR TRENCHING & BACKFILLING REQUIREMENTS

4 CONNECTION TO MAIN – 18" & SMALLER
N.T.S.



SECTION A–A



PLAN
N.T.S.

3 TEMPORARY SAMPLE STATION (TSS)
N.T.S.

PARTS LIST

1	3/4"x2" BRASS NIPPLE WITH 3/4" BRASS CAP
2	3/4" BALL VALVE WITH SIDE TAP FIPxFIP, FEBCO
3	1/4" 90° BRASS STREET ELBOW, 1/4"x2" BRASS NIPPLE WITH 1/4" BRASS CAP
4	1/8"x1/4" STREET TEST COCK WITH HANDLE
5	3/4" 90° ELBOW COMxMIP, MUELLER H 15531
6	3/4" COPPER PIPE W/2" 10 MIL TAPE
7	1"x3/4" BRASS BUSHING
8	3/4" MIP x COMP COUPLING MUELLER H15428
9	3/4" METER STOP, MUELLER KVT2W
10	TEST STATION COVER (8"), PIPE LINE PRODUCTS PART NO. WTS-858 OR EQUAL
11	3/4" METER BOX, CHRISTY B9X W/FIBERLYTE LID
12	3/4" COMP. x COMP. 90° ELBOW
13	4" BLIND FLANGE TAPPED 1" WITH 1" x 3/4" BUSHING
14	4" SO FLANGE
15	4" WELD TEE – PART 21 ON DETAIL 1, THIS PAGE

REDUCED SIZE:
NOT TO SCALE

CSW ST2

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Civil & Structural Engineers Surveying & Mapping Environmental Planning
Land Planning Construction Management Landscape Architecture

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REGISTERED PROFESSIONAL ENGINEER
AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

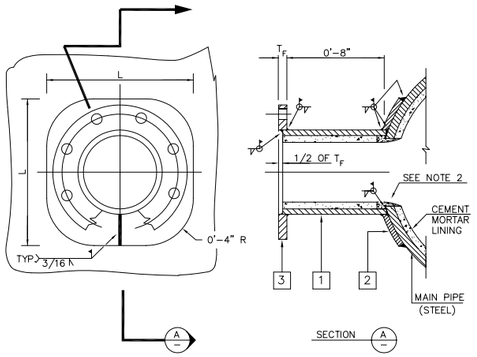
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	79 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D–004

Dec 04, 2013 – 4:24pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D04.dwg User: BARCJ

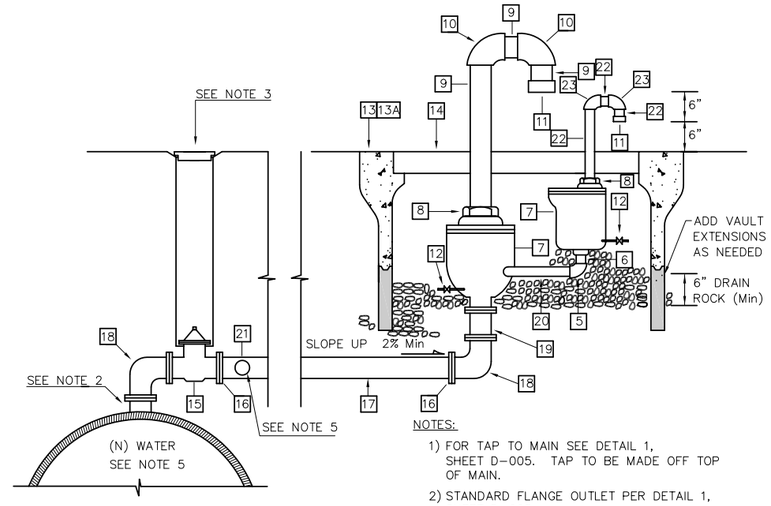


NOTES:
1) WELDING SHOWN SHALL BE SHOP PERFORMED ONLY. ALL WELDING SHALL BE PER AWWA C206.
2) CEMENT MORTAR LINING SHALL BE EXTENDED INTO THE INTERIOR OF THE BRANCH PIPE AND SHALL BE COMPLETELY AND SMOOTHLY FINISHED BY HAND.

PARTS LIST:

1	BRANCH PIPE (STEEL PIPE, CEMENT LINED, COAL TAR WRAPPED.)
2	WRAPPER/COLLAR PLATE (STEEL TO BE ASTM A36)
3	SLIP-ON WELD FLANGE (STEEL, AWWA C207 CLASS D, 150 PSI)

1/– STANDARD FLANGE OUTLET WITH COLLAR PLATE REINFORCEMENT
N.T.S.



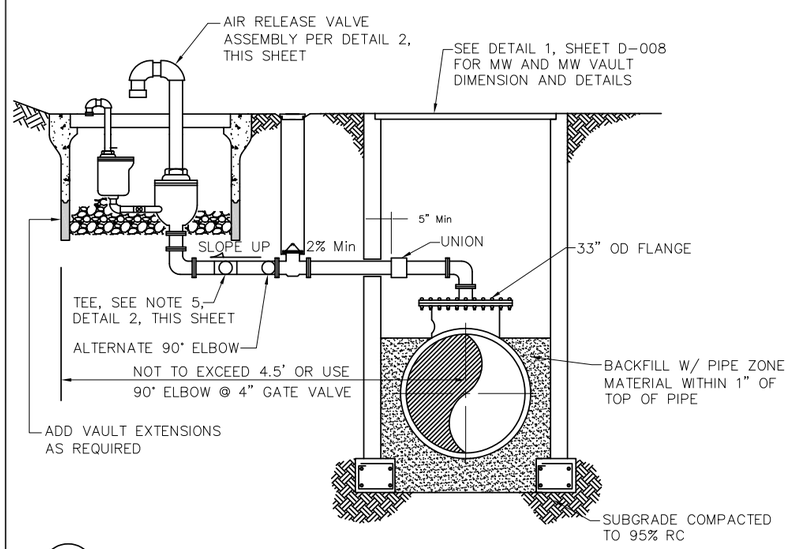
6"–14" AIR RELIEF ASSEMBLY

NOTES:
1) FOR TAP TO MAIN SEE DETAIL 1, SHEET D–005. TAP TO BE MADE OFF TOP OF MAIN.
2) STANDARD FLANGE OUTLET PER DETAIL 1, SHEET D–005
3) FOR VALVE RISER ASSEMBLY SEE DETAIL 3, SHEET D–001.
4) IF NOTED ON PLANS, INCLUDE TEE TO CONNECT TO TEMPORARY SAMPLING STATION PER DETAIL 3, SHEET D–004
5) USE SIZE AS NOTED ON PLAN

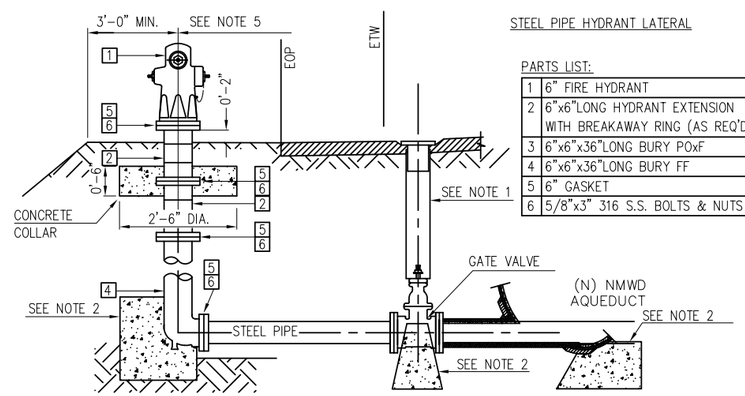
2/– COMBINATION AIR RELIEF, RELEASE, AND VACUUM VALVE INSTALLATION
N.T.S.

PARTS LIST

		AIR RELIEF SIZE					
		14"	12"	10"	8"	6"	1"
1	COPPER PIPE, TYPE K	–	–	–	–	–	–
2	METER STOP	–	–	–	–	–	–
3	BRASS BUSHING/METER FLANGE	–	–	–	–	–	–
4	BRASS NIPPLE	–	–	–	–	–	–
5	90° ELBOW BRASS	–	–	–	–	–	–
6	BRASS NIPPLE	–	–	–	–	–	–
7	6" CRISPIN AIR VACCUM VALVE 8" CRISPIN AIR VACCUM VALVE 10" CRISPIN AIR VACCUM VALVE OR EQUAL 12" CRISPIN AIR VACCUM VALVE 14" CRISPIN AIR VACCUM VALVE OR EQUAL	14"	12"	10"	8"	6"	1"
8	MALE ADAPTOR – PVC S/T	14"	12"	10"	8"	6"	1"
9	PVC PIPE, SCH 40/80	14"	12"	10"	8"	6"	1"
10	90° ELBOW – PVC SxS	14"	12"	10"	8"	6"	1"
11	SCREEN (NMWD FABRICATED) 316 SS, 1/8" OPENING	14"	12"	10"	8"	6"	1"
12	DRAIN VALVE ASSEMBLY (1/4" TEST COCK MIPxFIP & 1/4" PLUG)	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
13	METER BOX CHRISTY B30/B40/B48	B48	B48	B48	B48	B48	B48
14	METER BOX LID STEEL CHRISTY B30/B40–61D/B48–62G	62–G	62–G	62–G	62–G	62–G	62–G
15	GATE VALVE FF	14"	12"	10"	8"	6"	–
16	SLIP–ON WELD FLANGE	14"	12"	10"	8"	6"	–
17	STEEL PIPE CLCTW (FIELD FIT)	14"	12"	10"	8"	6"	–
18	90° ELBOW FF	14"	12"	10"	8"	6"	–
19	SPOOL FF (FIELD FIT)	14"	12"	10"	8"	6"	–
20	BRASS NIPPLE	1"x8"	1"x8"	1"x8"	1"x8"	1"x8"	–
21	4" WELD TEE – USE ONLY ON ARVS WHERE PLANS INDICATE TEMPORARY SAMPLING STATION STATION TO BE INSTALLED	14"	12"	10"	8"	6"	1" SER\ SADDLE CORP. S
22	PVC PIPE, SCH 40/80	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
23	90° ELBOW – PVC SxS	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"



3/– MANWAY AND AIR RELIEF COMBO
N.T.S.



STEEL PIPE HYDRANT LATERAL

PARTS LIST:

1	6" FIRE HYDRANT
2	6"x6"LONG HYDRANT EXTENSION WITH BREAKAWAY RING (AS REQ'D)
3	6"x6"x36"LONG BURY POxF
4	6"x6"x36"LONG BURY FF
5	6" GASKET
6	5/8"x3" 316 S.S. BOLTS & NUTS

NOTES:
1) FOR VALVE RISER REFER TO DETAIL 3, SHEET D–001.
2) FOR CONCRETE THRUST BLOCKING REFER TO DETAIL 1, THIS SHEET
3) BEFORE BACKFILLING, WRAP FLANGES AND BOLT RINGS WITH 10 MIL TAPE.
4) PRIME AND COAL TAR WRAP EXPOSED STEEL PIPE.
5) ALONG STREETS WITH NO CURB OR SIDEWALK FIRE HYDRANT SHALL BE INSTALLED 2'–6" AWAY FROM EDGE OF PAVEMENT.
6) FOR FIRE HYDRANT MATERIALS REFER TO SPECIFICATION
7) INSTALL FIRE HYDRANT SO THAT LARGEST OUTLET FACES STREET.

3/– TYPICAL FIRE HYDRANT
N.T.S.

REDUCED SIZE: NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	80 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D–005

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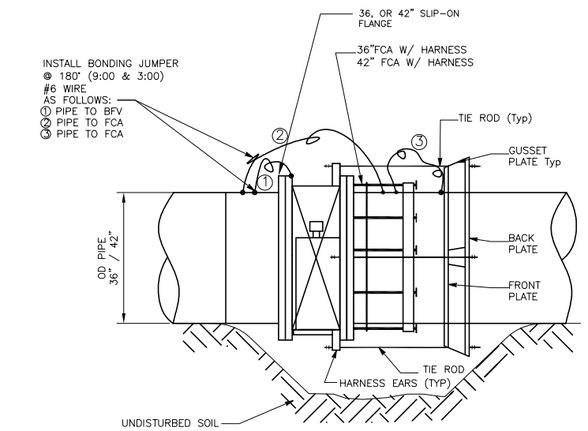
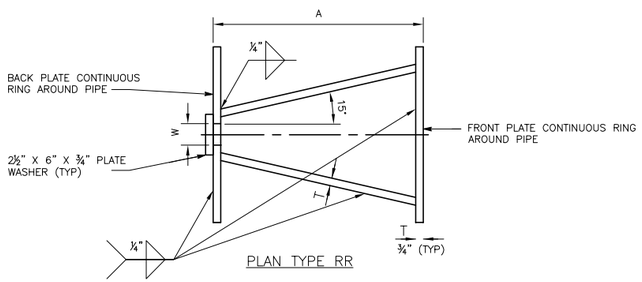


PIPE SIZE	TIE ROD (In)	T (In)	A (In)	W (In)	HB (In)	E (In)	HF (In)	HOLE Dia (In)	HARNESS EARS THICKNESS (In)
36"	1⅝	¾	10¾	2⅜	6¾	5⅝	3	1¾	2"
42"	1⅝	¾	10¾	2⅜	6¾	5⅝	3	1¾	2"



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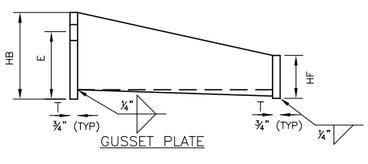
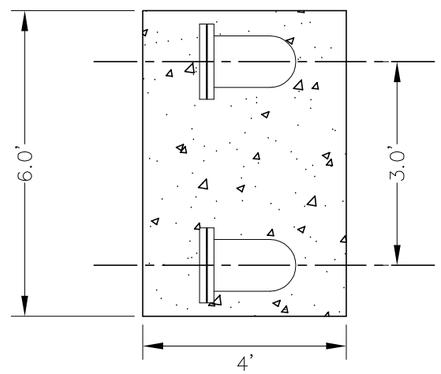
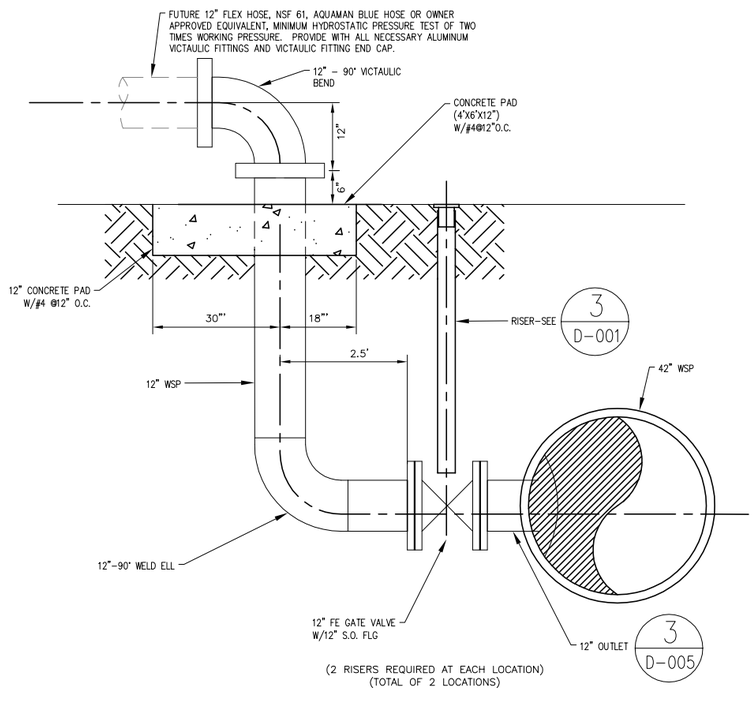


GUSSET PLATE

1 — N.T.S. 36", & 42" BUTTERFLY VALVE & FCA W/ HARNESS

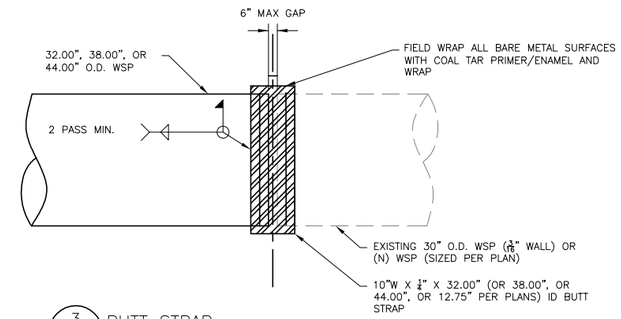


PLAN

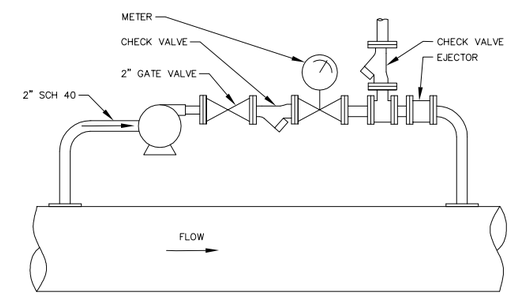


ELEVATION

5 — N.T.S. 12" EMERGENCY BYPASS

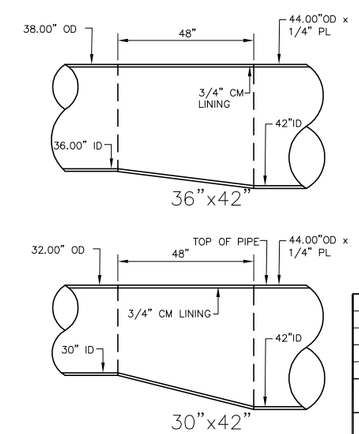


3 — N.T.S. BUTT STRAP



4 — N.T.S. SUPERIOR (TM) GAS CHLORINATOR SERIES CL-10/20

REDUCED SIZE: NOT TO SCALE



6 — N.T.S. ECENTRIC REDUCER

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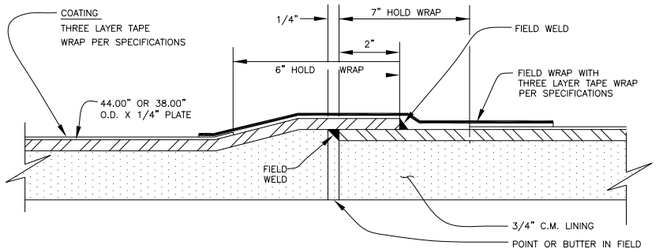
NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	81 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-006

Jan 16, 2014 – 11:01am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D06.dwg User: SHUJK



1) PIPE CYLINDER, LINING AND COATING SHALL CONFORM TO THE SPECIFICATIONS FOR MANUFACTURE OF MORTAR LINED STEEL PIPE.

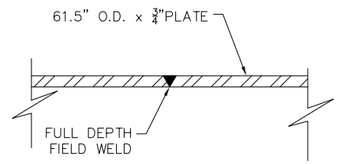
2) SUBMIT CERTIFICATES OF COMPLIANCE FROM PIPE MANUFACTURER THAT PIPE HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH SPECIFICATIONS.

3) "CLEAN" AREAS SHALL BE FREE OF ALL COATING MATERIALS OR SHALL BE TAPED FOR EASY STRIPPING IN THE FIELD TO BARE CLEAN STEEL.

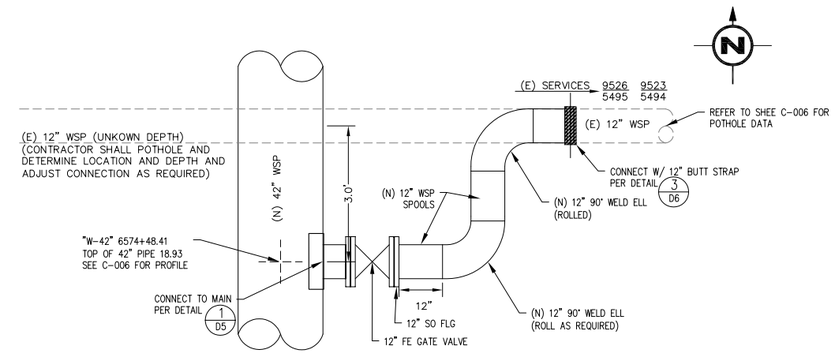
4) PIPE JOINTS SHALL BE DOUBLE LAP WELDED WITH A 1/4" FILLET WELD ALL AROUND (DOUBLE PASS).

5) DOUBLE WELD JOINTS ARE REQUIRED FROM STA. 6550+00 TO 6570+00.

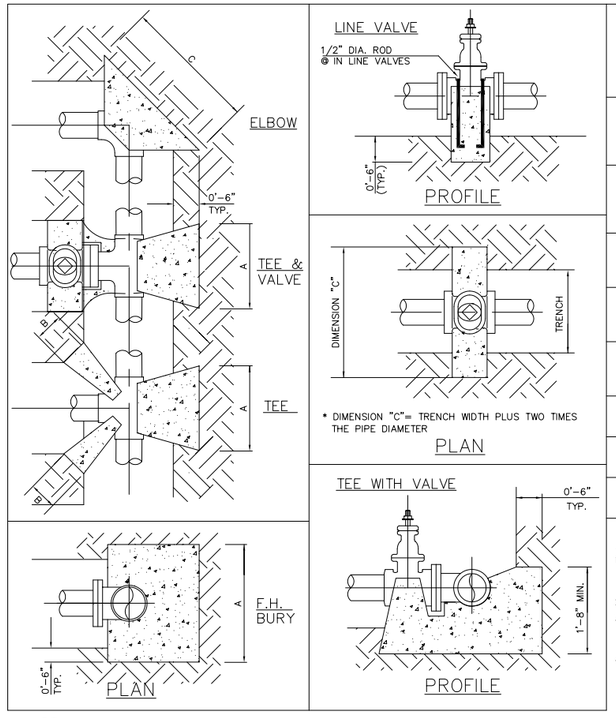
1 / — LAP WELD JOINT
N.T.S.



2 / — BUTT WELD JOINT (60" STEEL CASING ONLY)
N.T.S.



3 / — PLAN – 12" SERVICE CONNECTION
N.T.S.



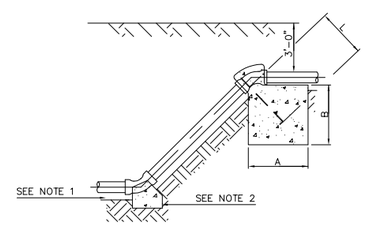
PIPE SIZE IN	SOIL TYPE	ALLOWABLE BEARING PRESSURE PSF	REQUIRED DIMENSIONS IN INCHES: TEES DEAD ENDS A	TEES CROSSES B	90° BEND C	45° BEND C	22.5° BEND C
4	SOFT CLAY	1000	18	13	25	14	7
4	SAND	2000	9	6	13	7	4
4	SAND, GRAVEL & CLAY	4000	5	3	6	3	2
4	SHALE OR ROCK	10000	2	1	3	1	1
6	SOFT CLAY	1000	41	29	57	31	16
6	SAND	2000	20	14	29	16	8
6	SAND, GRAVEL & CLAY	4000	10	7	14	8	4
6	SHALE OR ROCK	10000	4	3	6	3	2
8	SAND	2000	36	25	51	28	14
8	SAND, GRAVEL & CLAY	4000	18	13	25	14	7
8	SHALE OR ROCK	10000	7	5	10		3
10	SAND	2000	56	40	80	43	22
10	SAND, GRAVEL & CLAY	4000	28	20	40	22	11
10	SHALE OR ROCK	10000	11	8	16	9	4
12	SAND	2000	81	57	115	62	32
12	SAND, GRAVEL & CLAY	4000	41	29	57	31	16
12	SHALE OR ROCK	10000	16	11	23	12	6
14	SAND, GRAVEL & CLAY	4000	55	39	78	42	22
14	SHALE OR ROCK	10000	22	16	31	17	9
16	SAND, GRAVEL & CLAY	4000	72	51	102	55	28
16	SHALE OR ROCK	10000	29	20	41	22	11
18	SAND, GRAVEL & CLAY	4000	91	64	129	70	36
18	SHALE OR ROCK	10000	36	26	52	28	14

THRUST BLOCK BEARING AREAS BASED ON STATIC PRESSURE OF 150 PSI

NOTES:

1) SEE SPECIFICATIONS FOR CONCRETE REQUIREMENTS. PLACE CONCRETE AGAINST UNDISTURBED SOIL. ALL CONCRETE TO BE KEPT CLEAR OF VALVE AND FITTING ENDS FOR REPAIR REMOVAL. CONCRETE SHALL NOT EXTEND ONTO ADJOINING PIPE.
2) FOR USE WITH UNRESTRAINED PIPE.
3) A MINIMUM OF 24 HOURS CURING TIME REQUIRED FOR CONCRETE THRUST BLOCKS BEFORE ANY WATER IS INTRODUCED TO THE PIPELINE. A MINIMUM OF 3 DAYS CURING TIME IS REQUIRED PRIOR TO PRESSURE TESTING.
4) WRAP EXPOSED REBAR WITH TAPE.

4 / — CONCRETE THRUST BLOCKING
N.T.S.



PIPE SIZE INCH	ROD DIA. INCH	NO. OF RODS	EMBEDMENT LENGTH OF ROD INCH L	ANCHOR BLOCK: CUBIC FEET CONCRETE	CUBIC YARDS CONCRETE	BLOCK DIMENSIONS INCHES: A	B	WIDTH
4	0.500	1	12	13	0.47	28	28	28
6	0.500	1	12	29	1.07	36	36	36
8	0.500	1	12	51	1.90	44	44	44
10	0.625	1	14	80	2.96	51	51	51
12	0.750	1	16.5	115	4.26	57	57	57
14	1.000	1	22	157	5.80	64	64	64
16	1.000	1	22	205	7.58	69	69	69
18	1.000	2	22	259	9.59	75	75	75

BASED ON STATIC PRESSURE OF 150 PSI.
CONCRETE ANCHOR BLOCK DIMENSIONS BASED ON 150 PCF CONCRETE UNIT WEIGHT.

NOTES:

1) FOR TRENCH SECTION REFER TO DETAIL 1 AND 2 THIS SHEET
2) FOR CONCRETE THRUST BLOCKING REFER TO DETAIL 4, THIS SHEET.
3) PLACE CONCRETE AGAINST UNDISTURBED SOIL.
4) SEE SPECIFICATION FOR CONCRETE REQUIREMENTS.

5 / — CONCRETE ANCHOR BLOCKS FOR VERTICAL BENDS
N.T.S.

REDUCED SIZE:
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CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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AL G. Cornwell
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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	82 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D–007

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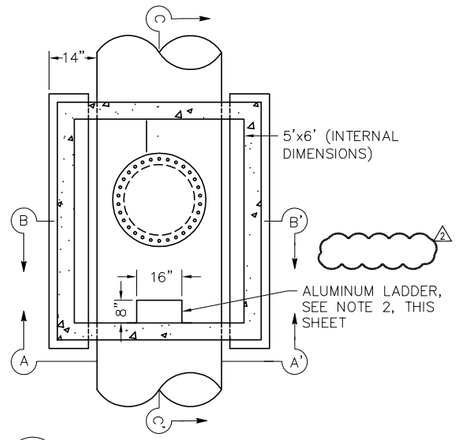
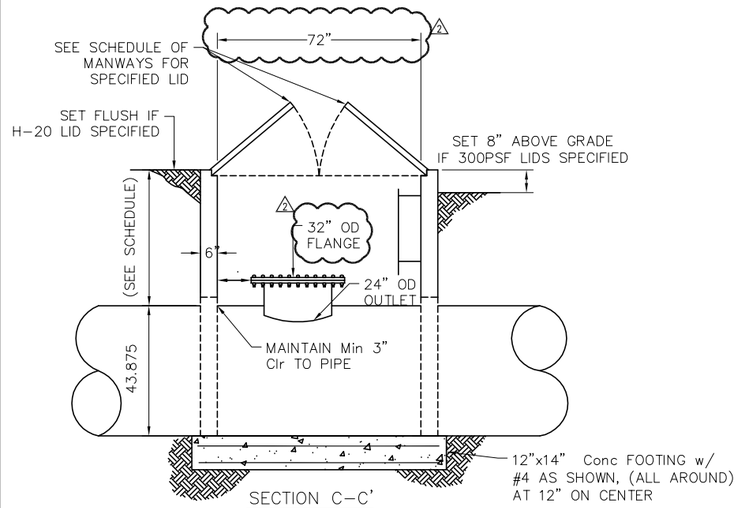


1 MANWAY VAULT – PLAN
N.T.S.

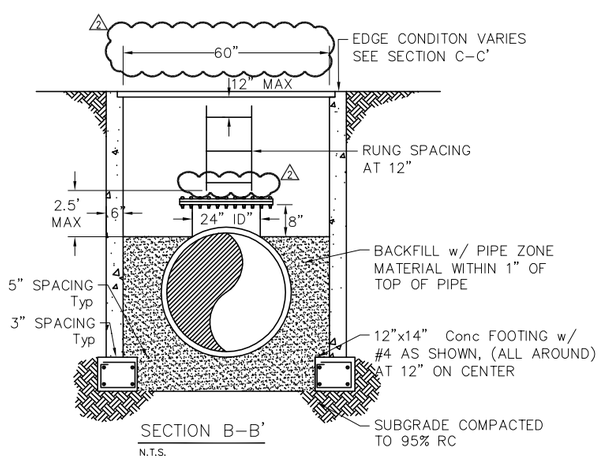


SECTION C–C'
N.T.S.

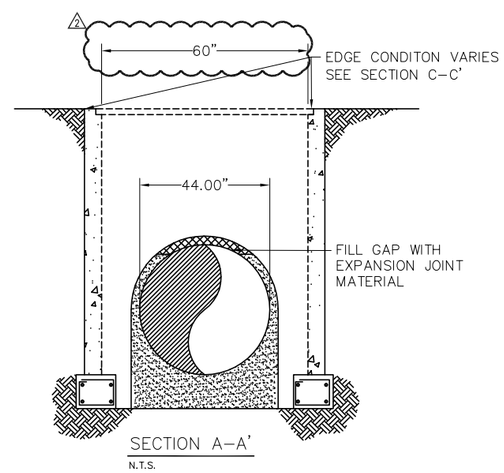
SCHEDULE OF MANYWAYS

LINE	STA	SHEET	SURFACE	VAULT LID
1	6522+92.42	C–001	UNPAVED	ALUMINUM, SPRING LOADED, H–20 RATED
2	6531+00.00	C–001	UNPAVED	ALUMINUM, SPRING LOADED, 300 PSF
2	6551+73.00	C–003	UNPAVED	ALUMINUM, SPRING LOADED, 300 PSF
3	6571+35.15	C–006	UNPAVED SHOULDER	ALUMINUM, SPRING LOADED, H–20
4	6591+37.89	C–008	UNPAVED SHOULDER	ALUMINUM, SPRING LOADED, H–20
5	6606+40.02	C–010	UNPAVED SHOULDER	ALUMINUM, SPRING LOADED, H–20
6	662640.02	C–012	UNPAVED SHOULDER	ALUMINUM, SPRING LOADED, H–20
7	6658+24.55	C–014	UNPAVED SHOULDER	ALUMINUM, SPRING LOADED, H–20

NOTE:
1. ALL MANWAYS TO BE 24" ID
2. UPPER RUNGS TO BE INCLUDED IF DEPTH TO TOP OF PIPE EXCEEDS 4.5' LADDER SHALL BE SECURELY BOLTED TO WALL OF VAULT



SECTION B–B'
N.T.S.



SECTION A–A'
N.T.S.

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NO.	DATE	REVISION	BY	APP.
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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
STANDARD DETAILS

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
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R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D–008

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CONNECTION SEQUENCE (SEE GENERAL NOTES ON DRAWING G-002 FOR TIME OF YEAR WHEN INTERRUPTION OF AQUEDUCT WATER FLOW IS ALLOWED)

THE FOLLOWING DESCRIBES THE WORK TO BE COMPLETED IN EACH OF THE PHASES OF THE CONNECTION OF THE NEW AQUEDUCT. CONTRACTOR SHALL FOLLOW GENERALIZED PROCEDURE BELOW, AS WELL AS SPECIFICATIONS, IN CONSTRUCTING THE THREE CONNECTIONS: SOUTHERN CONNECTION, MIDDLE CONNECTION AND NORTHERN CONNECTION (REFER TO DRAWINGS G-004 AND D-015 FOR SOUTHERN, MIDDLE, AND NORTHERN CONNECTION LOCATIONS), AS SHOWN ON THE FOLLOWING DETAILS PAGES.

PHASE 1: INSTALLATION OF CONNECTION WYE – MIDDLE CONNECTION ONLY

a. CONTRACTOR TO ASSEMBLE WYE, VALVES AND PIPING AS SHOWN.
b. CONTRACTOR TO CAP ENDS OF WYE ASSEMBLY TO CONDUCT HYDROSTATIC TEST, PER SPECIFICATIONS.
c. CONTRACTOR TO SWEEP AND DISINFECT WYE ASSEMBLY TO SATISFACTION OF NMWD AND SCWA.
d. IF NMWD INDICATES THAT DISINFECTION IS NOT ACCEPTABLE, CONTRACTOR IS TO REPEAT DISINFECTION OF WYE ASSEMBLY.
e. NMWD TO CLOSE VALVES ON NMWD SYSTEM TO ISOLATE PORTION OF AQUEDUCT CONTAINING CONNECTION POINT. CONTRACTOR SHALL NOT OPERATE VALVES ON EXISTING AQUEDUCT. SCWA VALVES SHALL BE OPERATED BY SCWA.
f. CONTRACTOR TO DEWATER SECTION OF PIPE CONTAINING CONNECTION POINT.
g. CONTRACTOR TO CUT PIPE AT SPECIFIED POINTS.
h. CONTRACTOR TO CONNECT NEW WYE ASSEMBLY TO EXISTING AQUEDUCT, INCLUDING WELDING JOINT, TAPE WRAPPING, AND CEMENT MORTAR POINTING JOINT.
i. WHEN CONNECTIONS ARE COMPLETE, CONTRACTOR TO NOTIFY NMWD THAT AQUEDUCT IS READY TO BE OPERATIONAL. NMWD WILL OPEN VALVES TO RESTORE FLOW THROUGH AQUEDUCT. SCWA VALVES SHALL BE OPERATED BY SCWA.
j. AQUEDUCT IS TO BE OPERATIONAL WITHIN TWELVE (12) HOURS OF INITIAL SHUTDOWN. CONTRACTOR IS TO SCHEDULE AND EXECUTE STEPS (e) THROUGH (i) TO COMPLY WITH THIS TIME CONSTRAINT.

PHASE 2: CONSTRUCTION OF NEW AQUEDUCT

a. CONTRACTOR TO CONSTRUCT NEW AQUEDUCT, EXCEPT FOR CONNECTION POINTS TO EXISTING AQUEDUCT
b. CONTRACTOR TO BROOM SWEEP AQUEDUCT AND REMOVE SWEEPINGS, IN CONFORMANCE TO SPECIFICATIONS.
c. (NORTHERN CONNECTION ONLY) CONTRACTOR TO CONSTRUCT TEMPORARY BACKFLOW PREVENTION AND CONNECTION TO EXISTING AQUEDUCT PER DETAIL (INCLUDES 24" LINE STOP).
d. NMWD AND SCWA TO INSPECT AND APPROVE BACKFLOW PREVENTION OF TEMPORARY CONNECTION. SCWA SHALL OPERATE SCWA VALVES ONLY.
e. CONTRACTOR TO USE TEMPORARY CONNECTION TO EXISTING AQUEDUCT TO FILL NEW AQUEDUCT.
f. CONTRACTOR TO CONDUCT HYDROSTATIC TEST OF NEW AQUEDUCT IN COMPLIANCE WITH SPECIFICATIONS. HYDROSTATIC TEST SHALL NOT BE CONDUCTED WHILE THERE IS A CONNECTION (EVEN TEMPORARY, PER ITEMS C & E) TO EXISTING AQUEDUCT. TEMPORARY CONNECTION MAY BE USED TO FILL THE PIPE, BUT HYDRAULIC PRESSURE IN THE NEW PIPE SHALL BE MAINTAINED LESS THAN THE PRESSURE IN THE EXISTING AQUEDUCT AT ALL TIMES WHILE THE TEMPORARY CONNECTION IS IN PLACE. REMOVE TEMPORARY CONNECTION DURING THE HYDROSTATIC TEST.
g. CONTRACTOR SHALL FLUSH THE AQUEDUCT, INJECTING CHLORINE INTO THE PIPE PER THE SPECIFICATIONS.
h. CONTRACTOR TO COLLECT WATER FLUSHED AT SOUTHERN END OF NEW AQUEDUCT SEGMENTS, DECHLORINATE, AND DISPOSE OF IN CONFORMANCE WITH THE SPECIFICATIONS AND PERMIT REQUIREMENTS.
i. NMWD WILL TEST CHLORINE RESIDUAL AT SAMPLING STATIONS TO ENSURE ADEQUATE INITIAL CHLORINATION. AREAS OF THE SYSTEM FOUND TO BE BELOW THE SPECIFIED CHLORINE CONCENTRATION LEVEL SHALL RECEIVE ADDITIONAL FLUSHING AS NOTED ABOVE AND/OR ADDITIONAL DISINFECTION SOLUTION AS NECESSARY.
j. CHLORINATED WATER TO BE RETAINED IN AQUEDUCT FOR 24 HOURS.
k. NWMD TO TEST WATER WITHIN NEW AQUEDUCT FOR ADEQUATE CHLORINE RESIDUAL AFTER 24 HOURS.
l. FOLLOWING A SUCCESSFUL RETENTION PERIOD AS DETERMINED BY NMWD, THE CHLORINATED WATER SHALL BE FLUSHED FROM THE SYSTEM AT ITS EXTREMITIES AND AT EACH APPURTENANCE, USING POTABLE WATER FROM THE EXISTING AQUEDUCT. FLUSHING SHALL CONTINUE UNTIL CHLORINE RESIDUAL AND THE TURBIDITY LEVEL ARE AS SPECIFIED IN THE SPECIFICATIONS.
m. NMWD WILL PERFORM BACTERIOLOGICAL SAMPLING AND TESTING.
n. AFTER 24 HOURS, NMWD WILL PERFORM BACTERIOLOGICAL SAMPLING AND TESTING A SECOND TIME.
o. PIPE MUST PASS BOTH TESTS FOR CONTRACTOR TO PROCEED TO PHASE 3.

PHASE 3: PERMANENT CONNECTION

a. CONTRACTOR TO REMOVE TEMPORARY BACKFLOW PREVENTER AT NORTHERN CONNECTION TO EXISTING AQUEDUCT AND CONSTRUCT PERMANENT CONNECTION, AS SHOWN.
b. CONTRACTOR TO INSTALL CONNECTION BETWEEN NEW AQUEDUCT AND WYE AT MIDDLE CONNECTION CONSTRUCTED IN PHASE 1.
c. CONTRACTOR TO INSTALL CONNECTION BETWEEN NEW AQUEDUCT AND SOUTHERN CONNECTION, AS SHOWN.
d. NMWD TO OPERATE VALVES TO SWITCH FLOW FROM OLD AQUEDUCT TO NEW AQUEDUCT.
e. CONTRACTOR TO REMOVE SUFFICIENT LENGTH OF OBSOLETE SECTION OF EXISTING AQUEDUCT IN ORDER TO INSTALL BLIND FLANGE, AS SHOWN.
f. OBSOLETE SECTION OF EXISTING AQUEDUCT TO BE ABANDONED, PER DEMO SHEETS. REMAINDER OF AQUEDUCT TO BE REMOVED OR ABANDONED IN PLACE BY HIGHWAY PROJECT, AS NEEDED.

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
CONNECTION SEQUENCE
PHASE DESCRIPTION

DES	DR	CH	SCALE	NTS
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013
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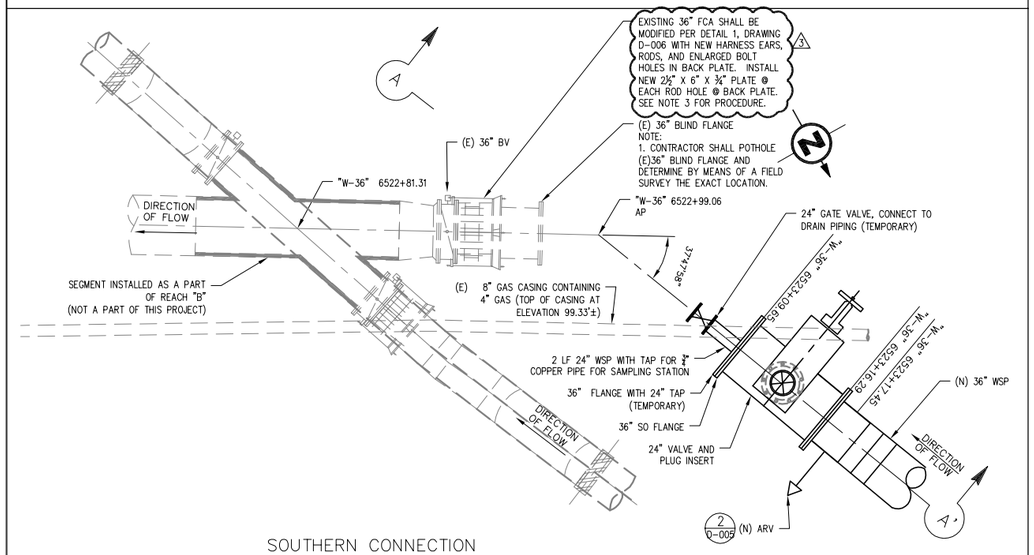
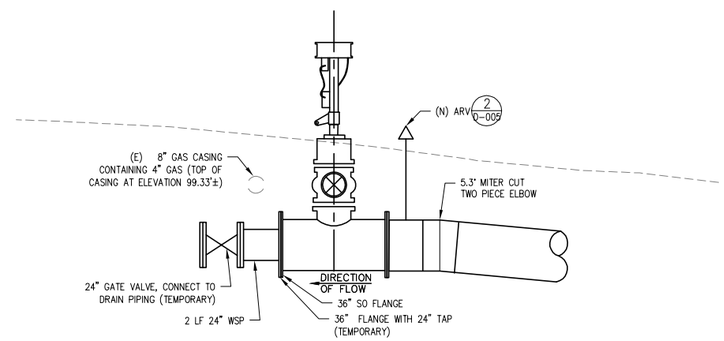
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 D-009

Dec 04, 2013 – 4:23pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D09.dwg User: SHUJK

SOUTHERN CONNECTION
PHASE 1 – NO WORK



SOUTHERN CONNECTION
PHASE 2 – PLAN VIEW
"W-36" 6522+81.31
SCALE: 1" = 4'



SOUTHERN CONNECTION
PHASE 2 – SECTION A – A'
"W-36" 6522+81.31
SCALE: 1" = 4'

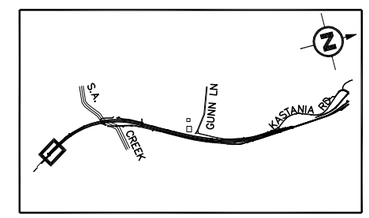
NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-001 FOR "SOUTH CONNECTION" PLAN AND PROFILE.
3. MODIFY EXISTING 36" FCA @ STA 6522+81±.

PROCEDURE FOR REPLACEMENT OF HARNESS EARS AND TIE RODS:

a. CLOSE EXISTING 36" BUTTERFLY VALVE; BLEED PRESSURE BETWEEN VALVE AND EXISTING 36" BLIND FLANGE.
b. REMOVE EXISTING TIE RODS, NUT ASSEMBLIES.
c. REMOVE 3 BOLTS FROM CLASS "D" FLANGES AND REMOVE EXISTING HARNESS EARS.
d. DRILL HOLES IN EXISTING BACK PLATE 1/8" LARGER THAN NEW TIE ROD SIZE.
e. INSTALL NEW EPOXY COATED HARNESS EARS PER CHART. INSTALL ROD, NUTS, AND PLATE WASHER PER CHART AND FIELD COAT WITH POLYGUARD 600 FIELD WRAP AND NUTS.
f. ENSURE TIE ROD ASSEMBLIES ARE FULLY TIGHTENED PRIOR TO REOPENING VALVE.

KEYMAP



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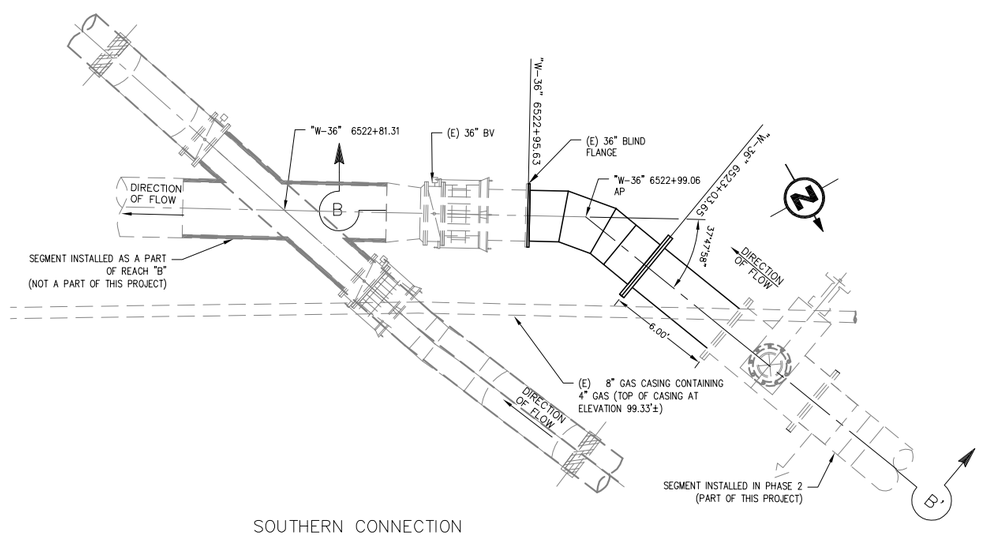
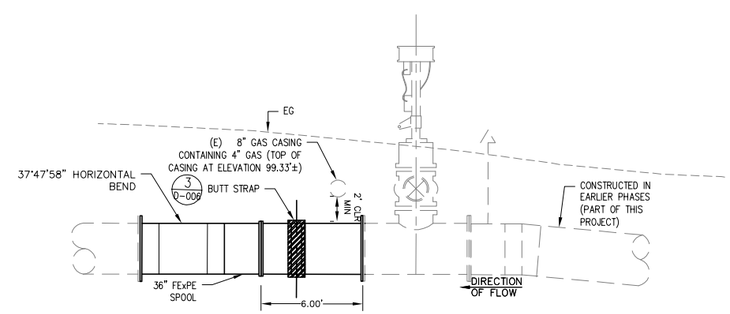


SOUTHERN CONNECTION
PHASE 3 – PLAN VIEW
"W-36" 6522+81.31
SCALE: 1" = 4'



SOUTHERN CONNECTION
PHASE 3 – SECTION B – B'
"W-36" 6522+81.31
SCALE: 1" = 4'

REDUCED SIZE:
NOT TO SCALE

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1	01/23/14	ADDENDUM 3	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
SOUTH CONNECTION
PHASES 1, 2, AND 3

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
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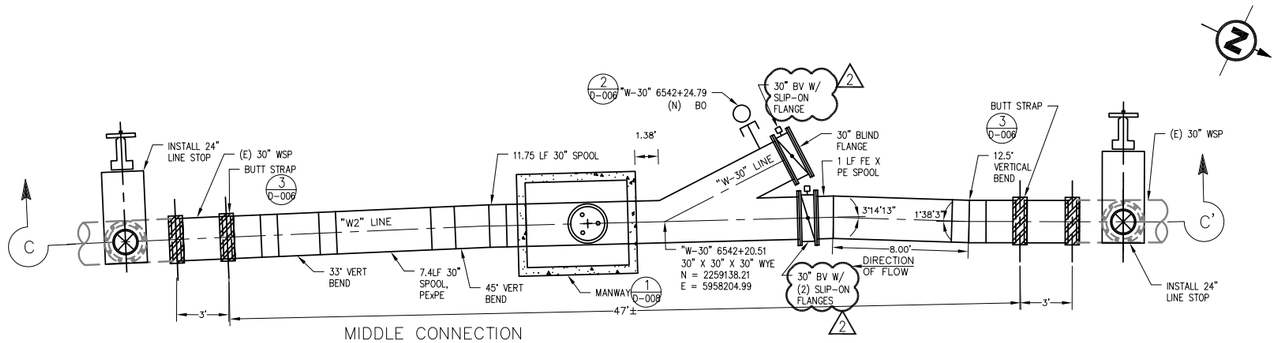
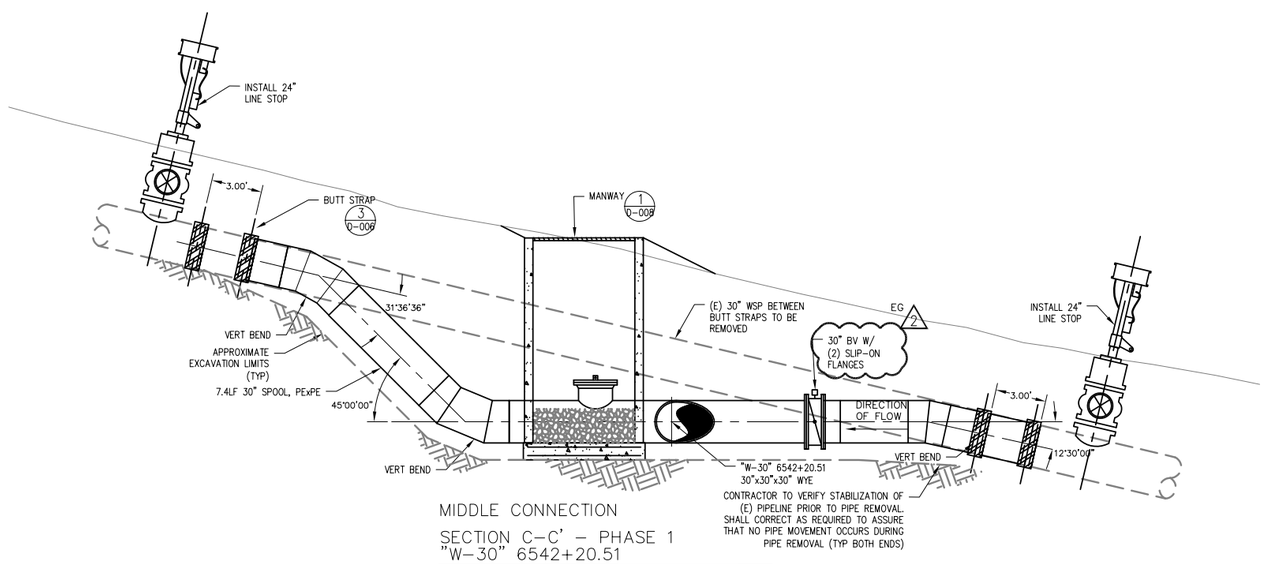
NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-003 FOR "MIDDLE CONNECTION" PLAN AND PROFILE.



MIDDLE CONNECTION
PLAN VIEW – PHASE 1
"W-30" 6542+20.51

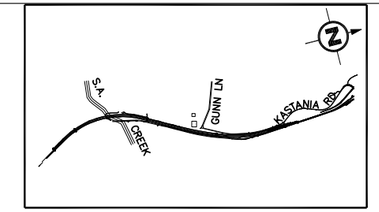
SCALE: 1" = 4'



MIDDLE CONNECTION
SECTION C–C' – PHASE 1
"W-30" 6542+20.51

SCALE: 1" = 4'

KEYMAP



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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
MIDDLE CONNECTION
PHASE 1

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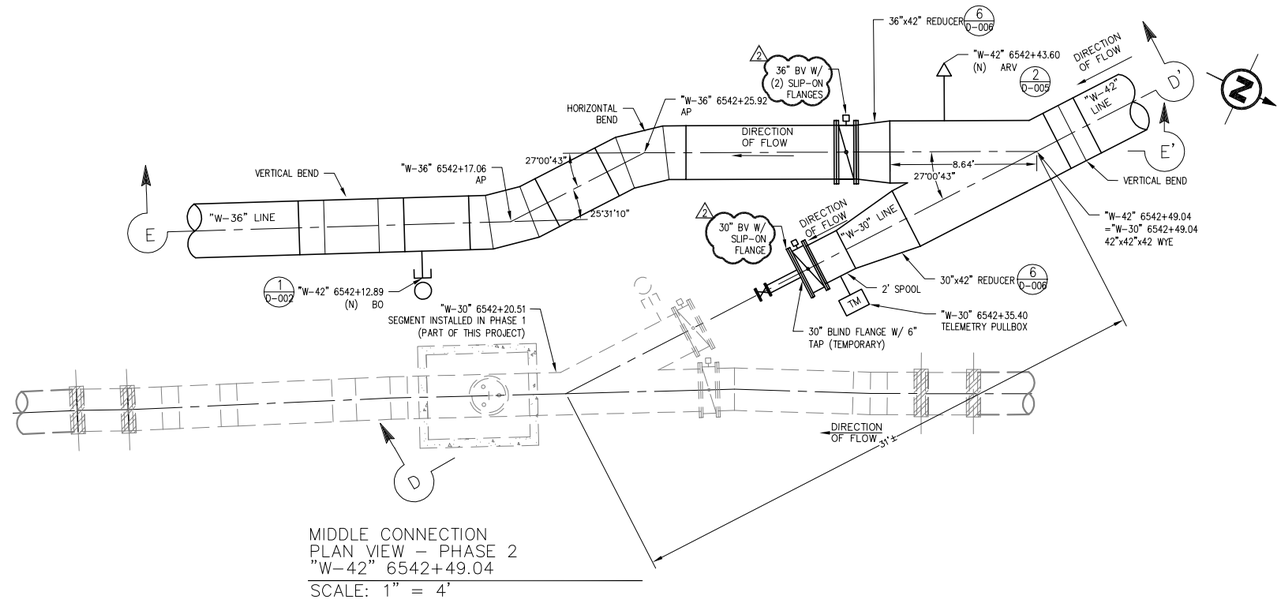
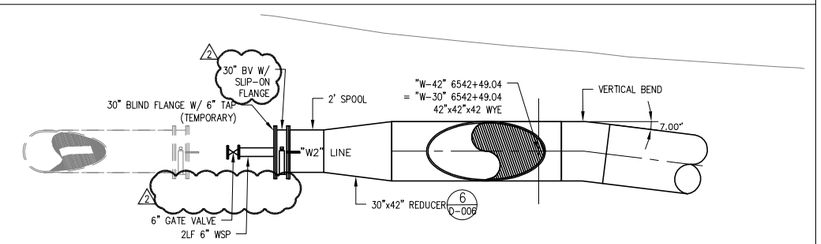
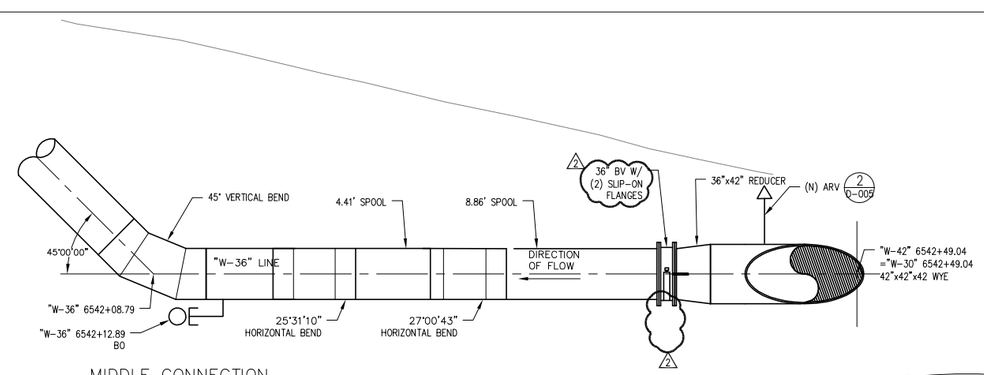


MIDDLE CONNECTION
PLAN VIEW – PHASE 2
"W-42" 6542+49.04
SCALE: 1" = 4'



MIDDLE CONNECTION
SECTION D–D' – PHASE 2
"W-42" 6542+49.04
SCALE: 1" = 4'



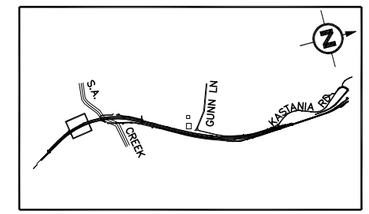
MIDDLE CONNECTION
SECTION E–E' – PHASE 2
"W-42" 6542+49.04
SCALE: 1" = 4'

REDUCED SIZE:
NOT TO SCALE

NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-003 FOR "MIDDLE CONNECTION" PLAN AND PROFILE.

KEYMAP



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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
MIDDLE CONNECTION
PHASE 2

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	87 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-012

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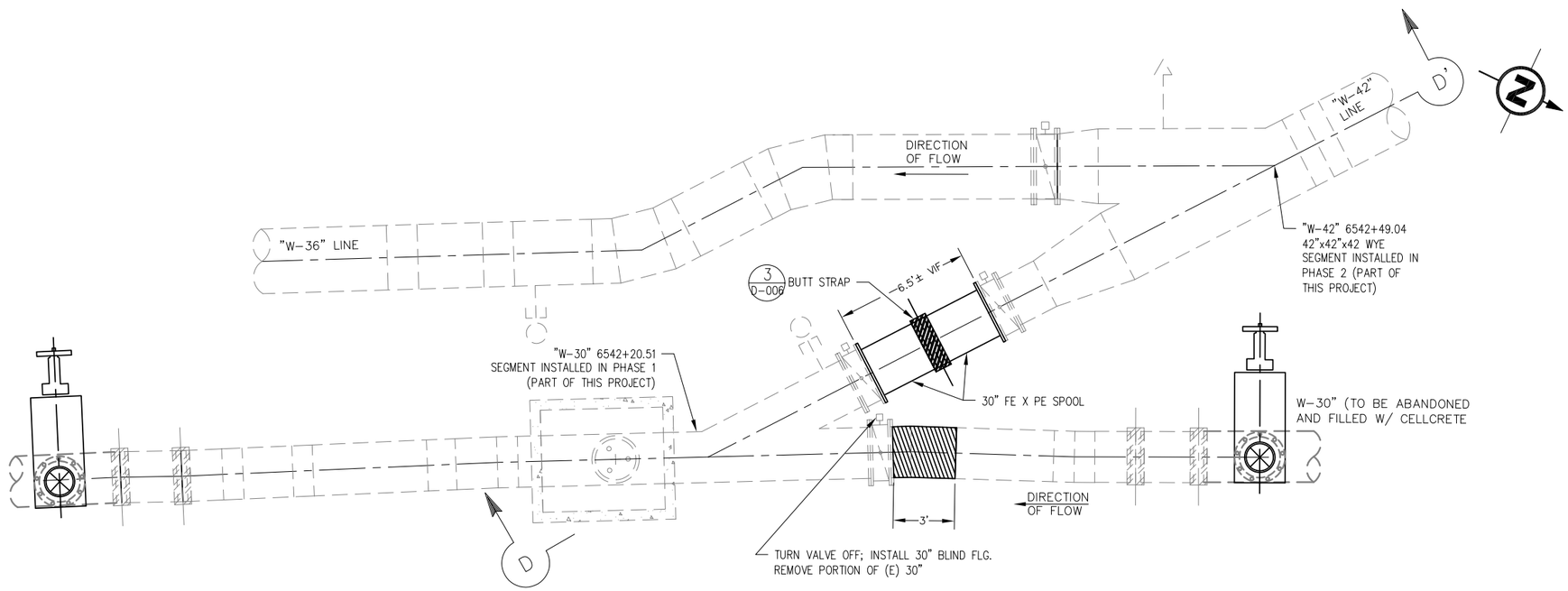
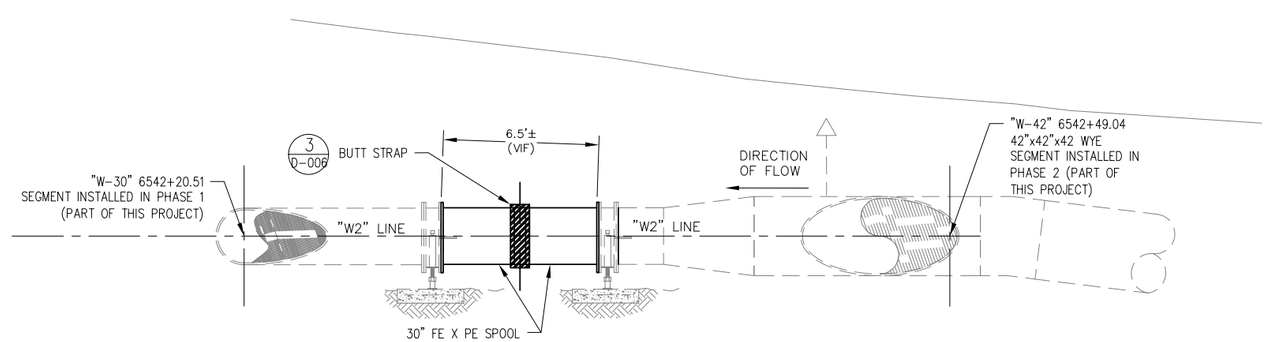
NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-003 FOR "MIDDLE CONNECTION" PLAN AND PROFILE.



MIDDLE CONNECTION
PLAN VIEW – PHASE 3
"W-42" 6542+49.04

SCALE: 1" = 4'



MIDDLE CONNECTION
SECTION I–I' – PHASE 3
"W-42" 6542+49.04

SCALE: 1" = 4'

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
MIDDLE CONNECTION
PHASE 3

DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	88 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-013

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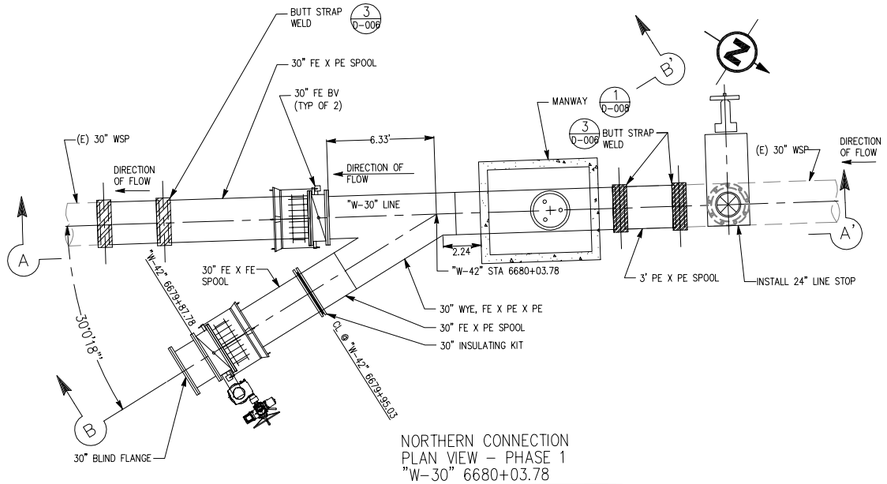
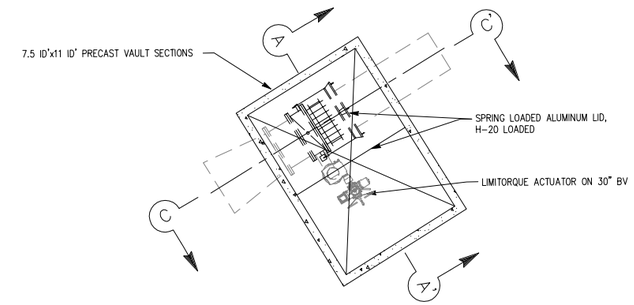


NORTHERN CONNECTION
PLAN VIEW – PHASE 1
"W-30" 6680+03.78

SCALE: 1" = 4'



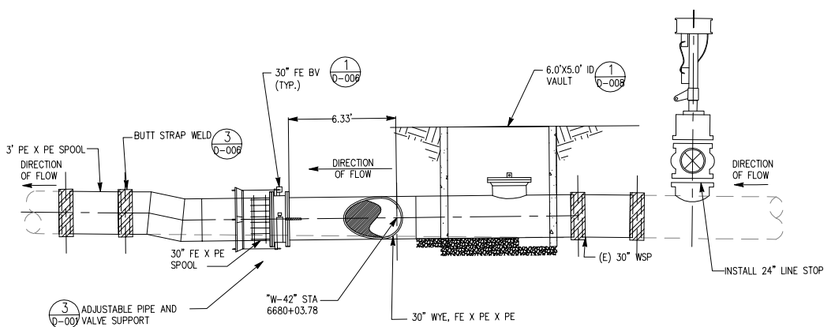
NORTHERN CONNECTION
PLAN VIEW– BV
"W-30" 6679+90.03

1 / --

N.T.S.

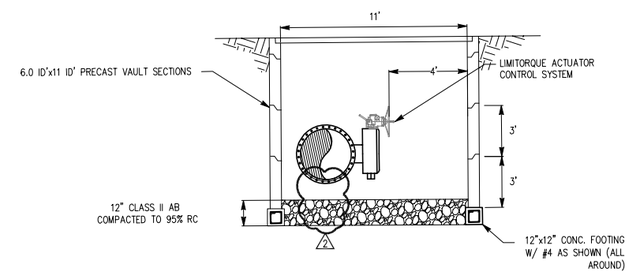
NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-020 FOR "NORTH CONNECTION" PLAN AND PROFILE.



NORTHERN CONNECTION
SECTION A–A' – PHASE 1
"W-30" 6680+03.78

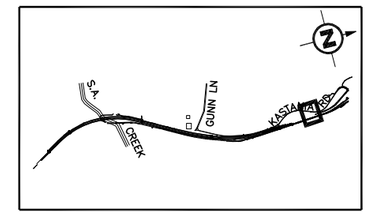
SCALE: 1" = 4'



SECTION A–A'

N.T.S.

KEYMAP



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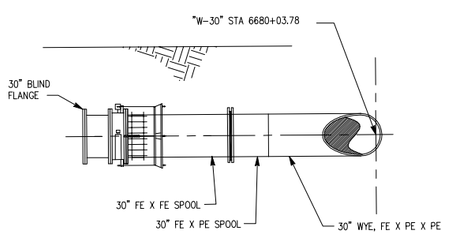


NORTHERN CONNECTION
SECTION B–B', PHASE 1

SCALE: 1" = 4'

REDUCED SIZE:
NOT TO SCALE

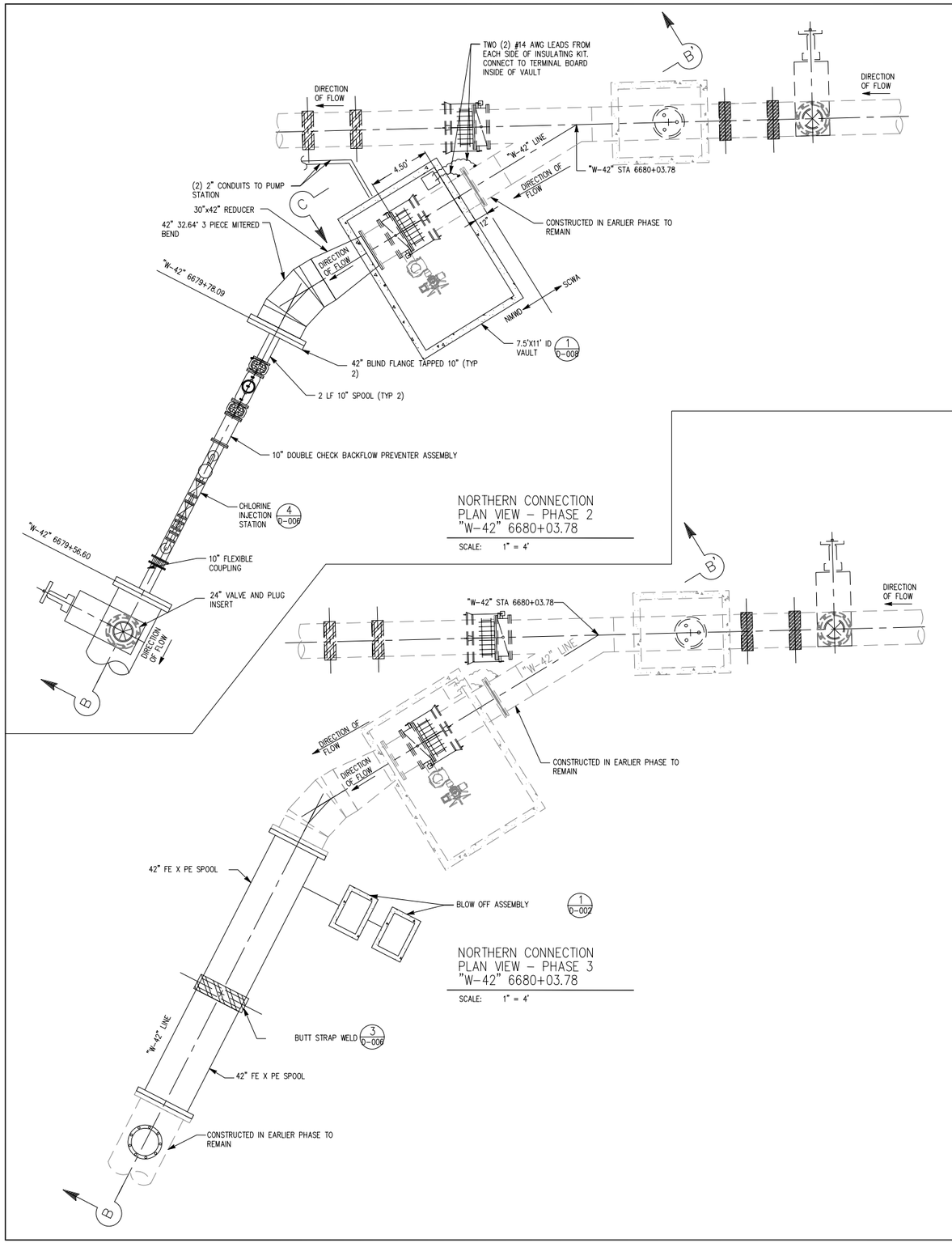
NO.	DATE	REVISION	BY	APP.
1	01/17/13	ADDENDUM 2	JKS	
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
NORTH CONNECTION
PHASE 1

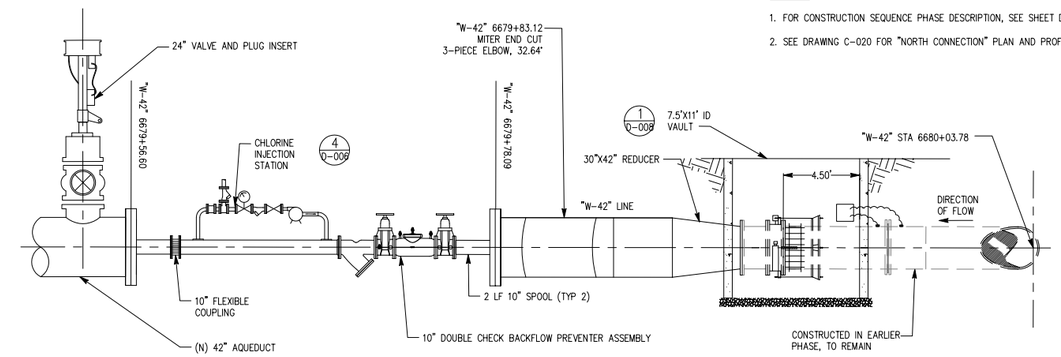
DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	89 OF 149	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D–014

Feb 26, 2014 – 6:18pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D14.dwg User: BARCJ



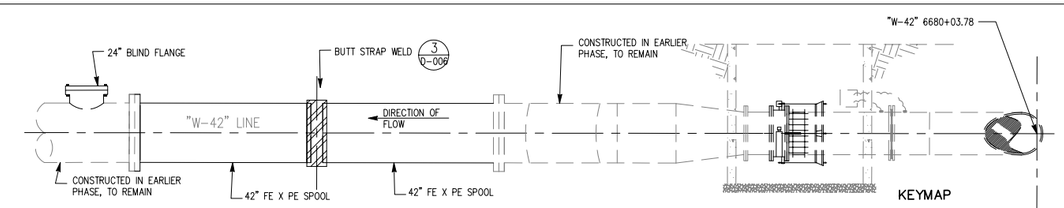
NOTES

1. FOR CONSTRUCTION SEQUENCE PHASE DESCRIPTION, SEE SHEET D-009.
2. SEE DRAWING C-020 FOR "NORTH CONNECTION" PLAN AND PROFILE.



NORTHERN CONNECTION
SECTION B-B', PHASE 2

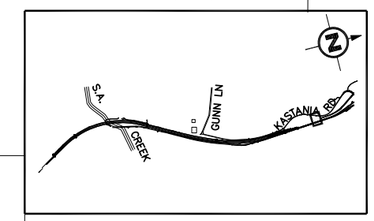
SCALE: 1" = 4'

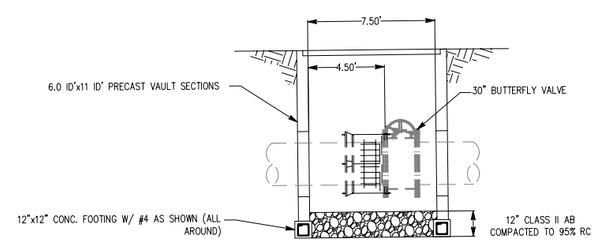


NORTHERN CONNECTION
SECTION B-B', PHASE 3

SCALE: 1" = 4'

KEYMAP





SECTION C-C'

N.T.S.

REDUCED SIZE:
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
NORTH CONNECTION
PHASE 2 & 3

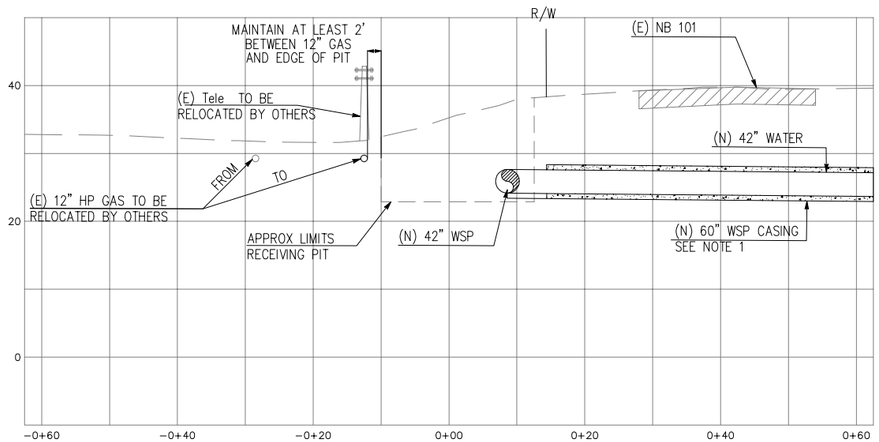
DES	DR	CH	SCALE	NTS	
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	90 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09	D-015

Dec 04, 2013 - 4:18pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D15.dwg User: SHUJK

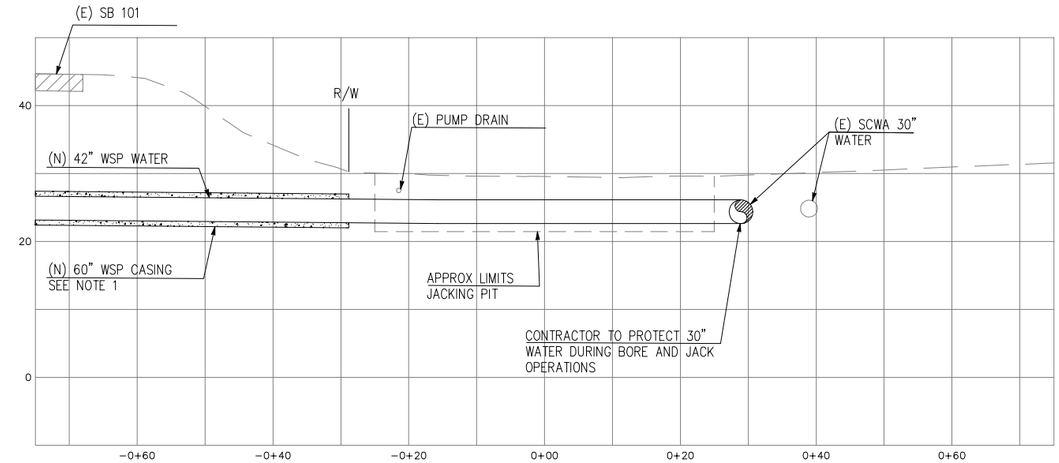
0' 5' 10' 15' 20'
SCALE: 1"=10'-0"

NOTES:

FOR ANNULAR SPACE MATERIAL, SEE DETAIL 3, DRAWING D-002



A C-003 RECEIVING PIT
Horiz: 1" = 10'
Vert. 1" = 10'



B C-003 JACK AND BORE PIT
Horiz: 1" = 10'
Vert. 1" = 10'

REDUCED SIZE: NOT TO SCALE

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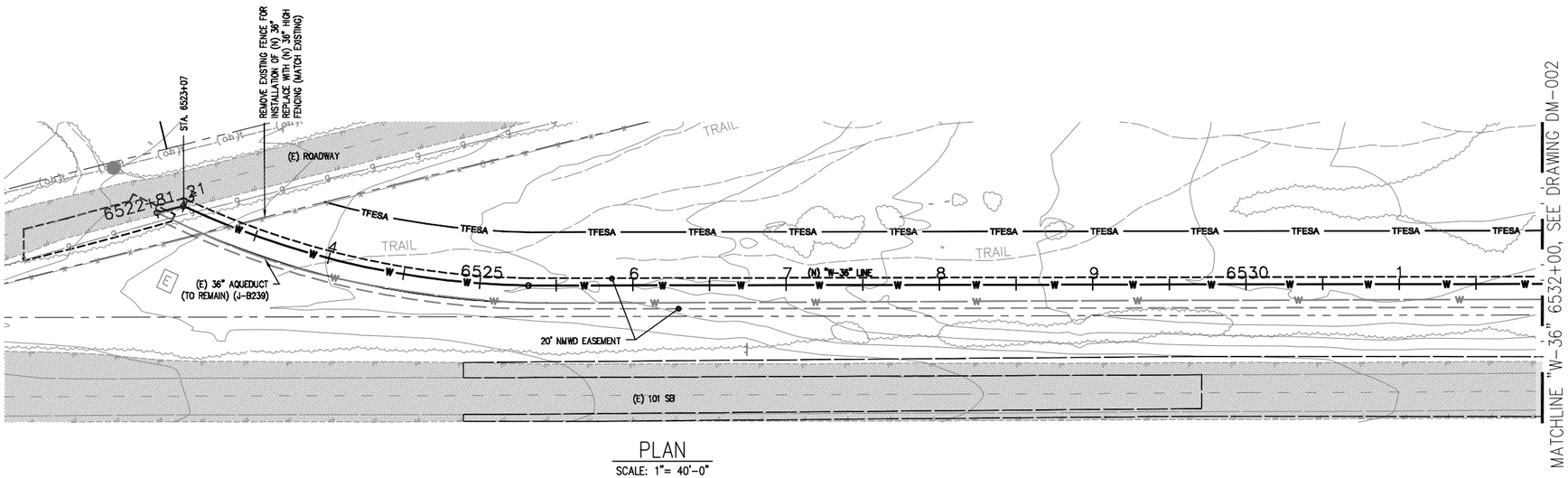
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
JACK AND BORE PITS

DES	DR	CH	SCALE 1" = 10'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 91 OF 192	SHEETS
R.E. 40936			SERVICE AREA	JOB.NO. 1.7118.09 D-016

Dec 04, 2013 - 4:14pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\D016.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

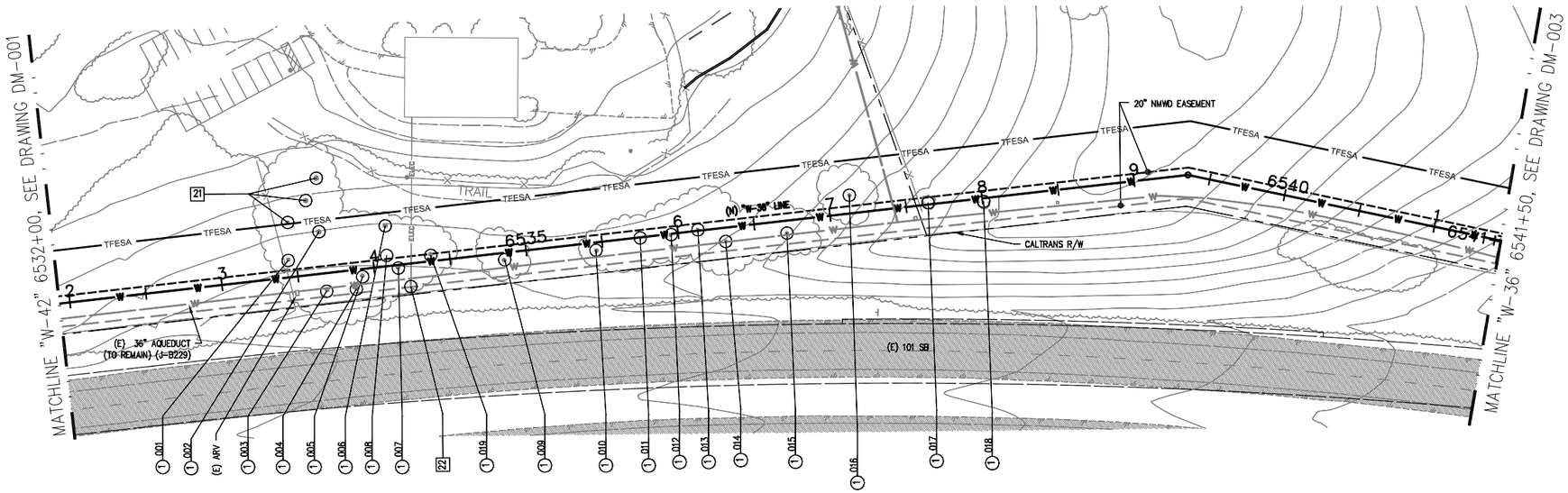
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6523+07-STA 6532+00

DES	DR	CH	SCALE 1": 40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 92 OF 192 SHEETS
			SERVICE AREA / JOB.NO. 1.7118.09 DM-001

REDUCED SIZE:
NOT TO SCALE

Dec 04, 2013 - 4:12pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM01.dwg User: SHUJK



PLAN

SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

ID #	DESCRIPTION
001	14" PINE
002	20" PINE
003	20" PINE
004	16" PINE
005	17" PINE
006	20" DEAD PINE
007	20" PINE
008	20" PINE
009	20" PINE
010	20" PINE
011	24" PINE
012	14", 16" PINE
013	19" PINE
014	30" PINE
015	20", 16" PINE
016	20" PINE
017	12" PINE
018	12" PINE
019	20" PINE

DEMOLITION

1 REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)

PROTECT-IN-PLACE

21 PROTECT TREES IN PLACE

22 PROTECT SIGN IN PLACE

REDUCED SIZE:
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

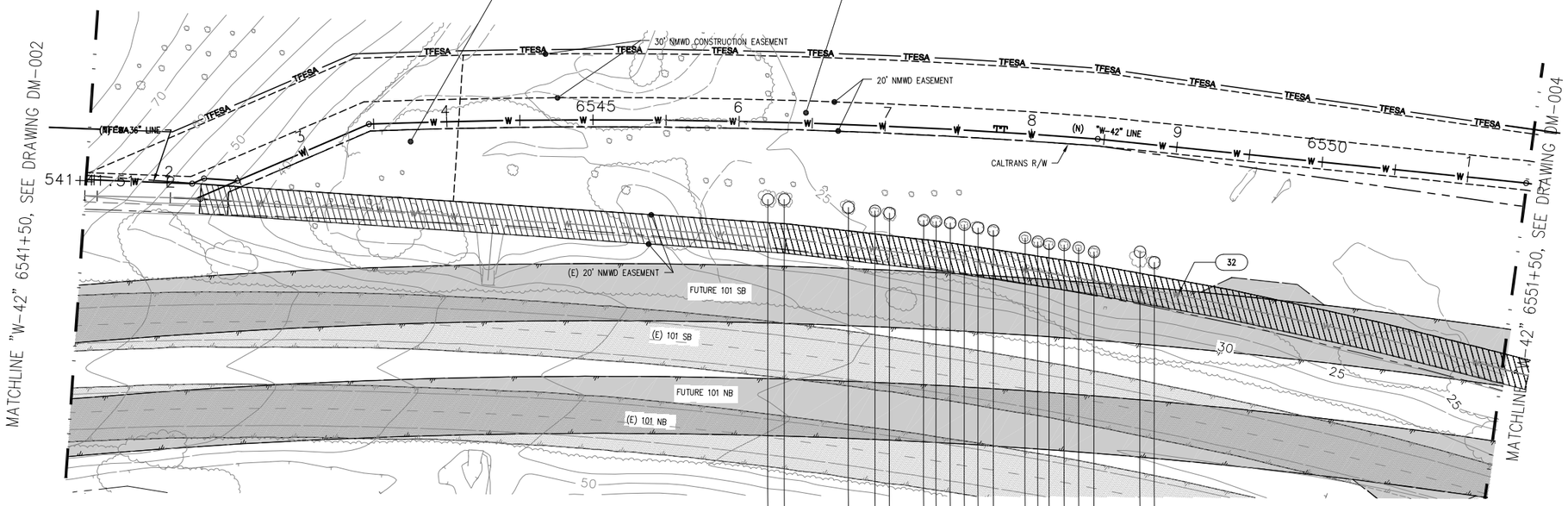
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6532+00-STA 6541+50

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 93 OF 192 SHEETS
			SERVICE AREA / JOB.NO. 1.7118.09 DM-002

Dec 05, 2013 - 11:20am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM02.dwg User: SHUJK

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

CONTRACTOR: NOTE IMPROVEMENTS AND TOPOGRAPHY HAVE CHANGED IN THIS AREA! THE CONTRACTOR SHALL FAMILIARIZE ITSELF WITH EXISTING CONDITIONS AND MAKE ALL ARRANGEMENTS TO TEMPORARILY MOVE EXISTING IMPROVEMENTS TO ALLOW CONSTRUCTION OF THE WATER LINE. THIS INCLUDES STRUCTURES, FENCES, CONTAINERS, AND APPURTENANCE WITHIN THE WATERLINE EASEMENTS OR TEMPORARY CONSTRUCTION EASEMENT AND PROVIDING SAFE CONDITIONS TO CONTAIN ANIMALS AND NOT ALLOW LIVESTOCK OR OTHER ANIMALS INTO THE CONSTRUCTION AREA. AT THE CONCLUSION OF CONSTRUCTION THE CONTRACTOR SHALL RETURN THE AREA TO ITS PRE-CONSTRUCTION CONDITIONS.



PLAN
SCALE: 1"= 40'-0"

PROTECT-IN-PLACE

21 PROTECT TREES IN PLACE

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6541+50-STA 6551+50

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 94 OF 192 SHEETS
			SERVICE AREA / JOB.NO. 1.7118.09 / DM-003

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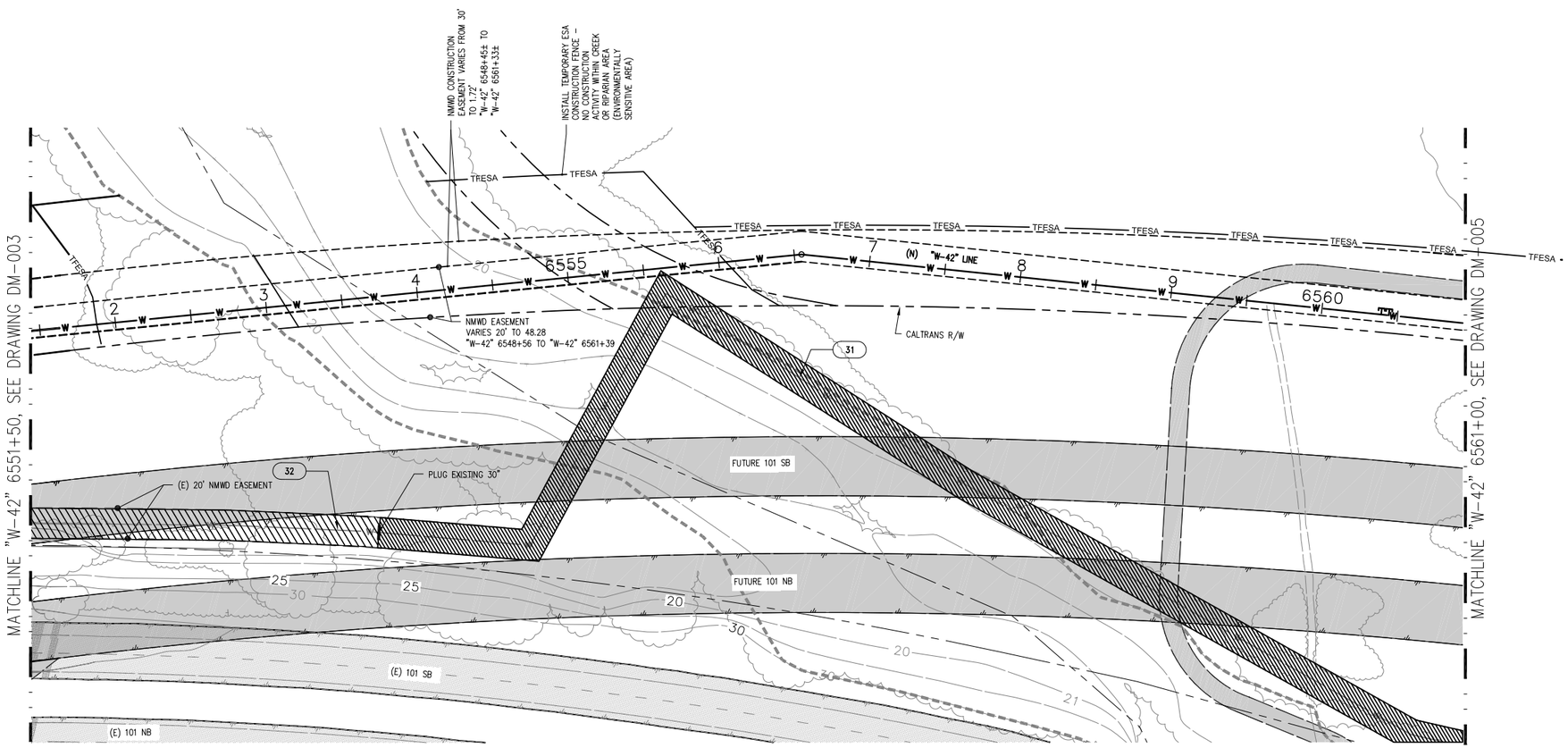

PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6551+50-STA 6561+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 95 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-004

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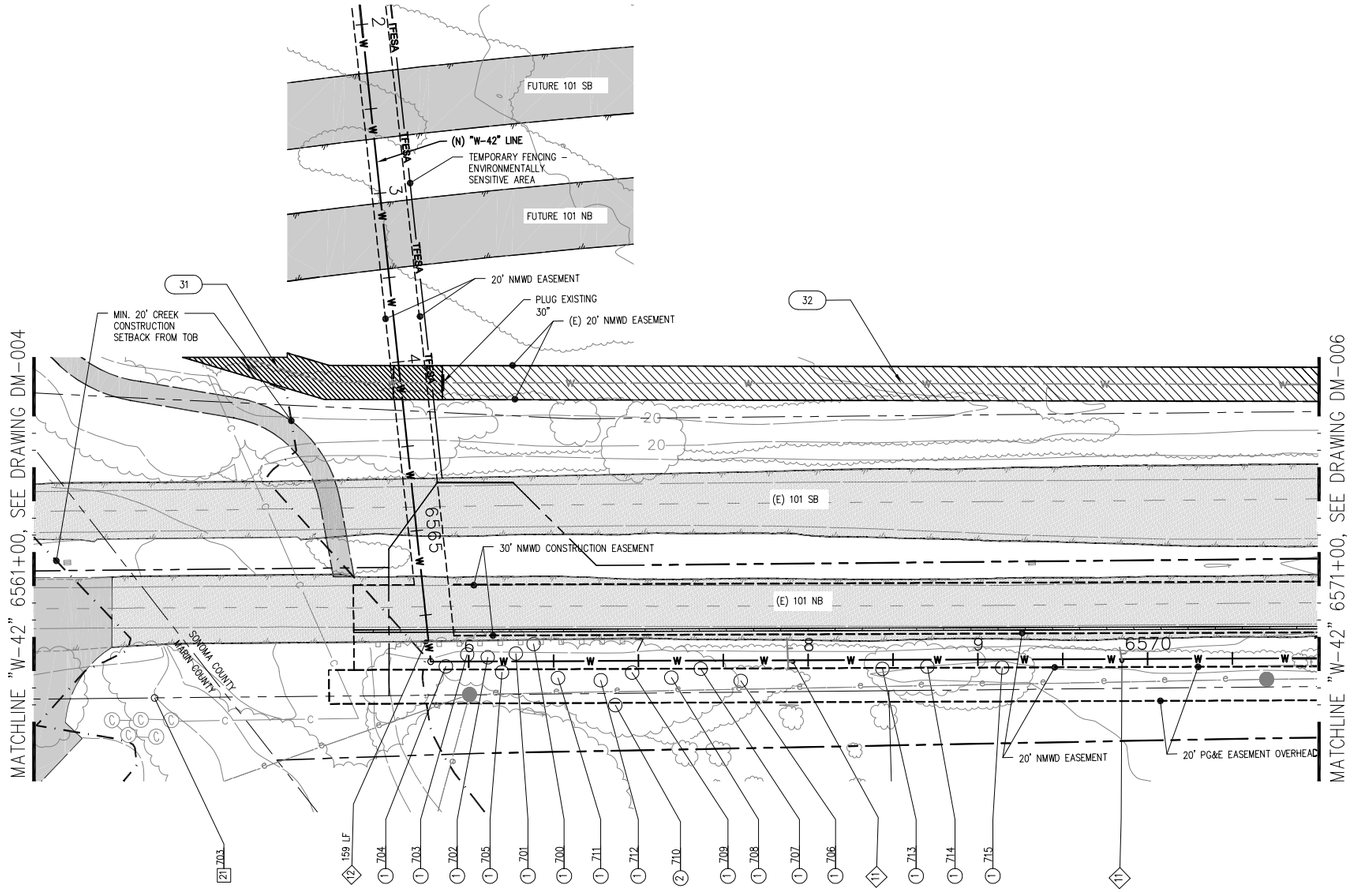

PLAN

SCALE: 1"= 40'-0"

Graphic Scale (in feet)

1 inch = 40 ft.

REDUCED SIZE: NOT TO SCALE

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ID #	DESCRIPTION
702	20" WILLOW
703	4X12" WILLOWS
704	12" COTTON WOOD
705	15" WILLOW
706	2X10" FIG
707	18" COTTON WOOD
708	5X12" FIG
709	4x12" FIG
710	3X15" WILLOW
711	2X15" FIG
712	4X10" FIG
713	24" OAK
714	4X15" WILLOW
715	4X10" FIG

DEMOLITION

1. REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)
2. STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11. REMOVE AND RELOCATE EXISTING SIGN
12. REMOVE AND REPLACE GUARDRAIL (APPROX. 5' WEST)

PROTECT-IN-PLACE

21. PROTECT TREE(S) IN PLACE, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID

PIPELINE

31. (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)
32. (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6561+00-STA 6571+00

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 96 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 DM-005

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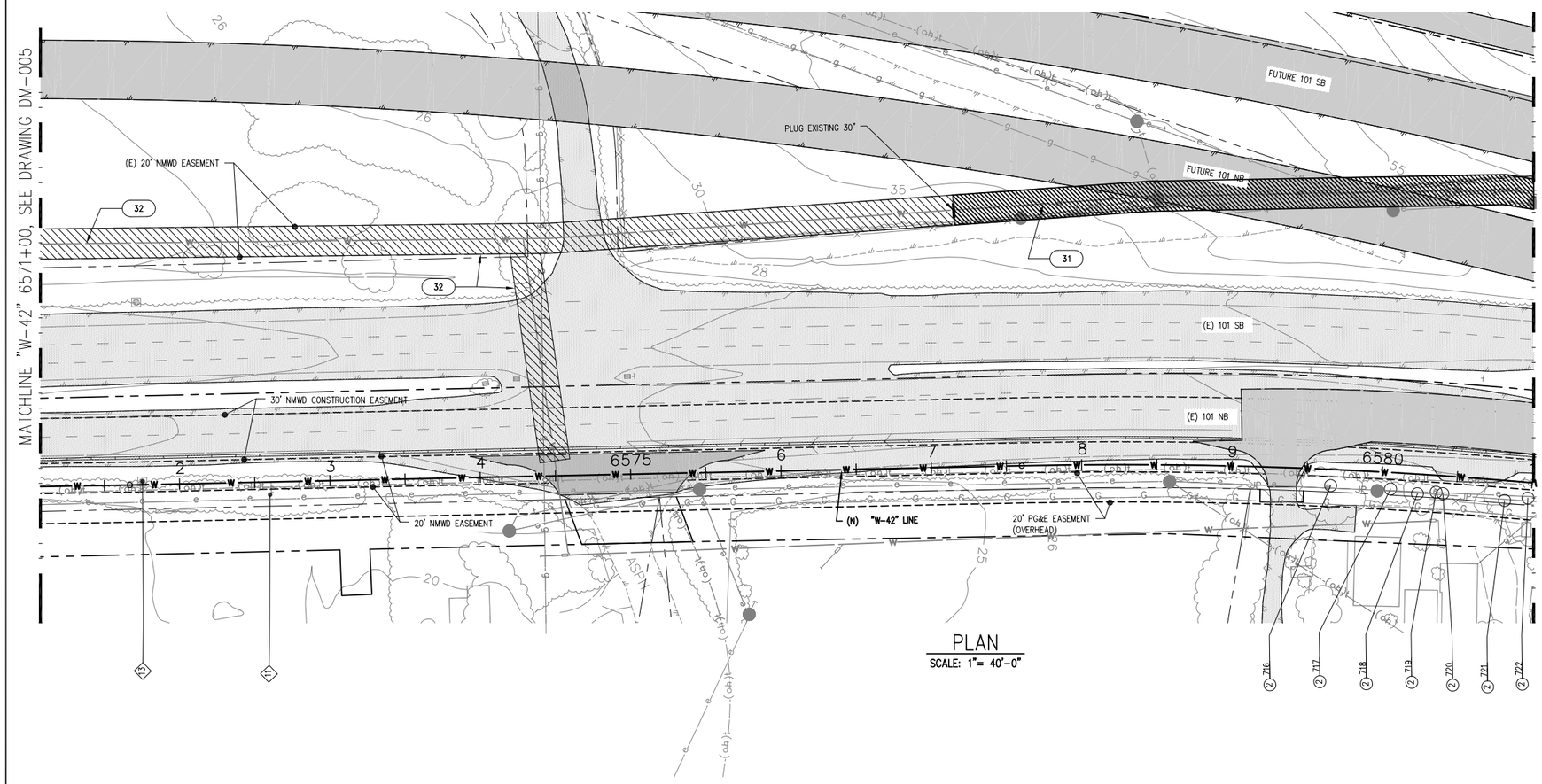
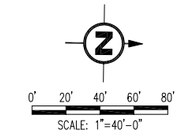


PLAN
SCALE: 1"= 40'-0"



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DEMOLITION

(2) STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN

13 REMOVE AND RELOCATE CALL BOX

PIPELINE

(31) (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

(32) (E) NMWD 30" AND 12" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

ID #	DESCRIPTION
716	5X8" OAK
717	10" OLEANDER
718	15" OAK
719	12" YUCCA
720	8" WILLOW
721	24" OAK
722	16"PINE

REDUCED SIZE:
NOT TO SCALE

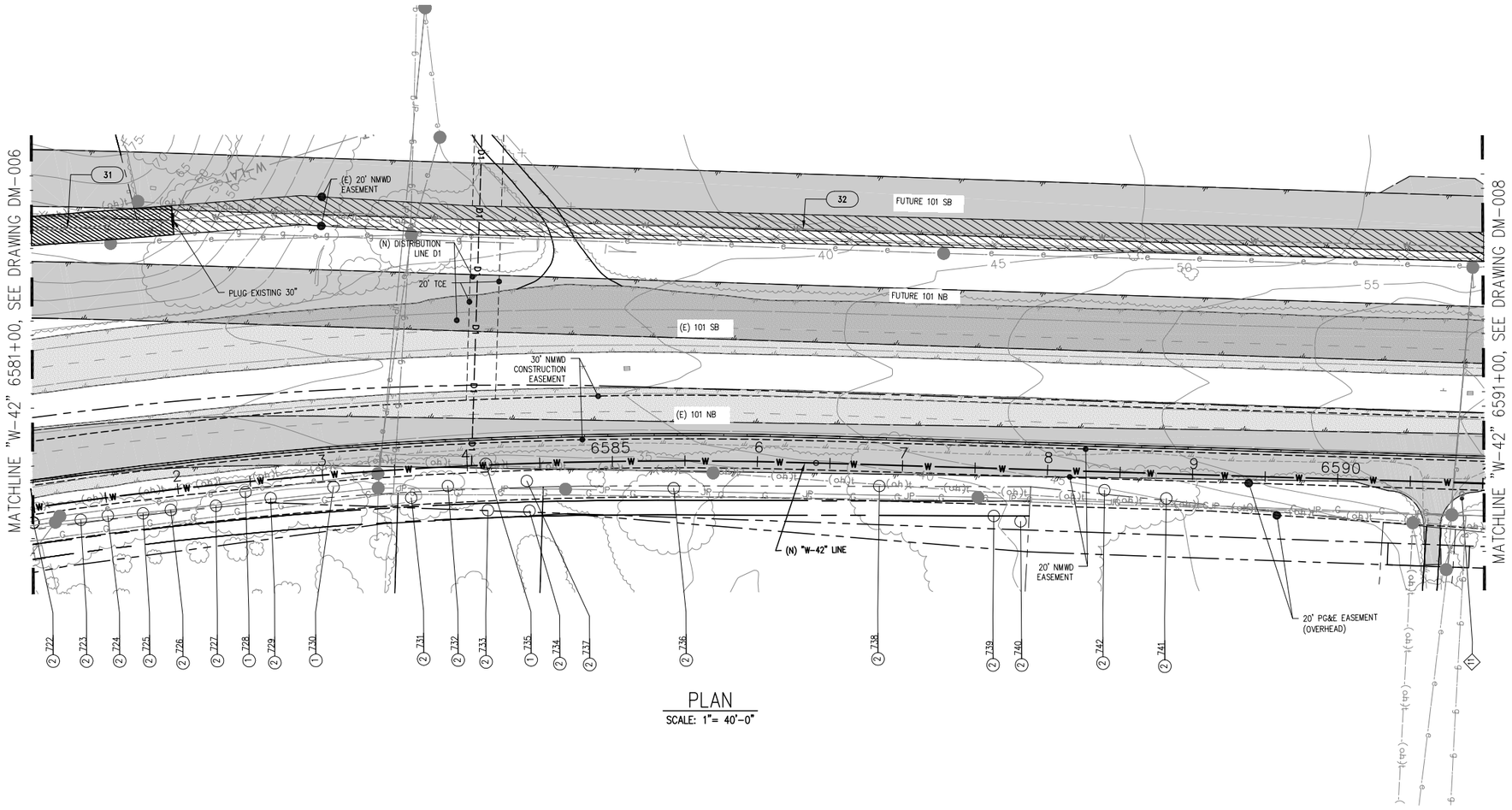
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6571+00-STA 6581+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 97 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-006

Dec 05, 2013 - 11:21am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM06.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

ID #	DESCRIPTION
722	16" PINE
723	15" WILLOW
724	36" PINE
725	10" WILLOW
726	8" OAK
727	40" REDWOOD
728	2x6" OAK
729	42" REDWOOD
730	4X18"-20" WILLOWS
731	14" OAK
732	2X14" PEPPER
733	24" PALM
734	24" PALM
735	10" OAK
736	50" EUCALYPTUS
737	24" OAK
738	60" EUCALYPTUS
739	60" EUCALYPTUS
740	30" OAK
741	30" OAK
742	30" OAK

DEMOLITION

(1) REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)

(2) STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

(11) REMOVE AND RELOCATE EXISTING SIGN

(13) REMOVE AND RELOCATE CALL BOX

(14) REMOVE AND RELOCATE TRAFFIC FLOW SENSOR

PROTECT-IN-PLACE

(21) PROTECT TREE(S) IN PLACE, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID

PIPELINE

(31) (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

(32) (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

CSW ST2
CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
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tel: 415.883.9850
fax: 415.883.9835
Civil & Structural Engineers Surveying & Mapping Environmental Planning
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Exp. 12/31/13
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STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6581+00-STA 6591+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 98 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-007

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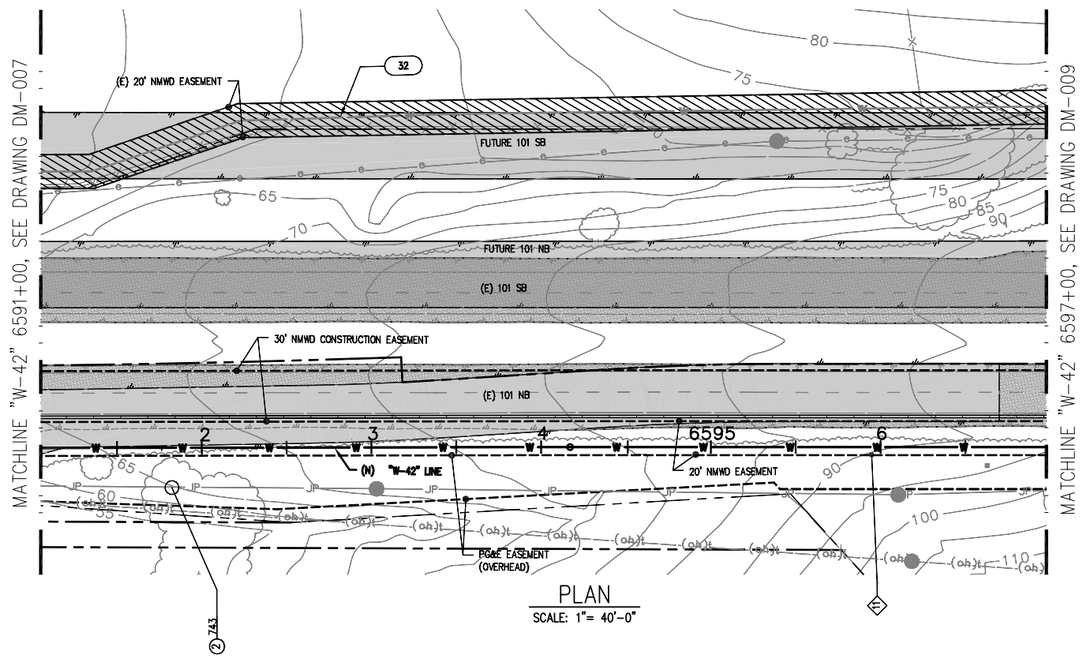

PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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CIVIL
STATE OF CALIFORNIA

DEMOLITION

(2) STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

(11) REMOVE AND RELOCATE EXISTING SIGN

PIPELINE

(31) (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

(32) (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

ID #	DESCRIPTION
743	24" OAK

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
DEMOLITION
STA 6591+00–STA 6597+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 99 OF 149	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM–008

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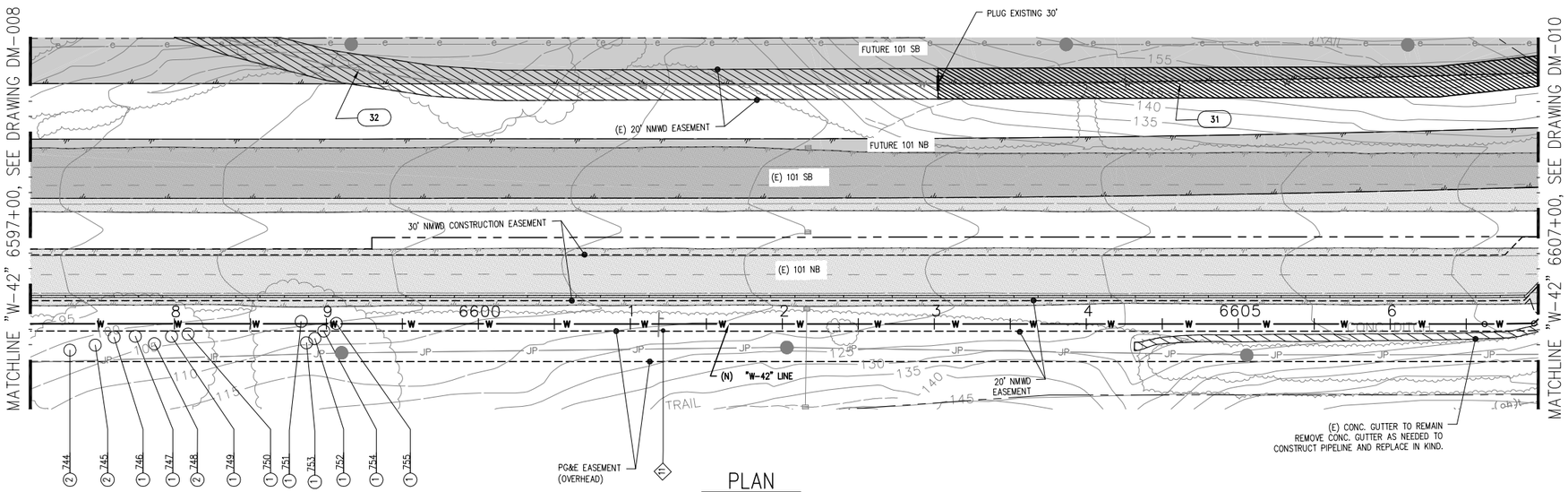

PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
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ID #	DESCRIPTION
744	30" OAK
745	15" OAK
746	15" OAK
747	15" OAK
748	15" OAK
749	15" OAK
750	15" OAK
751	30" OAK
752	18" OAK
753	12" OAK
754	20" OAK
755	16" OAK

DEMOLITION

1. REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)
2. STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN
12 REMOVE AND RELOCATE GUARDRAIL
13 REMOVE AND RELOCATE CALL BOX
14 REMOVE AND RELOCATE TRAFFIC FLOW SENSOR

NOTES:

1. SEE DRAWING C-009 FOR LOCATION OF RELOCATED FACILITIES
2. SEE DRAWING C-052 (SIGNAGE PLAN), FOR SIGN MESSAGE AND LOCATION.

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)
32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

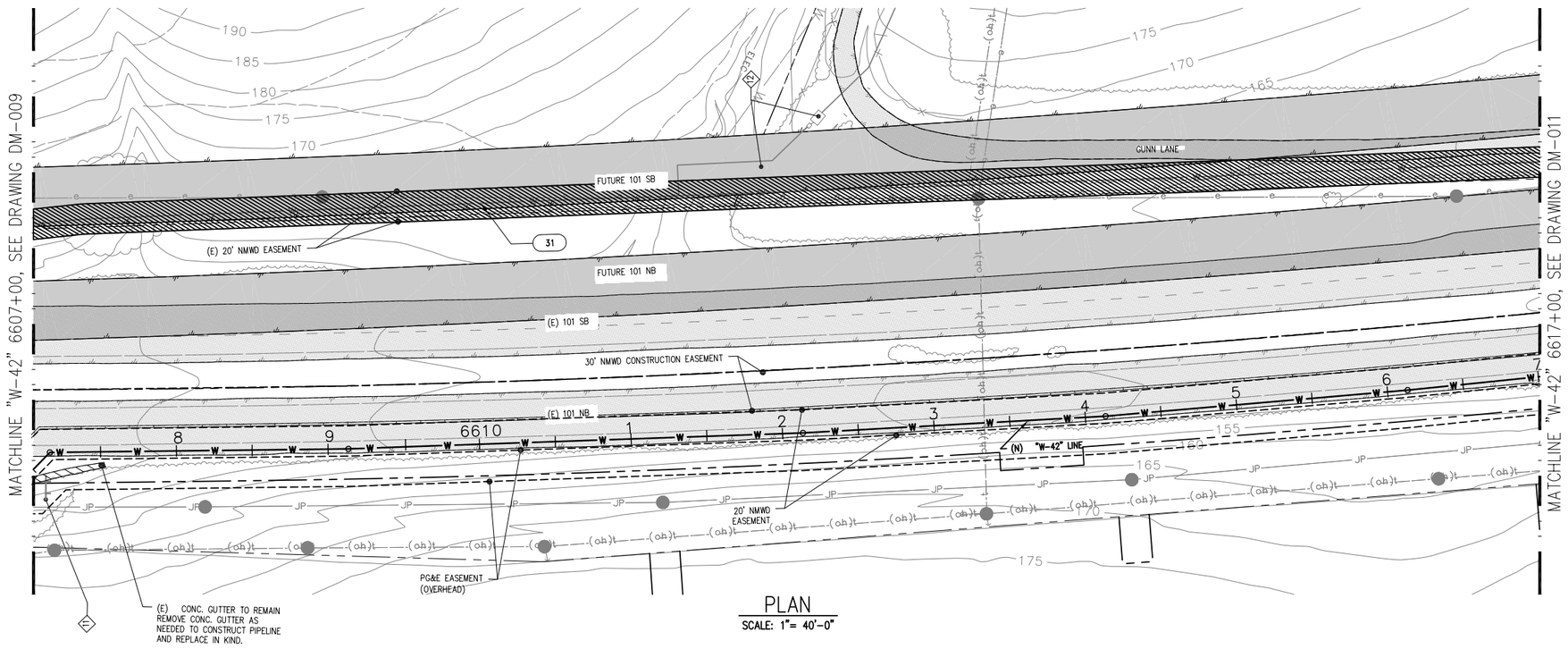
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6597+00-STA 6607+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 100 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-009

Dec 05, 2013 - 11:28am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM09.dwg User: SHUJK



PLAN

SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN

12 RELOCATE PUMP STATIONS (SEE SHEET C-025)

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

CSW ST2

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0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6607+00-STA 6617+00

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 101 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 DM-010

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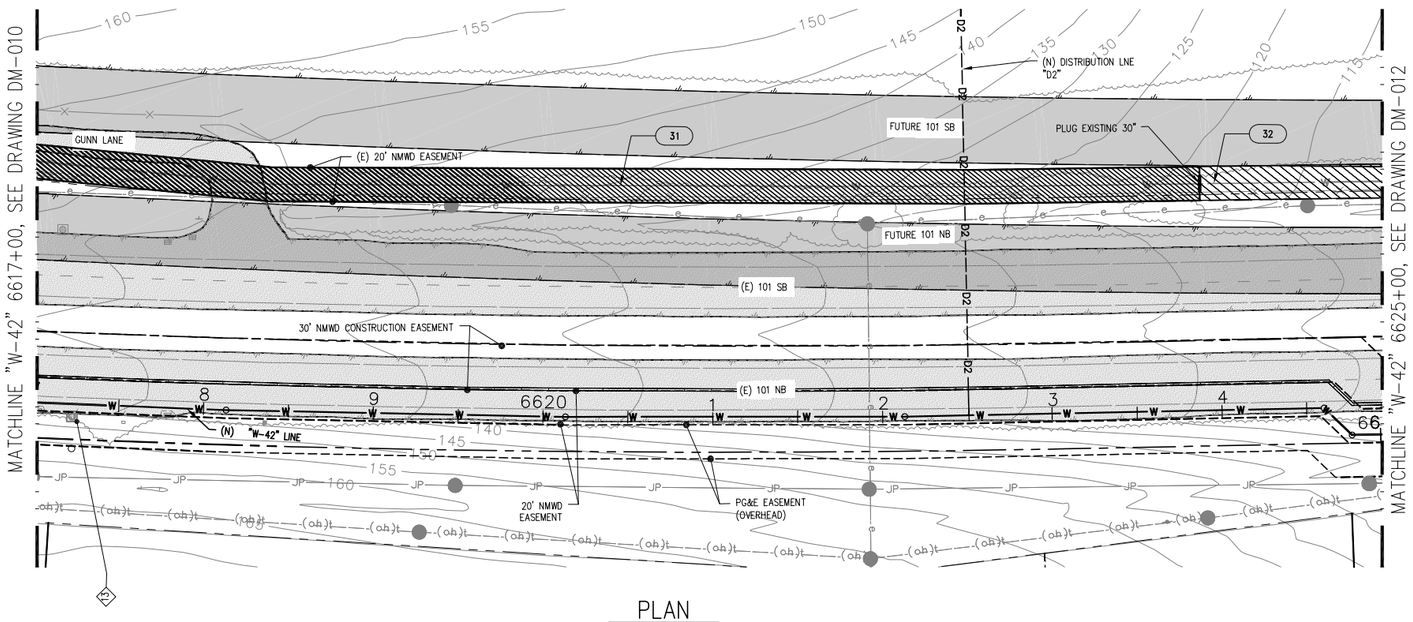

PLAN

SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'

SCALE: 1"=40'-0"

CSW ST2

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RELOCATE

13 REMOVE AND RELOCATE CALL BOX

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6617+00-STA 6625+00

DES	DR	CH	SCALE	1":40'
CSW	JKS/CJB	DAC	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	102 OF 192 SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-011

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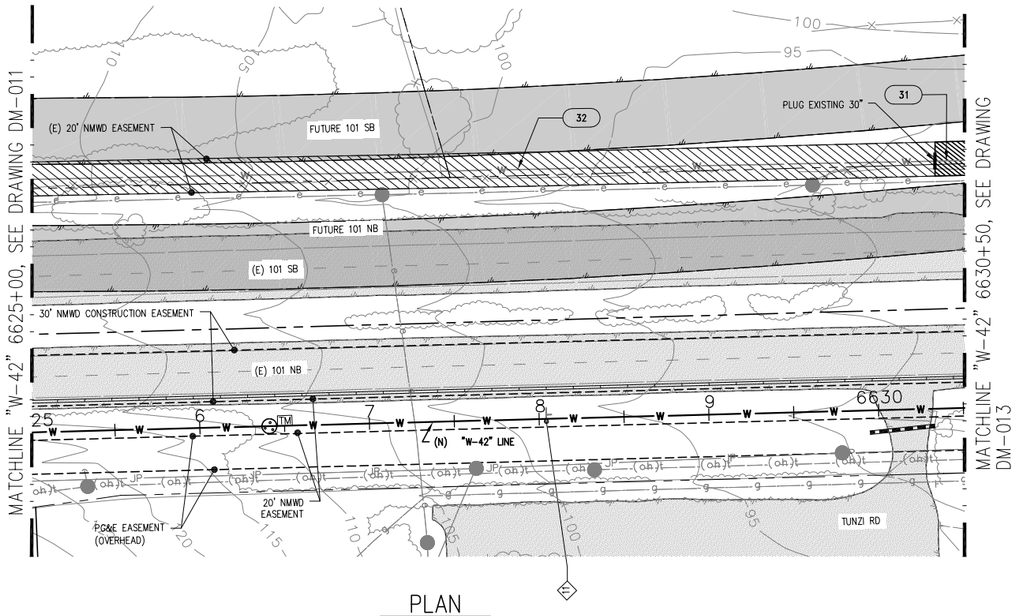

PLAN

SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'

SCALE: 1"=40'-0"

CSW ST2

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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

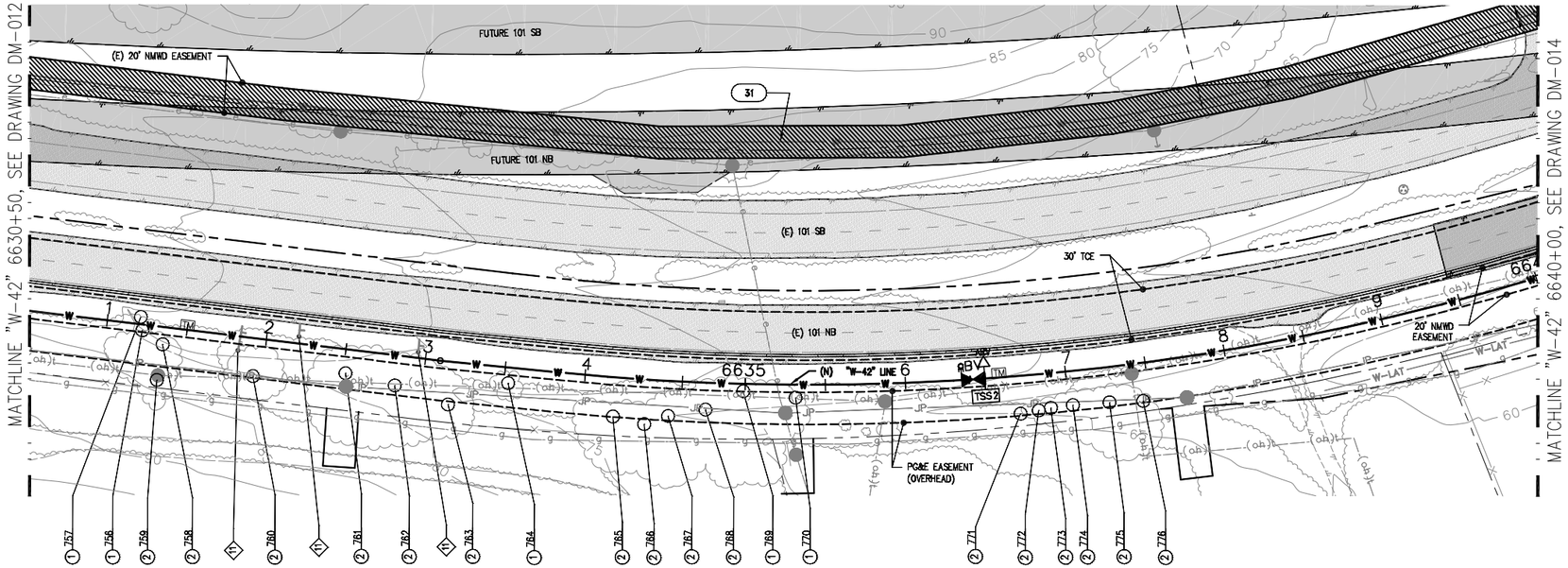
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6625+00-STA 6630+50

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 103 OF 192 SHEETS
			SERVICE AREA / JOB.NO. 1.7118.09 / DM-012

Dec 04, 2013 - 3:38pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM12.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

ID #	DESCRIPTION
756	14" WILLOW
757	18" WILLOW
758	15" WILLOW
759	20" OAK
760	3X10" WILLOW
761	20" WILLOW
762	4X15" WILLOW
763	5X12" WILLOW
764	16" OAK
765	6X8"-10" WILLOW
766	24" WILLOW
767	28" WILLOW
768	30" WILLOW
769	6X8"-10" WILLOW
770	2X15" OAK
771	4" WILLOW
772	24" WILLOW
773	36" WILLOW
774	24" WILLOW
775	36" WILLOW
776	16" OAK

DEMOLITION

1. REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)
2. STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

CSW ST2

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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6630+50-STA 6640+00

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 104 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 DM-013

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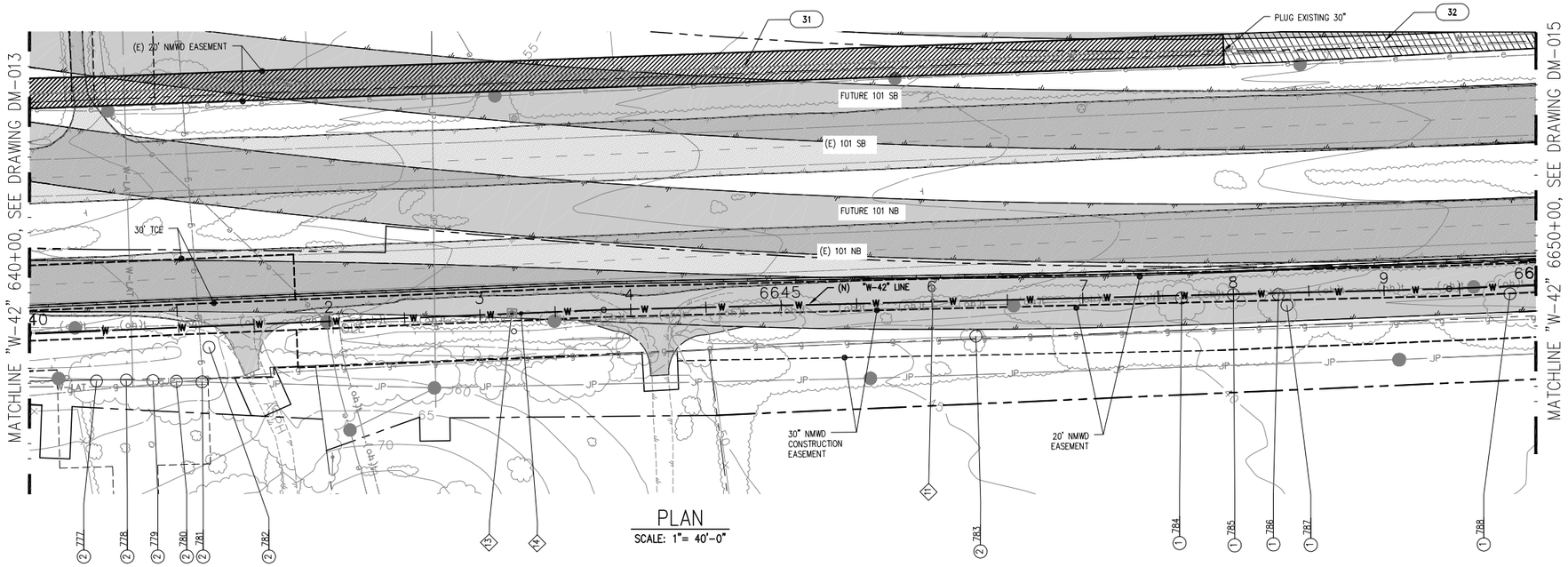
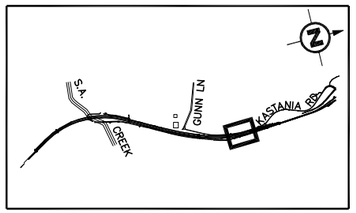


PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

KEYMAP



CSW ST2

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STATE OF CALIFORNIA

ID #	DESCRIPTION
777	24" PINE
778	24" PINE
779	24" PINE
780	24" PINE
781	24" PINE
782	24" OAK
783	12" WILLOW
784	6" OAK
785	12" OAK
786	6" OAK
787	20" WILLOW
788	16" WILLOW

DEMOLITION

1. REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)
2. STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11 REMOVE AND RELOCATE EXISTING SIGN
13 REMOVE AND RELOCATE CALL BOX
14 REMOVE AND RELOCATE TRAFFIC FLOW SENSOR

PROTECT-IN-PLACE

21 PROTECT TREE(S) IN PLACE, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)
32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6640+00-STA 6650+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 105 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-014

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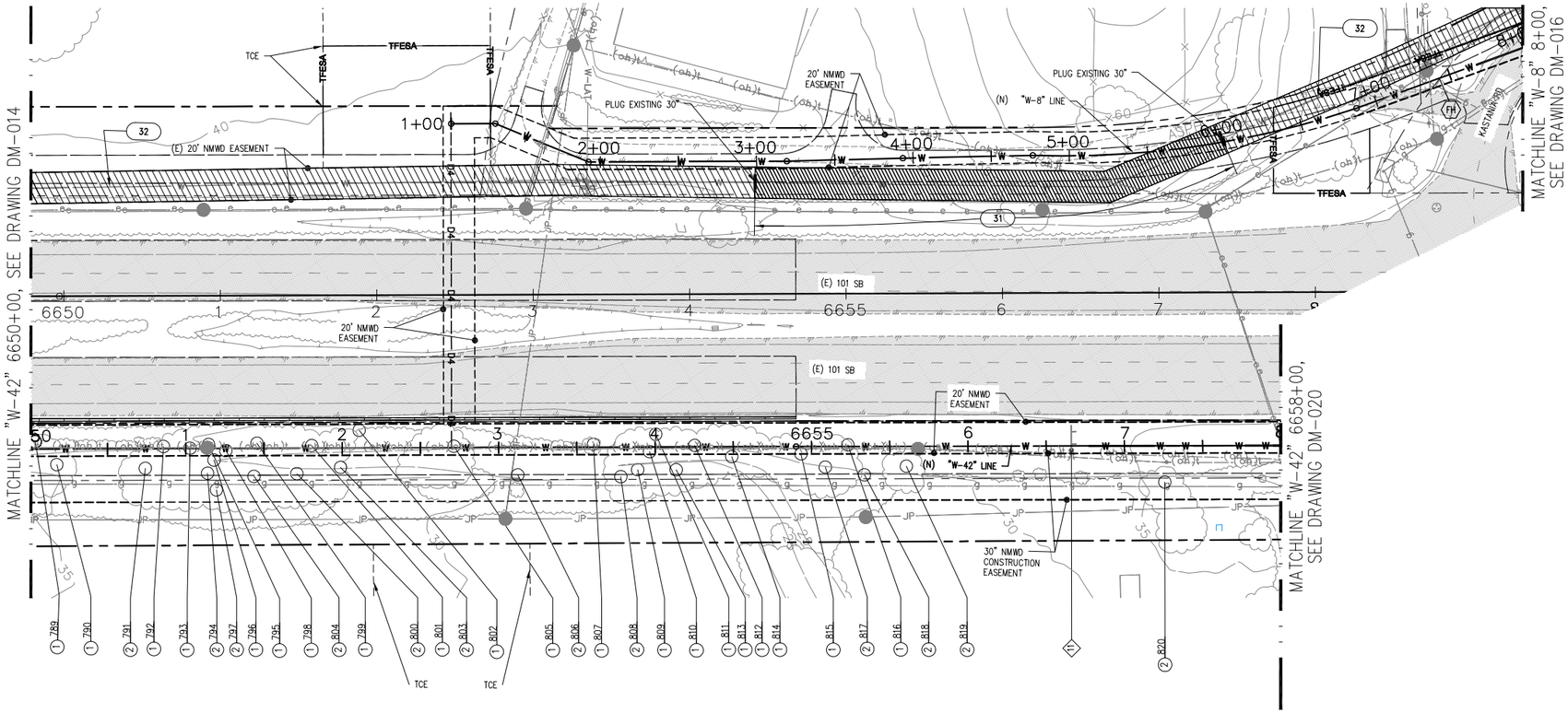

PLAN

SCALE: 1"= 40'-0"

ID #	DESCRIPTION	ID #	DESCRIPTION
789	16" OAK	807	6" OAK
790	18" WILLOW	808	10" OAK
791	24" OAK	809	30" WILLOW
792	8" OAK	810	14" OAK
793	20" WILLOW	811	10" OAK
794	12" WILLOW	812	3X8" OAK
795	12" IWLLOW	813	20" WILLOW
796	15" WILLOW	814	40" OAK
797	15" WILLOW	815	8" OAK
798	15" WILLOW	816	8" OAK
799	28" OAK	817	24" WILLOW
800	20" WILLOW	818	20" STUMP LAN
801	2X6" OAK	819	15" OAK
802	10" OAK	820	15" OAK
803	12" OAK		
804	20" WILLOW		
805	30" OAK		
806	8" OAK		

DEMOLITION

1. REMOVE TREE STUMPS/ROOTBALLS, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID (NMWD)
2. STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

RELOCATE

11. REMOVE AND RELOCATE EXISTING SIGN
12. REMOVE AND RELOCATE GUARDRAIL
13. REMOVE AND RELOCATE CALL BOX
14. REMOVE AND RELOCATE TRAFFIC FLOW SENSOR

PROTECT-IN-PLACE

21. PROTECT TREE(S) IN PLACE, SEE TREE TYPE TABLE WITH CORRESPONDING TREE ID
22. REPLACE (E) SIGN IF AFFECTED BY CONSTRUCTION

PIPELINE

31. (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)
32. (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

CSW ST2

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6650+00-STA 6658+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 106 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-015

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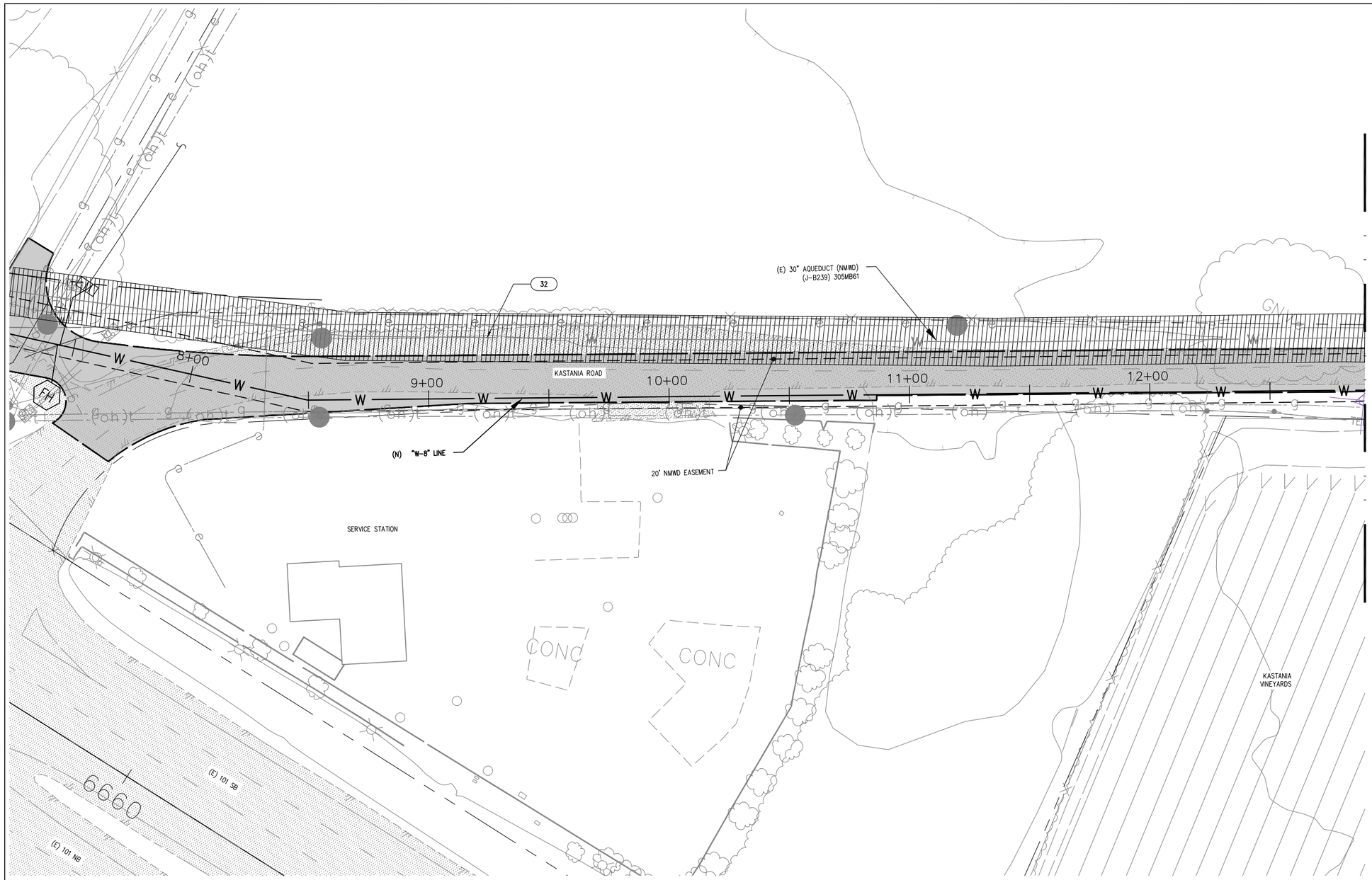

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

PLAN
SCALE: 1"= 20'-0"

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

CSW ST2

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STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
KASTANIA RD

DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 107 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-016

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PLAN
SCALE: 1"= 20'-0"

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

CSW ST2

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STATE OF CALIFORNIA

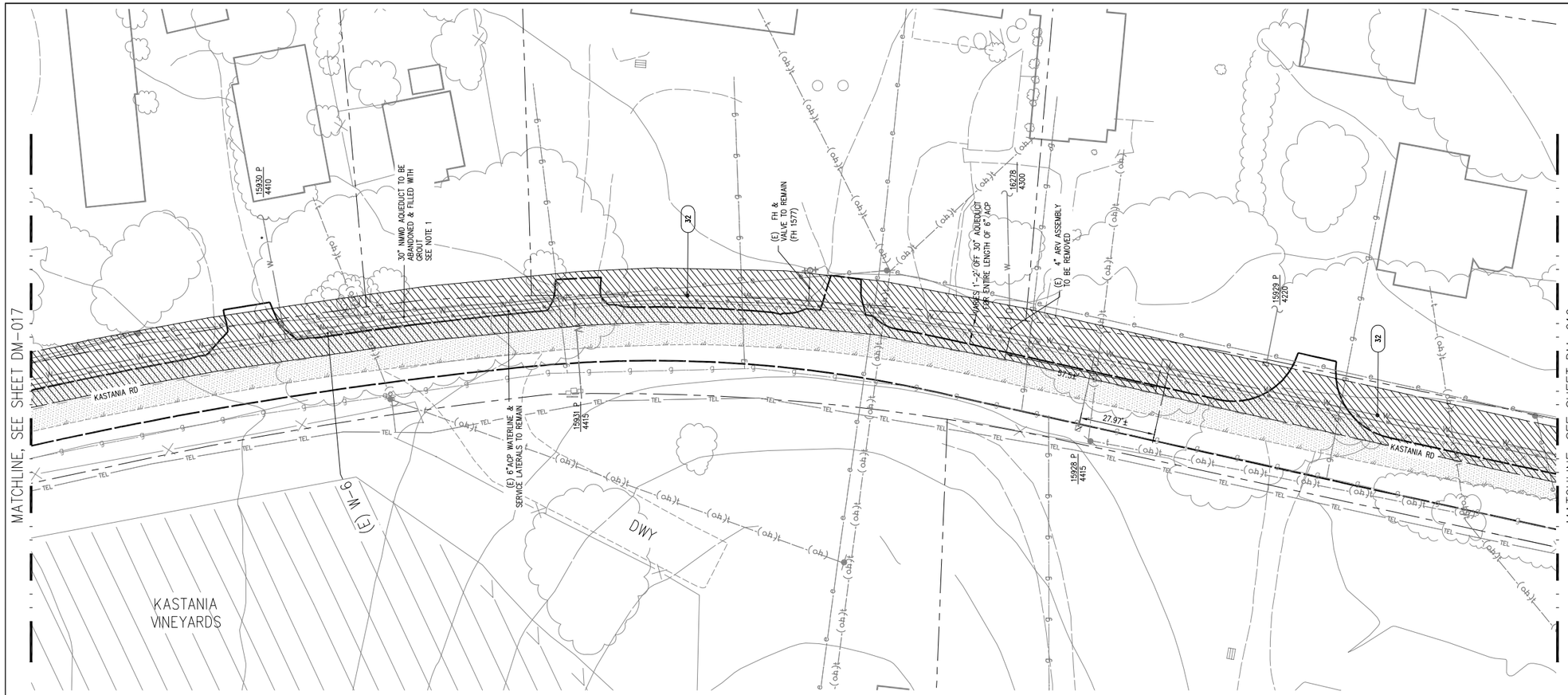
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
KASTANIA RD

DES	DR	CH	SCALE 1":20'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 108 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-017

Dec 04, 2013 - 3:34pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM17.dwg User: SHUJK



PLAN
SCALE: 1"= 20'-0"

0' 10' 20' 30' 40'
SCALE: 1"=20'-0"

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, CA 94949
tel: 415.883.9850
fax: 415.883.9835
Civil & Structural Engineers Surveying & Mapping Environmental Planning
Land Planning Construction Management Landscape Architecture

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REGISTERED PROFESSIONAL ENGINEER
AL G. Cornwell
No. 27577
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE:
NOT TO SCALE

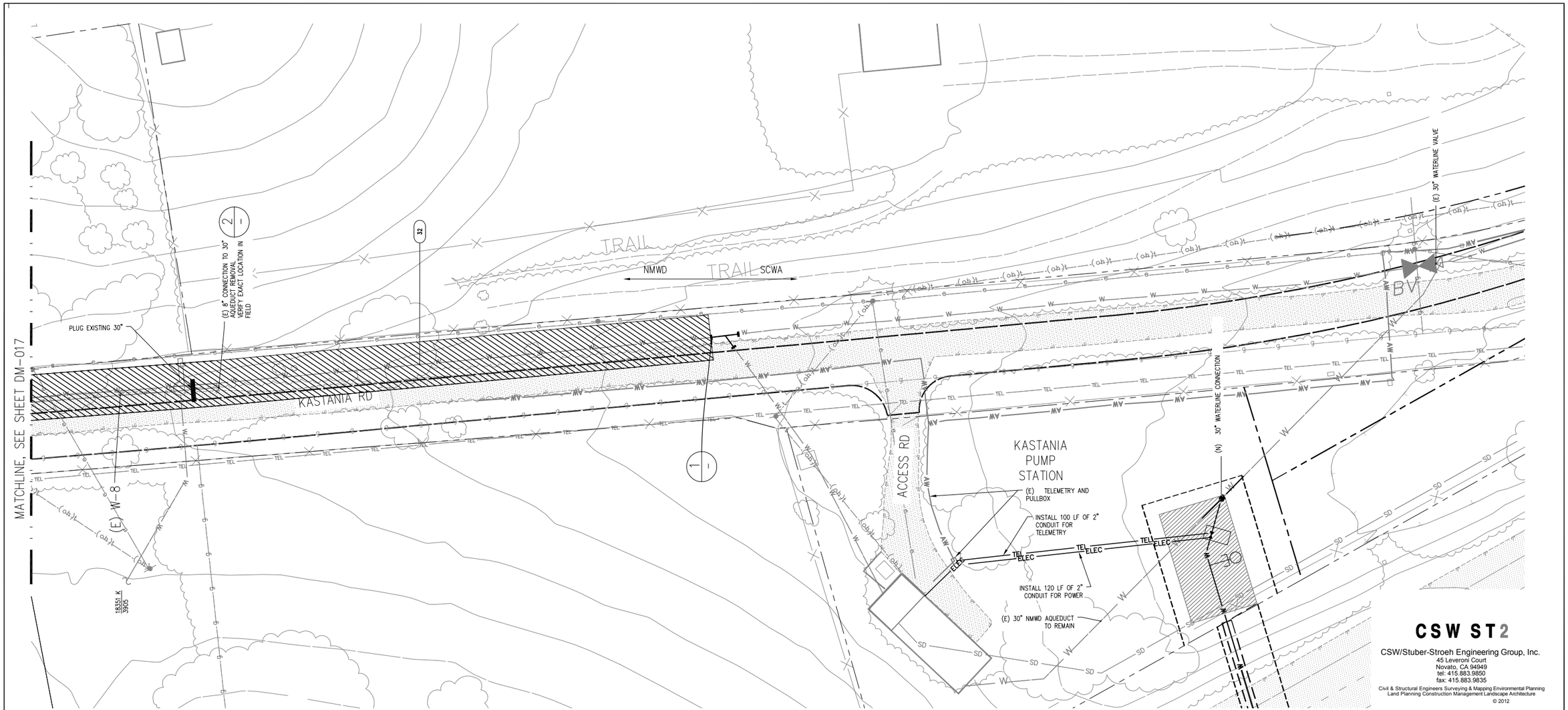
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

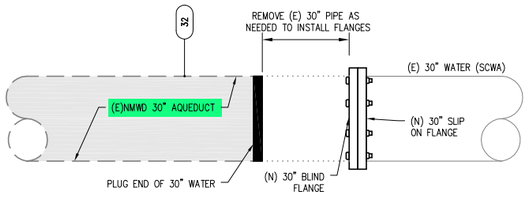
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
KASTANIA RD

DES	DR	CH	SCALE 1":20'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 109 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 DM-018

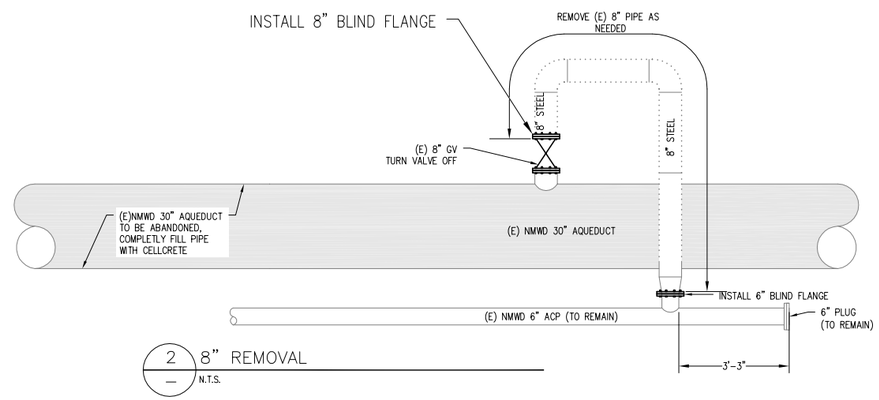
Dec 04, 2013 - 3:33pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM18.dwg User: SHUJK



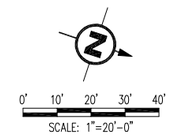
PLAN
SCALE: 1"= 20'-0"



1 PLAN: CUT & CAP (E) 30" AQUEDUCT
N.T.S.



2 8" REMOVAL
N.T.S.



PIPELINE

31 (E) NMWD 30" WATERLINE TO BE REMOVED IN FUTURE CONTRACT (N.I.C.)

32 (E) NMWD 30" WATERLINE TO BE ABANDONED IN PLACE (FILLED WITH CELLCRETE)

REDUCED SIZE: NOT TO SCALE

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
KASTANIA RD

DES	DR	CH	SCALE 1":20'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
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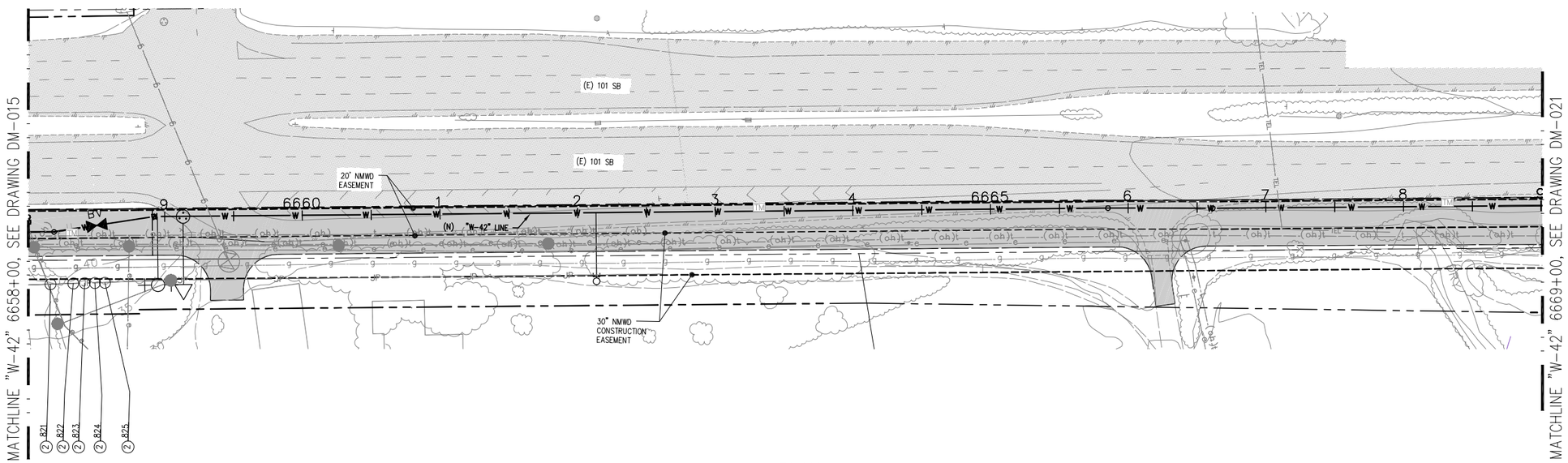
			SERVICE AREA / JOB.NO. 1.7118.09 DM-019

Dec 04, 2013 - 3:33pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM19.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

DEMOLITION

(2) STUMPS/ROOTBALLS TO REMAIN IN PLACE (TO BE REMOVED IN FUTURE CONTRACT) (CALTRANS)

NOTES:

1. SEE DRAWING C-018 FOR LOCATION OF RELOCATED FACILITIES
2. SEE DRAWING C-057 (SIGNAGE PLAN), FOR SIGN MESSAGE AND LOCATION.

ID #	DESCRIPTION
821	8" APRICOT
822	18" EUCALYPTUS
823	18" EUCALYPTUS
824	18" EUCALYPTUS
825	18" EUCALYPTUS

REDUCED SIZE:
NOT TO SCALE

CSW ST2
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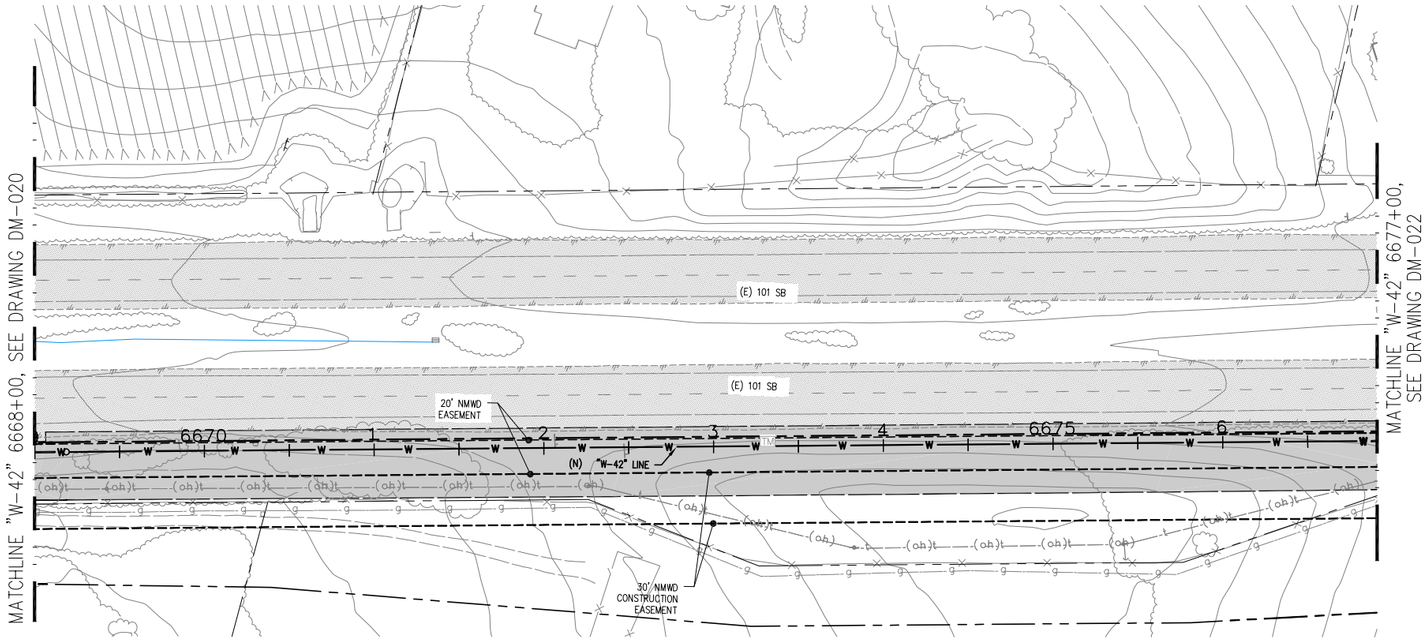
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6658+00-STA 6668+00

DES	DR	CH	SCALE 1":40'
CSW	JKS/CJB	DAC	DATE DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 111 OF 192 SHEETS
			SERVICE AREA JOB.NO. 1.7118.09 DM-020

Dec 05, 2013 - 11:36am N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM20.dwg User: SHUJK



PLAN
SCALE: 1"= 40'-0"

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

NOTES:

1. SEE DRAWING C-019 FOR LOCATION OF RELOCATED FACILITIES
2. SEE DRAWING C-057 (SIGNAGE PLAN), FOR SIGN MESSAGE AND LOCATION.

REDUCED SIZE:
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

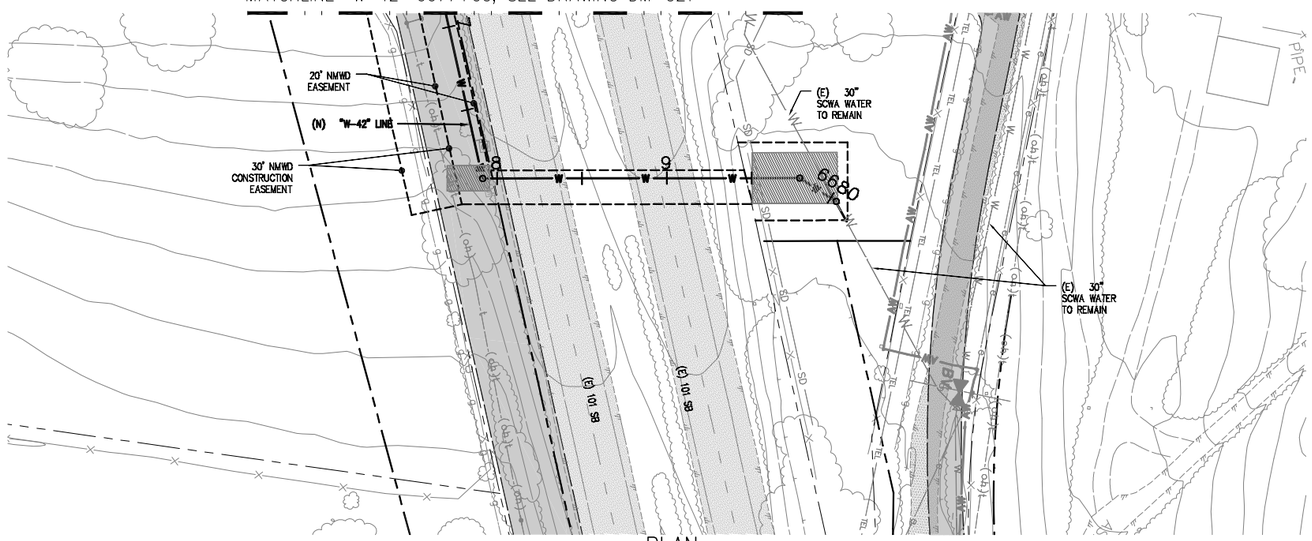
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6668+00-STA 6677+00

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 112 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-021

Dec 04, 2013 - 3:30pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM21.dwg User: SHUJK

0' 20' 40' 60' 80'
SCALE: 1"=40'-0"

MATCHLINE "W-42" 6677+00, SEE DRAWING DM-021



PLAN
SCALE: 1"= 40'-0"

CSW ST2

CSW/Stuber-Stroeh Engineering Group, Inc.
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tel: 415.883.9850
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Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

NOTES:

1. SEE DRAWING C-020 FOR LOCATION OF RELOCATED FACILITIES
2. SEE DRAWING C-057 (SIGNAGE PLAN), FOR SIGN MESSAGE AND LOCATION.

REDUCED SIZE:
NOT TO SCALE

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
DEMOLITION
STA 6677+00-STA 6680+00±

DES	DR	CH	SCALE 1":40'	
CSW	JKS/CJB	DAC	DATE DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 113 OF 192	SHEETS
			SERVICE AREA	JOB.NO. 1.7118.09 DM-022

Dec 04, 2013 - 3:29pm N:\CIVIL\4\4113100\Dwg\Sheet Dwgs\DM22.dwg User: SHUJK

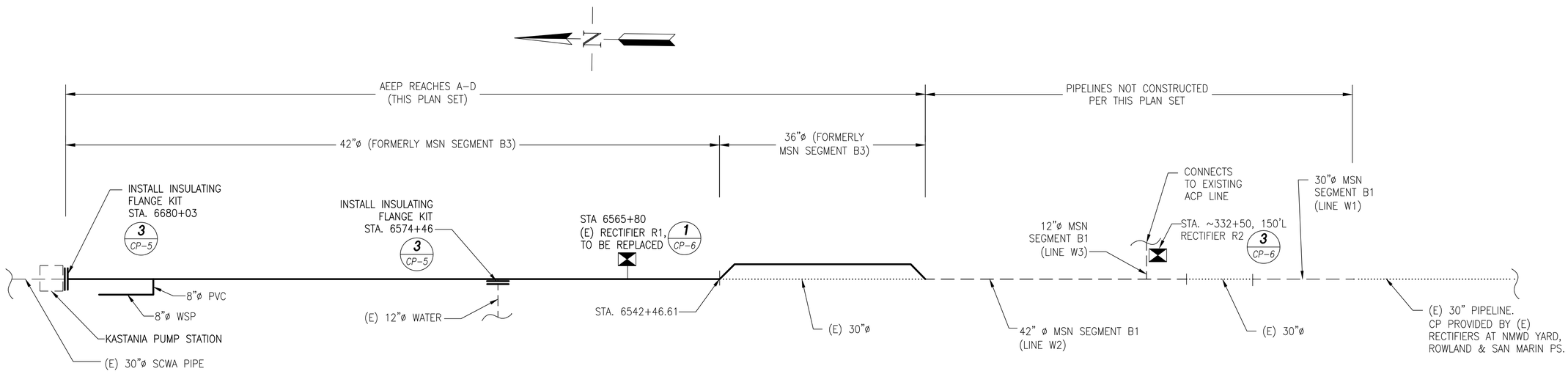
CATHODIC PROTECTION (CP) SYSTEM
AQUEDUCT RELOCATION, AEEP REACHES A–D
NORTH MARIN WATER DISTRICT, NOVATO, CA

GENERAL NOTES

1. RECTIFIERS R1 AND R2 ARE INTENDED TO PROVIDE CATHODIC PROTECTION TO AEEP REACHES A–D AND MSN SEGMENT B1. THE 8"ø WSP AT KASTANIA ROAD WILL UTILIZE A SEPARATE GALVANIC CATHODIC PROTECTION SYSTEM.
2. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS, INCLUDING LOCATIONS OF UNDERGROUND UTILITIES.
3. CONTRACTOR SHALL OBTAIN NECESSARY PERMITS FOR ANODE BED INSTALLATION AT CONTRACTOR'S SOLE EXPENSE.
4. UNDERGROUND CABLES SHALL BE IN PVC CONDUIT, MINIMUM 24" DEEP. USE RGS FOR ANY ABOVEGROUND CONDUIT.
5. CONTRACTOR SHALL CALL U.S.A. DIG TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO WORK.
6. CONTRACTOR SHALL BOND NON–WELDED PIPE JOINTS TO ENSURE ELECTRICAL CONTINUITY. CONTRACTOR SHALL VERIFY ELECTRICAL CONTINUITY OF THE JOINT BONDS BEFORE BACKFILL.
7. ELECTRICALLY ISOLATE PROJECT PIPELINES FROM OTHER METALLIC STRUCTURES INCLUDING OTHER METALLIC PIPELINES, PIPE SECTIONS TO BE ABANDONED IN PLACE, REINFORCING STEEL AT CONCRETE PENETRATIONS, MANHOLES AND CONCRETE ENCASEMENTS. UNDERGROUND ISOLATION JOINTS SHALL BE TESTED BEFORE BACKFILL.
8. THE TEST STATIONS, ANODE JUNCTION BOXES AND ANODE WELL LOCATIONS SHOWN ARE APPROXIMATE, AND MAY BE MODIFIED TO SUIT ACTUAL SITE CONDITIONS, AFTER APPROVAL FROM THE CITY ENGINEER.
9. USE ZIP–TIE CABLE MARKER TO LABEL ALL THE CABLES, INCLUDING AT THE TEST STATIONS, PER DETAIL 4/CP–5.
10. REFER TO CATHODIC PROTECTION SPECIFICATION SECTION 13110 FOR MORE INFORMATION.

ABBREVIATIONS

ACP	ASBESTOS CEMENT PIPE	ICCP	IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM
AEEP	AQUEDUCT ENERGY EFFICIENCY PROJECT	IJTS	ISOLATION JOINT TEST STATION
ARV	AIR RELEASE VALVE	MSN	MARIN SONOMA NARROWS
ATS	ANODE TEST STATION	NMWD	NORTH MARIN WATER DISTRICT
CATS	CASING TEST STATION	PS	PUMP STATION
CP	CATHODIC PROTECTION	PVC	POLYVINYL CHLORIDE
CTS	CORROSION MONITORING TEST STATION	RGS	RIGID GALVANIZED STEEL
E	EXISTING	SCWA	SONOMA COUNTY WATER AGENCY
FPTS	FOREIGN PIPELINE TEST STATION	WSP	WELDED STEEL PIPE



1 / – *CATHODIC PROTECTION SYSTEM SCHEMATIC*
NOT TO SCALE

corrpro
An Aegion Company
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2 99 Miller Street,
San Leandro, CA 945
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fax: 510. 14.8811
CCI 3405 00 3

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REGISTERED PROFESSIONAL ENGINEER
JEFFREY KENNETH KOALER
No. C68329
Expires 09/30/15
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	MB	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3

CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE
MB	MB	JK	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	114 OF 149 SHEETS
			SERVICE AREA	JOB.NO 1.7118.09

CP–1

STATION	STRUCTURE	TEST STATION			REMARKS
		TYPE	ANODES	DETAIL NUMBER	
	NEW 12" WSP WATER MAIN				
~332+50	INSTALL NEW RECTIFIER R2		(8), TA-4	3/CP-6	INSTALL NEW RECTIFIER (50V-22A) AND DEEP WELL (OFFSET ~150'L)
	NEW 36" WSP WATER MAIN				
6522+81	CONNECT TO (E) 42" NMWD WATER - SEGMENT B1	CTS		3/CP-4	
6533+07	36" WATER LINE	CTS		3/CP-4	
6542+30	36" WATER LINE	CTS		3/CP-4	
	NEW 42" WSP WATER MAIN				
6551+68	456-FT 60" WSP BEGIN CASING (CREEK)	CATS	(30), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 15 ANODES ON EACH SIDE OF THE CASING
6556+24	456-FT 60" WSP END CASING (CREEK)	CATS	(30), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 15 ANODES ON EACH SIDE OF THE CASING
6561+45	421-FT 60" WSP BEGIN CASING (101)	CATS	(30), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 15 ANODES ON EACH SIDE OF THE CASING
6565+66	421-FT 60" WSP END CASING (101)	CATS	(30), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 15 ANODES ON EACH SIDE OF THE CASING
6565+80	(E) RECTIFIER R1, TO BE REPLACED		(8), TA-4	1/CP-6	REPLACE WITH NEW RECTIFIER (50V-22A)AND DEEP WELL.
6574+46	CONNECT TO (E) 12" WATER	IJTS		3/CP-3	
6602+50	NEW 42" WATER LINE	CTS		3/CP-4	
6617+50	NEW 42" WATER LINE	CTS		3/CP-4	
6632+50	NEW 42" WATER LINE	CTS		3/CP-4	
6662+50	NEW 42" WATER LINE	CTS		3/CP-4	
6677+97	150-FT 60" WSP END CASING	CATS	(12), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 6 ANODES ON EACH SIDE OF THE CASING
6679+46	150-FT 60" WSP BEGIN CASING	CATS	(12), 60-LB Mg	2/CP-3	INSTALL 1 TS WITH 6 ANODES ON EACH SIDE OF THE CASING
6680+03	CONNECT TO (E) 30" WATER (NORTH CONNECTION)	IJTS		3/CP-3	CONNECTS TO (E) 30" SCWA

1 - *TABLE 1 – CATHODIC PROTECTION TEST STATION SCHEDULE*

STATION	STRUCTURE	TEST STATION		
		TYPE	ANODES	DETAIL NUMBER
	NEW 8" WSP WATER MAIN			
2+50	NEW 8" WATERLINE	ATS	(3), 60-LB Mg	4/CP-3
12+00	NEW 8" WATERLINE	ATS	(3), 60-LB Mg	4/CP-3
16+25	NEW 8" WATERLINE	ATS	(2), 60-LB Mg	4/CP-3

2 - *TABLE 2 – CATHODIC PROTECTION TEST STATION SCHEDULE FOR 8"ø WSP*

corrpro
An Aegion Company
Corrpro
2[illegible]99 Miller Street,
San Leandro, CA 945[illegible]
tel: 510.[illegible]14.8800
fax: 510.[illegible]14.8811
CCI: 3405[illegible]00[illegible]3

Prepared Under the Direction of:

REGISTERED PROFESSIONAL ENGINEER
JEFFREY KENNETH KRAUSER
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Expires 09/30/15
CIVIL
STATE OF CALIFORNIA

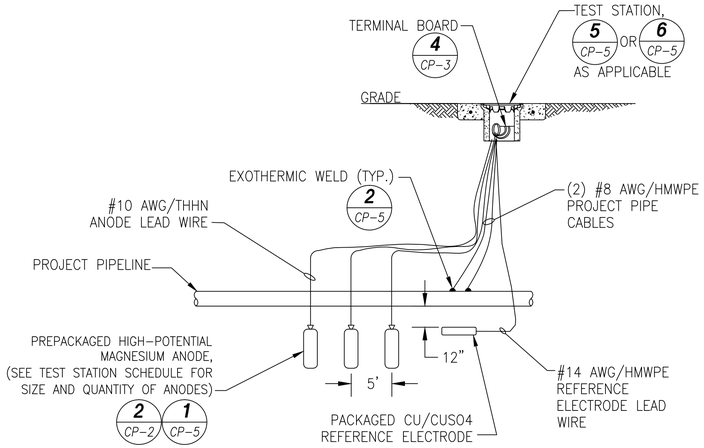
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	MB	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

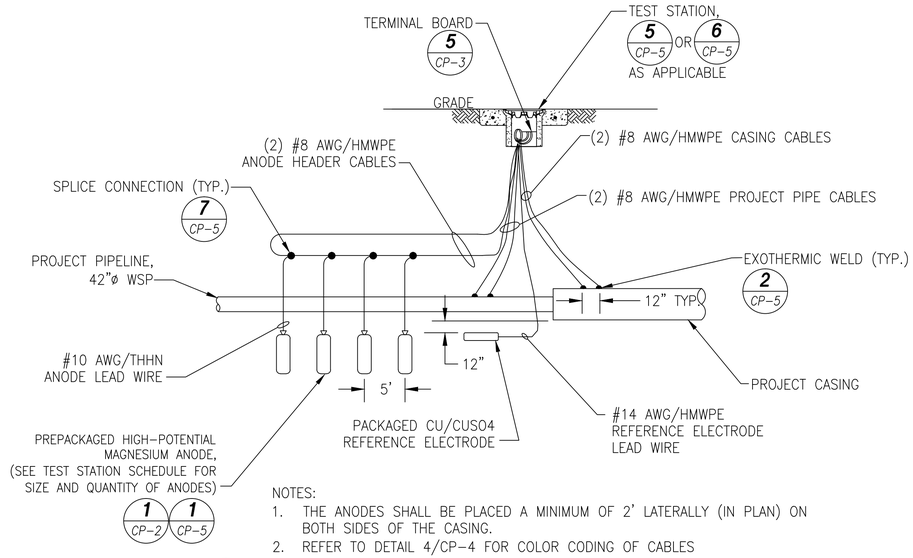
CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE
MB	MB	JK	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	115 OF 149 SHEETS
			SERVICE AREA	JOB.NO 1.7118.09 CP-2



1 ATS – ANODE TEST STATION (TYP.)

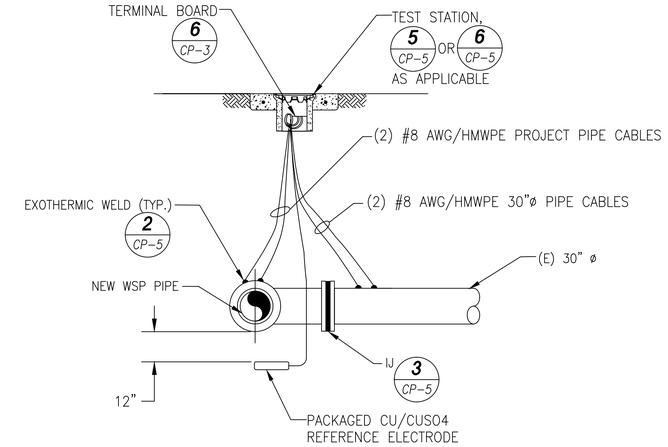
NOT TO SCALE



NOTES:
1. THE ANODES SHALL BE PLACED A MINIMUM OF 2' LATERALLY (IN PLAN) ON BOTH SIDES OF THE CASING.
2. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

2 CATS–CASING ANODE TEST STATION (TYP.)

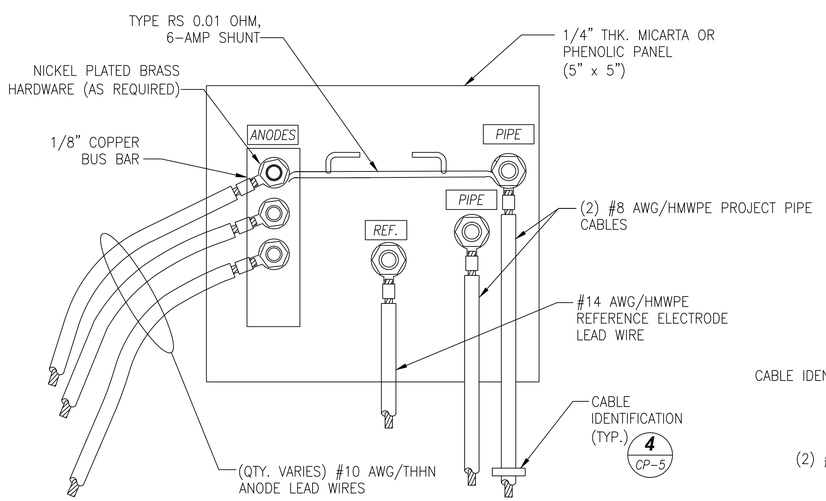
NOT TO SCALE



NOTE:
1. INSTALL (2) AWG #2 BOND JUMPERS AT EACH NON-WELDED JOINT OF THE NEW WSP MAIN.
2. INSTALL DIELECTRIC ISOLATION JOINT AT THE TIE-IN TO THE (E) 30"ø PIPES
3. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

3 IJTS–ISOLATION JOINT TEST STATION

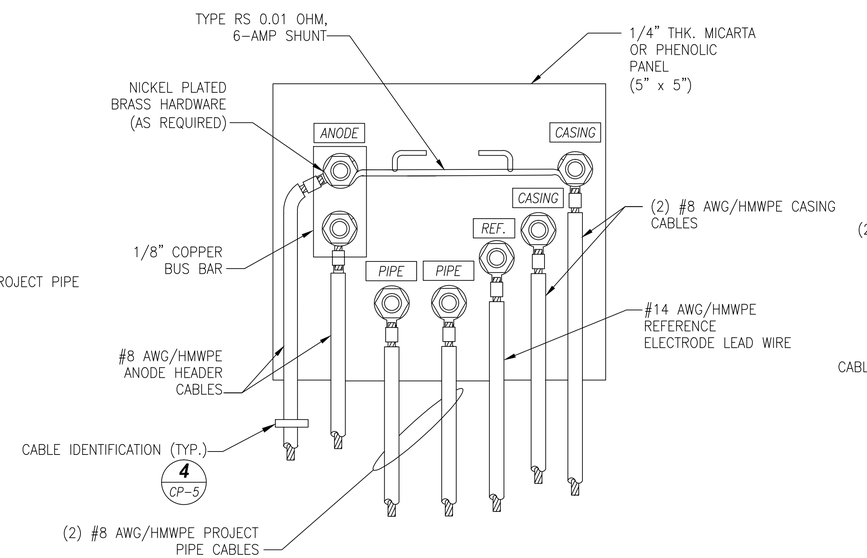
NOT TO SCALE



NOTE:
1. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

4 TERMINAL BOARD FOR ATS

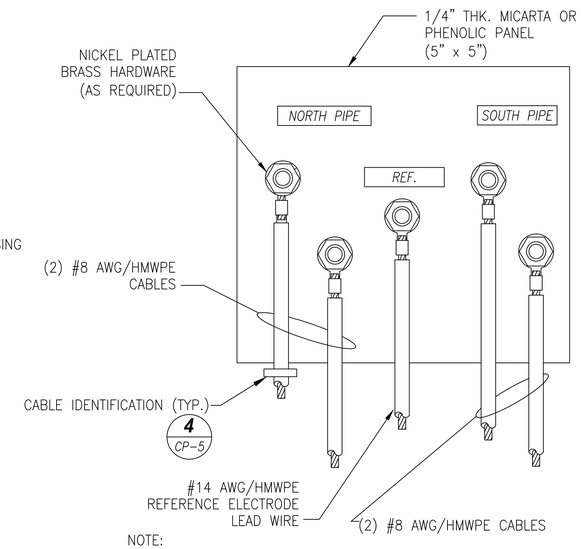
NOT TO SCALE



NOTE:
1. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

5 TERMINAL BOARD FOR CATS

NOT TO SCALE



NOTE:
1. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

6 TERMINAL BOARD FOR IJTS

NOT TO SCALE

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fax: 510 14.8811
CCI: 3405 00 3

Prepared Under the Direction of:

REGISTERED PROFESSIONAL ENGINEER
JEFFREY KENNETH KOALER
No. C68329
Expires 09/30/15
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APP.
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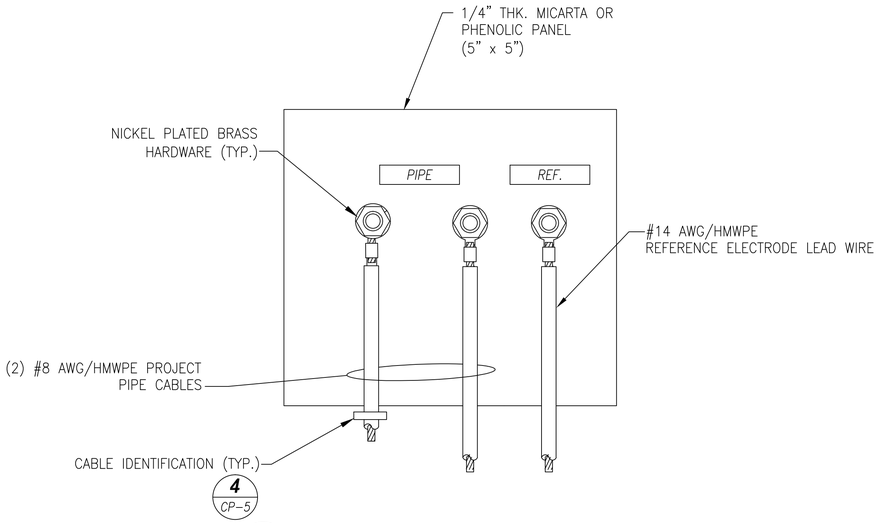
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3

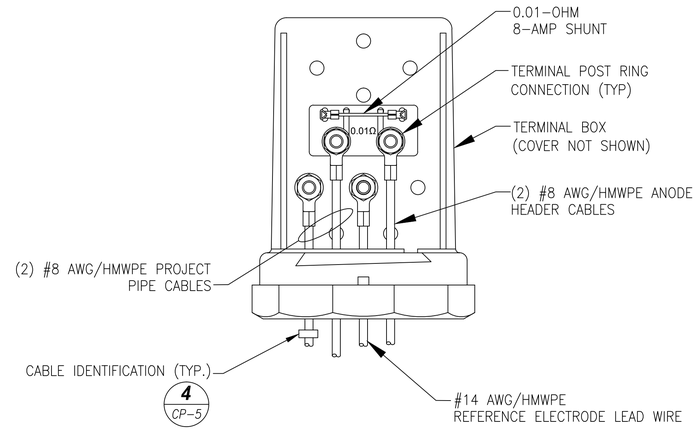
CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE
MB	MB	JK	DATE	DECEMBER 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	116 OF 149 SHEETS
			SERVICE AREA	JOB.NO.1.7118.09 CP–3



1 / - TERMINAL BOARD FOR CTS

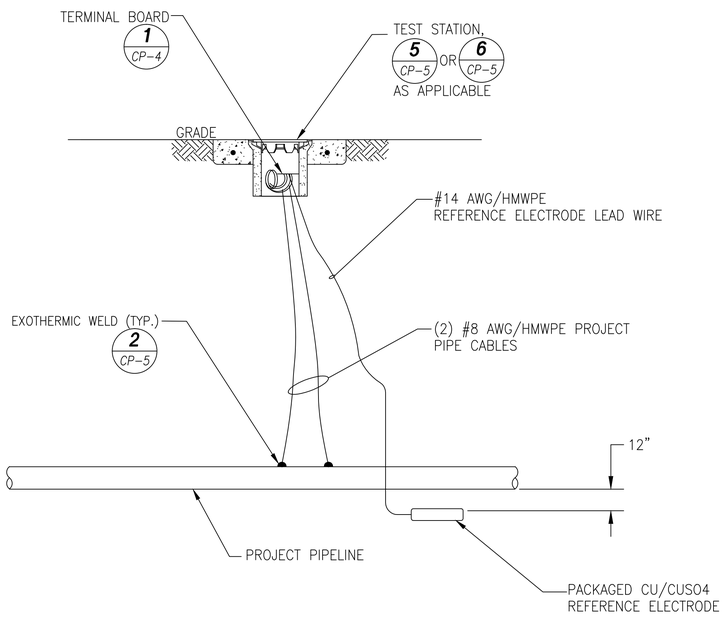
NOT TO SCALE



NOTES:
1. MODIFY THE WIRES ACCORDING TO THE TYPE OF TEST STATION
2. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES

2 / - TERMINAL BOARD FOR POST-MOUNTED TEST STATION (TYP.)

NOT TO SCALE



3 / - CTS-CORROSION MONITORING TEST STATION (TYP.)

NOT TO SCALE

STRUCTURE	CABLE	TAPE COLOR
PROJECT PIPE	#8 AWG/HMWPE STRANDED BLACK	WHITE
CASING	#8 AWG/HMWPE STRANDED BLACK	BLUE
30"ø PIPE	#8 AWG/HMWPE STRANDED BLACK	RED
EXISTING PIPE	#8 AWG/HMWPE STRANDED BLACK	RED
REFERENCE ELECTRODE	#14 AWG/HMWPE STRANDED BLACK	YELLOW
ANODE HEADER	#8 AWG/HMWPE STRANDED BLACK	NONE
MAGNESIUM ANODE LEAD WIRE	#10 AWG/THHN STRANDED BLACK	NONE
HIGH-SILICON CAST IRON ANODE LEAD WIRE	#8 AWG/HMWPE STRANDED BLACK	NONE
ANODE HEADER CABLE TO RECTIFIER POSITIVE	#4 AWG/THHN STRANDED RED	NONE
STRUCTURE HEADER CABLE TO RECTIFIER NEGATIVE	#4 AWG/THHN STRANDED BLACK	NONE
DRAIN CABLE FOR IMPRESSED CURRENT SYSTEM	#4 AWG/HMWPE STRANDED BLACK	NONE
TEST CABLE FOR IMPRESSED CURRENT SYSTEM	#10 AWG/HMWPE STRANDED BLACK	NONE

NOTE:
1. TEST STATION CABLES SHALL BE COLOR CODED USING 3M VINYL ELECTRICAL TAPE OR APPROVED EQUAL. TAPE SHALL BE WRAPPED FOR A MINIMUM OF 1" WIDE.

4 / - COLOR CODE FOR CABLES

NOT TO SCALE

corrpro
An Aegion Company
Corrpro
2[illegible]99 Miller Street,
San Leandro, CA 945[illegible]
tel: 510.[illegible]14.8800
fax: 510.[illegible]14.8811
CCI[illegible]3405[illegible]00[illegible]3

Prepared Under the Direction of:

REGISTERED PROFESSIONAL ENGINEER
JEFFREY KENNETH KAUFFER
No. C68329
Expires 09/30/15
CIVIL
STATE OF CALIFORNIA

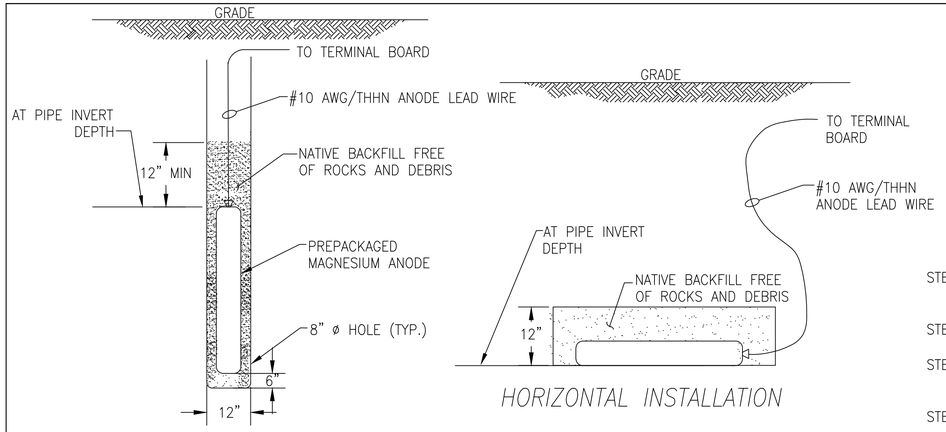
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	MB	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

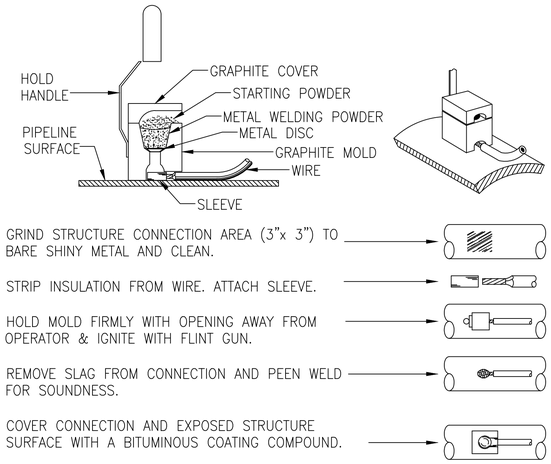
CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE	
MB	MB	JK	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	117 OF 149	SHEETS
			SERVICE AREA	JOB.NO1.7118.09	CP-4

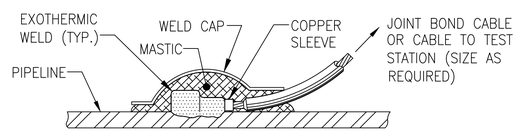


1 MAGNESIUM ANODE INSTALLATION (TYP.)

NOT TO SCALE

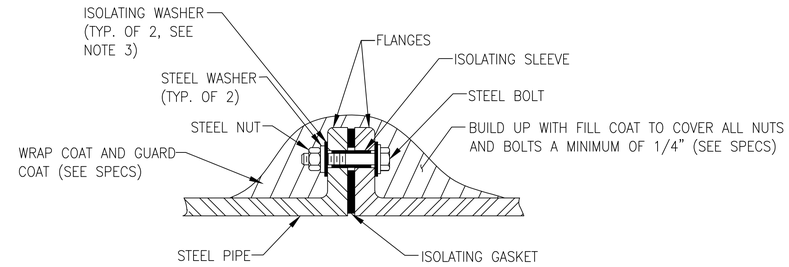


NOTE: PROCEDURE SHOWN ABOVE IS TO BE USED AS A GENERAL GUIDE ONLY. CONSULT MANUFACTURER'S LITERATURE FOR SPECIFIC INSTALLATION INSTRUCTIONS.



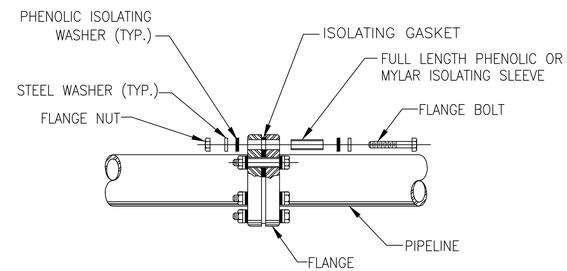
2 EXOTHERMIC WELDING (TYP.)

NOT TO SCALE



NOTE:
1. GASKET SHALL BE FOR WATER SERVICE AND BE OF SAME PRESSURE RATING AS THE FLANGE.
2. DELETE COATING IF FLANGE IS LOCATED ABOVE GRADE OR IN VAULTS.
3. DELETE ISOLATING WASHER ON THE SIDE OF THE FLANGE THAT IS UNDER CATHODIC PROTECTION. IF BOTH SIDES ARE PROTECTED, DELETE ISOLATING WASHERS ON ONE SIDE.

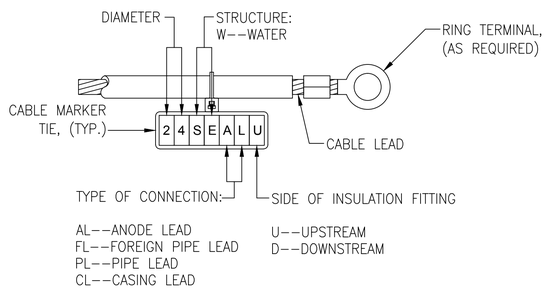
BELOW GRADE ISOLATING JOINT COATING



ABOVE GRADE ISOLATING JOINT

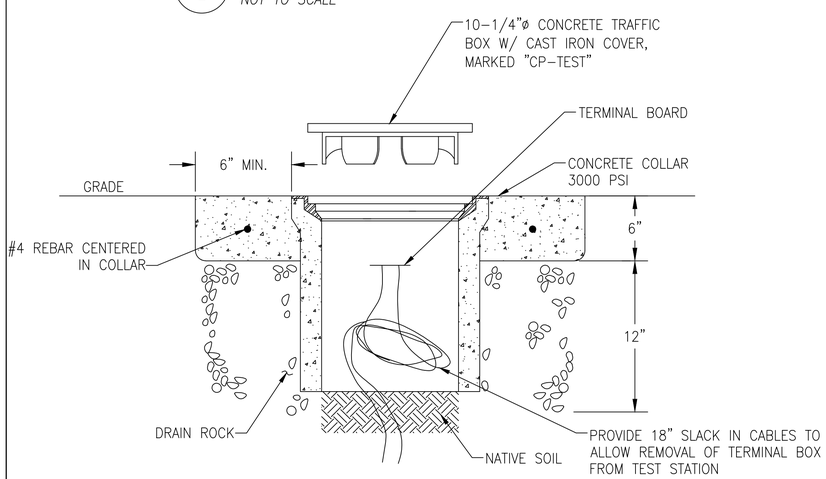
3 IJ–DIELECTRIC ISOLATION JOINT FLANGE

NOT TO SCALE



4 CABLE IDENTIFICATION (TYP.)

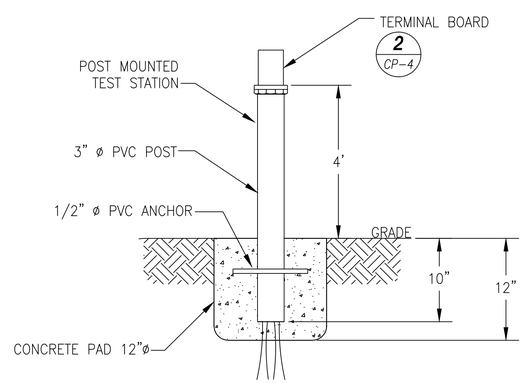
NOT TO SCALE



NOTE: ALL FLUSH TO GRADE TEST STATIONS SHALL BE INSTALLED BEHIND THE CURB AND OUT OF THE ROADWAY.

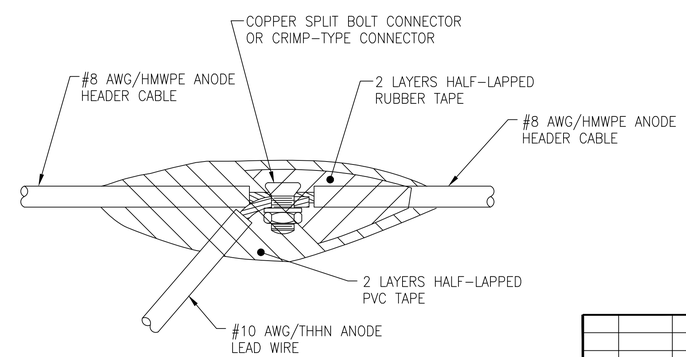
5 FLUSH MOUNTED TEST STATION (PAVED AREAS)

NOT TO SCALE



6 POST MOUNTED TEST STATION (UNPAVED AREAS)

NOT TO SCALE



7 SPLICE CONNECTION (TYP.)

NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
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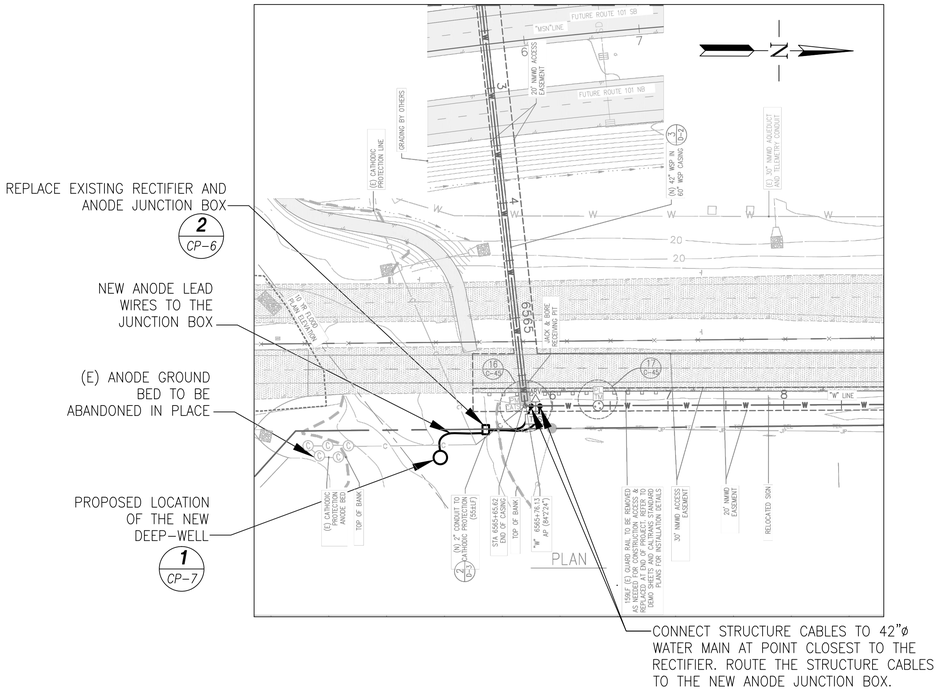
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3

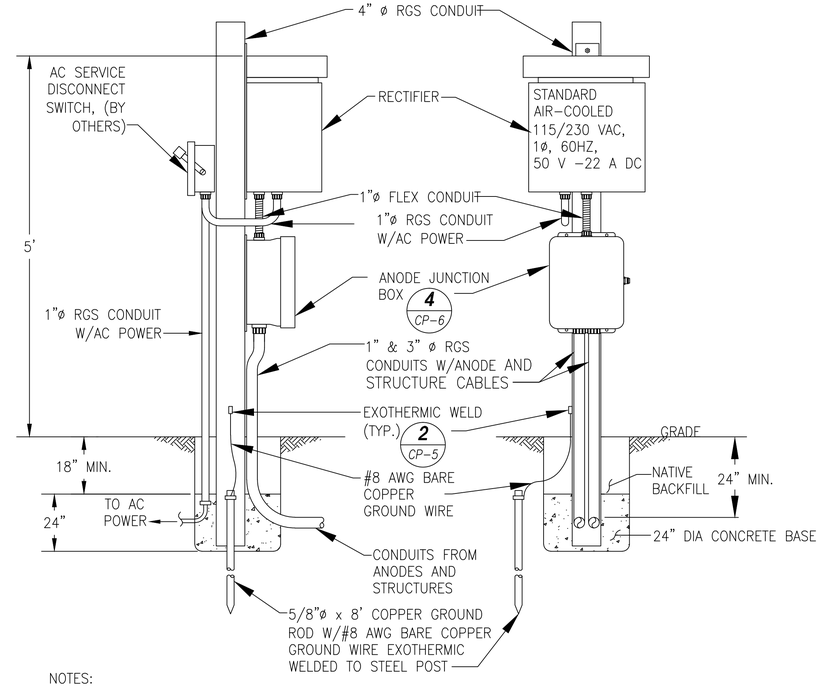
CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE	
MB	MB	JK	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	118 OF 149	SHEETS
			SERVICE AREA	JOB.NO 1.7118.09	CP–5



1 RECTIFIER R1 SITE PLAN

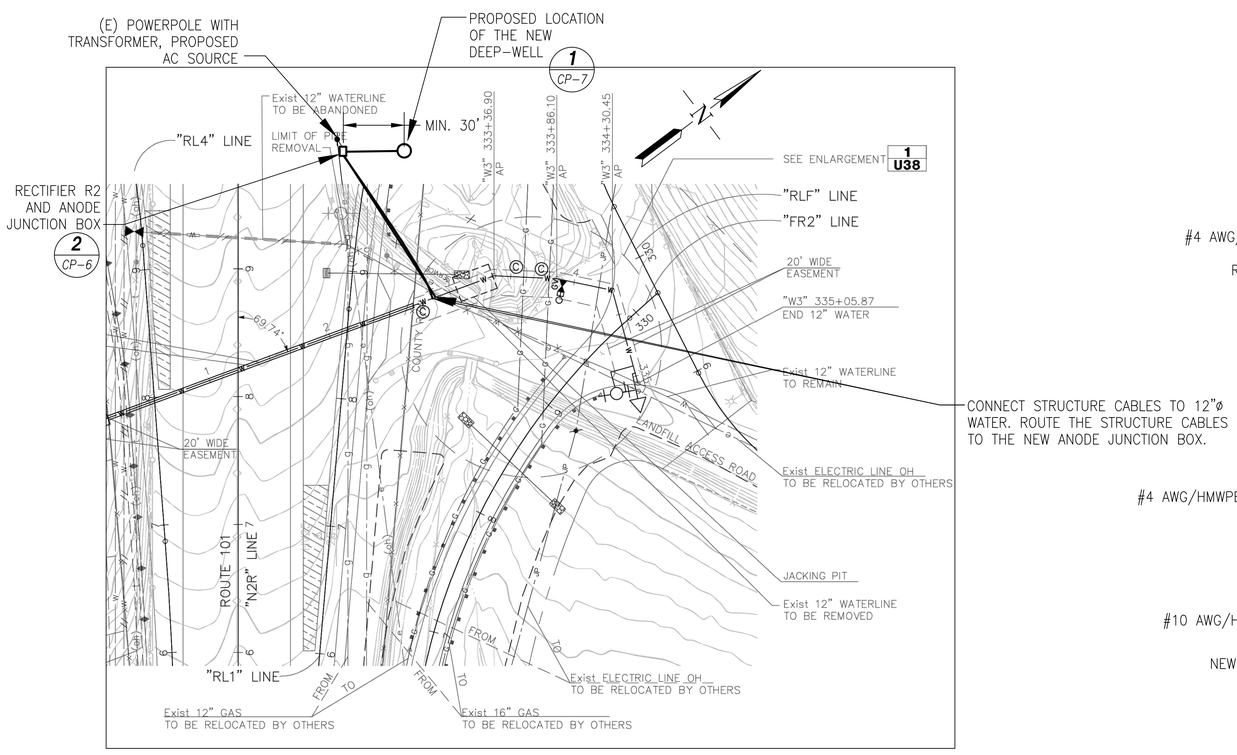
NOT TO SCALE



NOTES:
1. MOUNTING OF RECTIFIER/JUNCTION BOX AND EXACT CONDUIT CONFIGURATION TO BE FIELD DETERMINED.
2. RECTIFIER/JUNCTION BOX MAY BE POLE MOUNTED.
3. TRANSIT TO PVC CONDUIT UNDERGROUND.

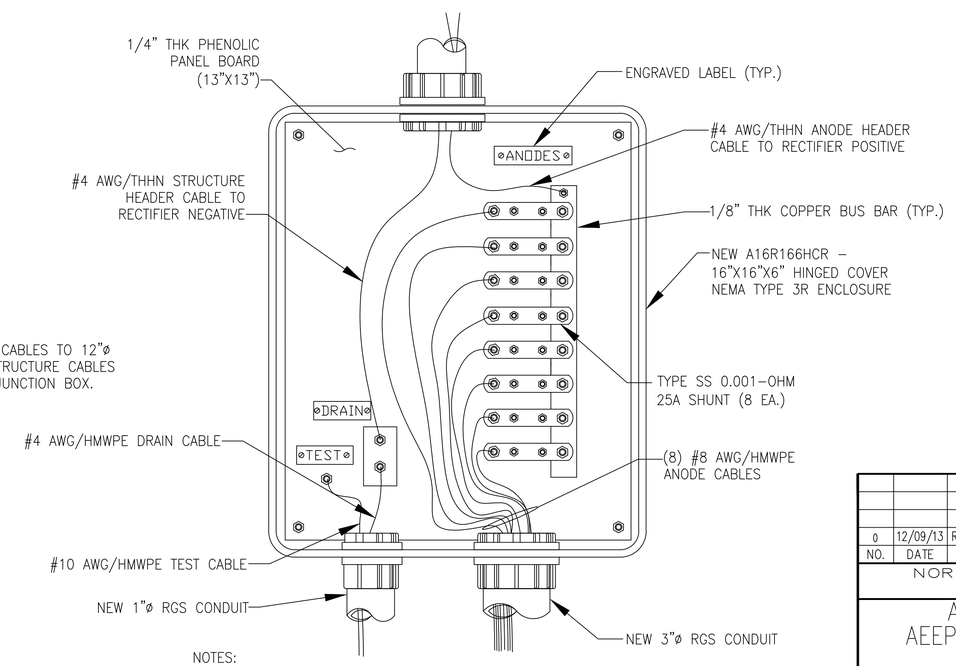
2 RECTIFIER AND JUNCTION BOX INSTALLATION (TYP.)

NOT TO SCALE



3 RECTIFIER R2 SITE PLAN

NOT TO SCALE



NOTES:
1. LABEL ALL CABLES AT THE JUNCTION BOX FOR PROPER IDENTIFICATION.
2. REFER TO DETAIL 4/CP-4 FOR COLOR CODING OF CABLES.

4 NEW ANODE JUNCTION BOX

NOT TO SCALE

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2199 Miller Street,
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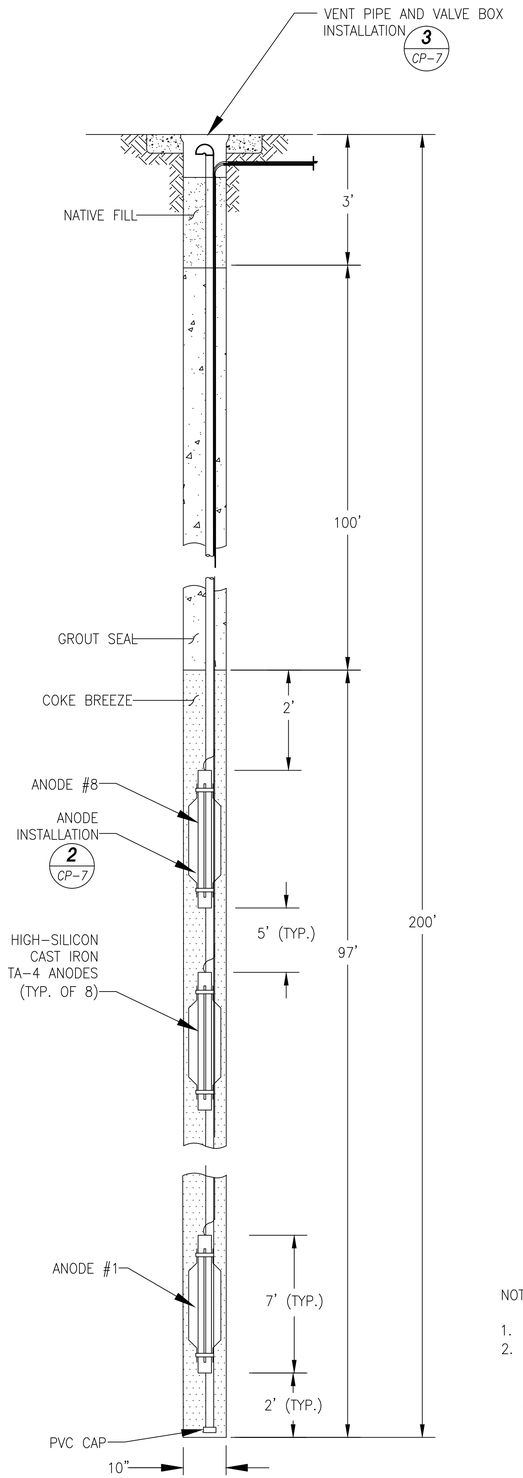
NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	MB	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

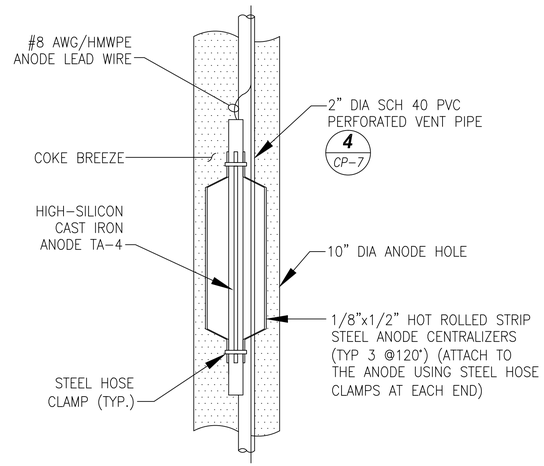
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

CATHODIC PROTECTION (CP) SYSTEM

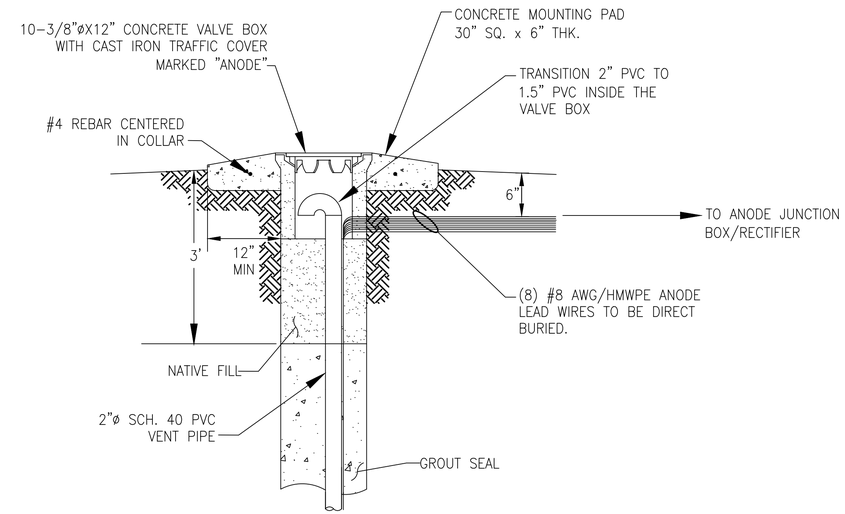
DES	DR	CH	SCALE	NOT TO SCALE	
MB	MB	JK	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	119 OF 149	SHEETS
			SERVICE AREA	JOB.NO.1.7118.09	CP-6



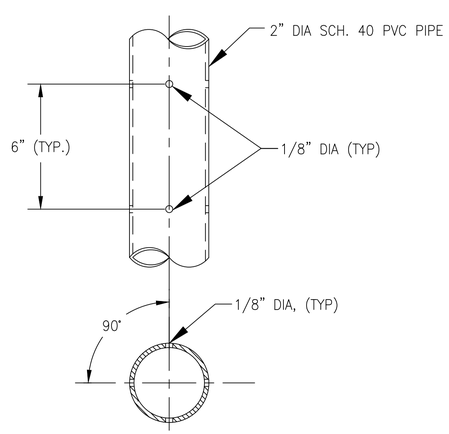
1 - DEEP WELL (TYP.)
NOT TO SCALE



2 - ANODE INSTALLATION (TYP. OF 8)
NOT TO SCALE



3 - VENT PIPE AND VALVE BOX INSTALLATION (TYP.)
NOT TO SCALE



NOTES:

1. PERFORATED LENGTH FROM BOTTOM TO BE EQUAL TO 97'.
2. GLUE PVC JOINTS AND SECURE WITH (3) 3/4"-10 SELF TAPPING SHEET METAL SCREWS.

4 - VENT PIPE PERFORATION (TYP.)
NOT TO SCALE

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NO.	DATE	REVISION	BY	APP.
0	12/09/13	RELEASE FOR BID	MB	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

CATHODIC PROTECTION (CP) SYSTEM

DES	DR	CH	SCALE	NOT TO SCALE	
MB	MB	JK	DATE	DECEMBER 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	120 OF 149	SHEETS
			SERVICE AREA	JOB.NO.1.7118.09	CP-7

GENERAL NOTES:

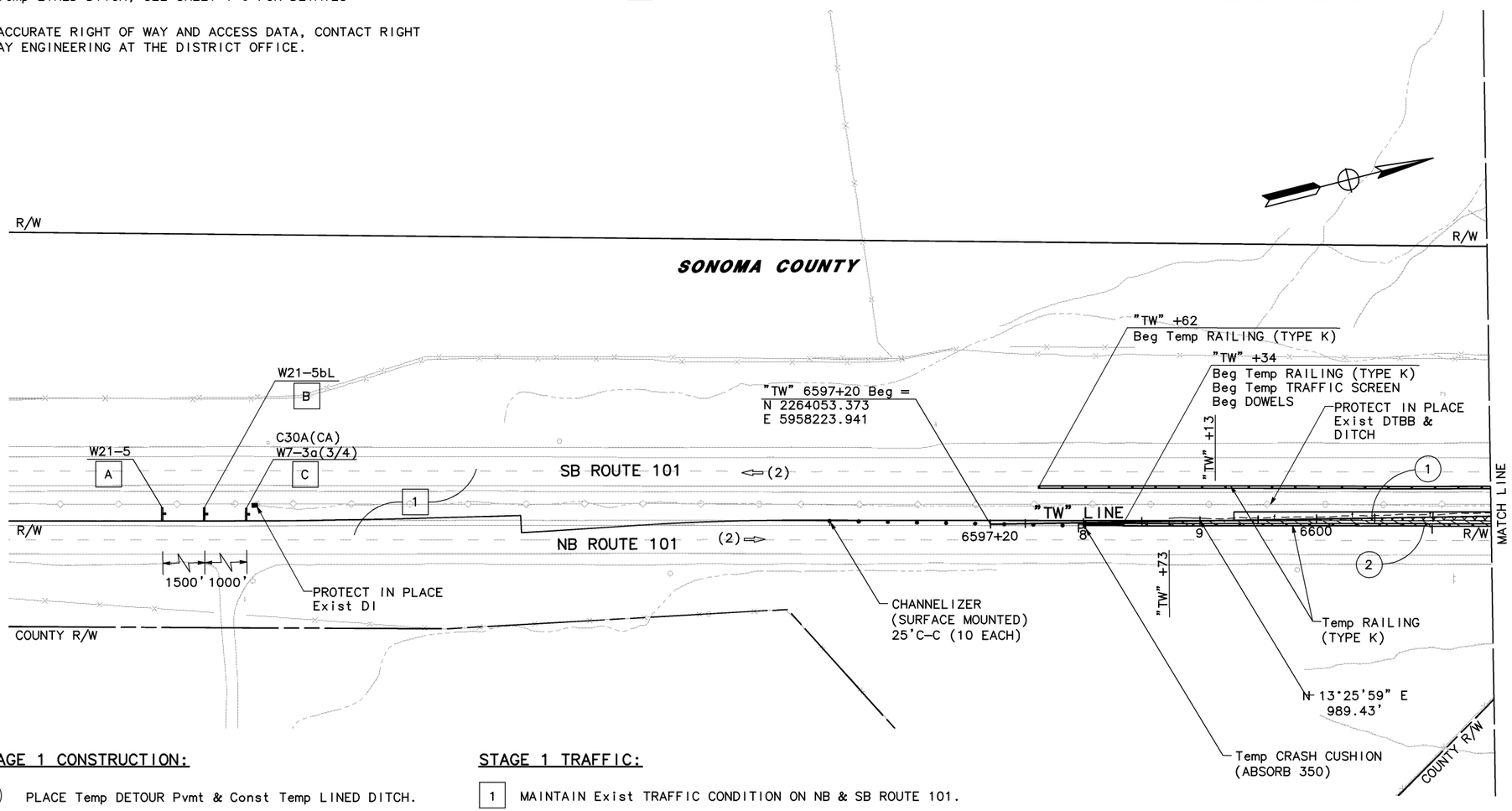
1. UNLESS OTHERWISE NOTED, ALL TEMPORARY RAILING (TYPE K) SHALL BE PLACED NO CLOSER THAN ONE FOOT FROM EDGE OF TRAVEL WAY.
2. PLACE REFLECTORS ON ALL TEMPORARY RAILING (TYPE K).
3. TEMPORARY RAILING (TYPE K) SHALL BE DOWELED IN ACCORDANCE WITH CALTRANS Std PLAN T3B.
4. CONTRACTOR SHALL REFER TO CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR ALL APPLICABLE TEMPORARY TRAFFIC CONTROL DETAILS AND SIGNS.
5. ALL EXISTING SIGNS IN CONFLICT WITH TRAFFIC CONTROL PLANS SHALL BE COVERED WITH MATERIALS OTHER THAN PLASTICS UNDER THE DIRECTION OF THE ENGINEER.
6. CONTRACTOR SHALL MAINTAIN ACCESS TO LOCAL PROPERTIES IN ALL AREAS WITHIN CONSTUCTION LIMITS AT ALL TIMES.
7. CONTRACTOR SHALL BACKFILL OR COVER WITH STEEL PLATES ANY OPEN TRENCHES, AND RESTORE ALL WORK AREAS TO EXISTING TRAFFIC CONFIGURATION AT THE END OF EACH WORK DAY.
8. CONSTRUCTION ACTIVITIES DENOTED AS "FIRST ORDER OF WORK" SHALL BE COMPLETED PRIOR TO OPENING TO TRAFFIC.
9. FOR Temp LINED DITCH, SEE SHEET T-6 FOR DETAILS
10. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND:

- PERMENANT CONSTRUCTION THIS STAGE
- TEMPORARY PAVEMENT THIS STAGE 0.5' HMA (TYPE A) / 1.40' CI 4 AS
- TEMPORARY AC OVERLAY THIS STAGE
- REMOVE BASE & SURFACING THIS STAGE
- PAVEMENT FROM PREVIOUS STAGE
- (No.) NUMBER OF TRAVEL LANES IN DIRECTION OF TRAFFIC
- TEMPORARY CRASH CUSHION (ARRAY AS NOTED)
- TEMPORARY CRASH CUSHION (ABSORB 350)
- (No.) CONSTRUCTION ITEM NUMBER
- [No.] TRAFFIC ITEM NUMBER
- No. TEMPORARY PAVEMENT DELINEATION (PAINT)
- No FINAL PAVEMENT DELINEATION
- Rem REMOVE Exist PAVEMENT DELINEATION
- a CURVE DATA
- A TEMPORARY SIGN LETTER
- CHANNELIZER (SURFACE MOUNTED)
- TEMPORARY RAILING (TYPE K)
- P OBJECT MARKER (TYPE P)
- TEMPORARY SIGN
- CHANGE IN PAVEMENT DELINEATION DETAIL

ABBREVIATION:

Rem REMOVE



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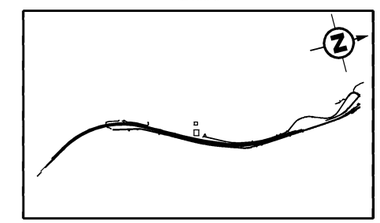

REGISTERED PROFESSIONAL ENGINEER
S. D. DANSKY
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MARK THOMAS & COMPANY, INC.
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WALNUT CREEK, CALIFORNIA 94597
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NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	121 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-1

STAGE 1 CONSTRUCTION:

1. PLACE Temp DETOUR Pvmt & Const Temp LINED DITCH.
2. PLACE Temp AC OVERLAY AS FIRST ORDER OF WORK.

STAGE 1 TRAFFIC:

1. MAINTAIN Exist TRAFFIC CONDITION ON NB & SB ROUTE 101.
2. MAINTAIN LOCAL TRAFFIC DURING CONTRUCTION.

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

CURVE DATA

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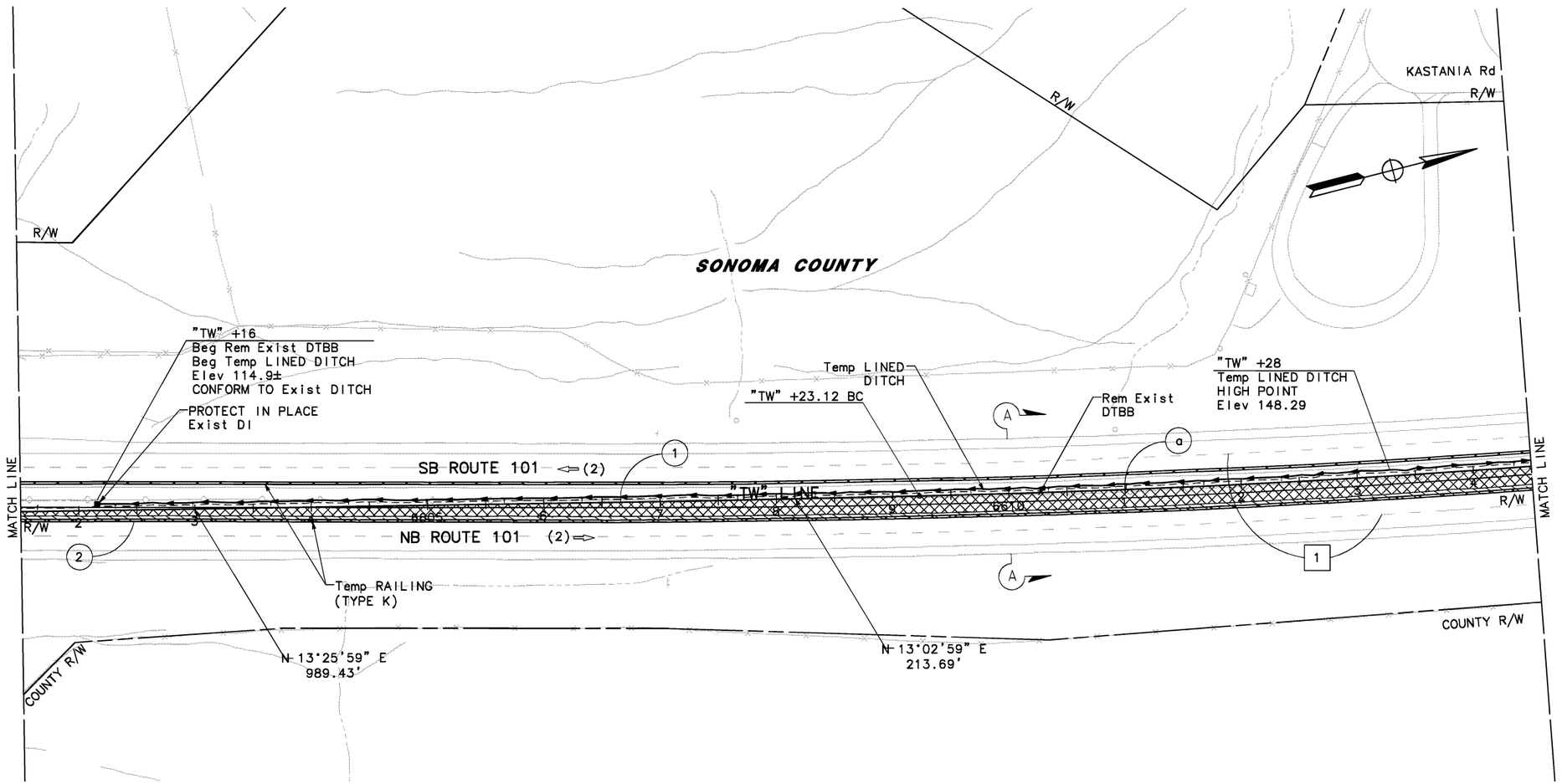
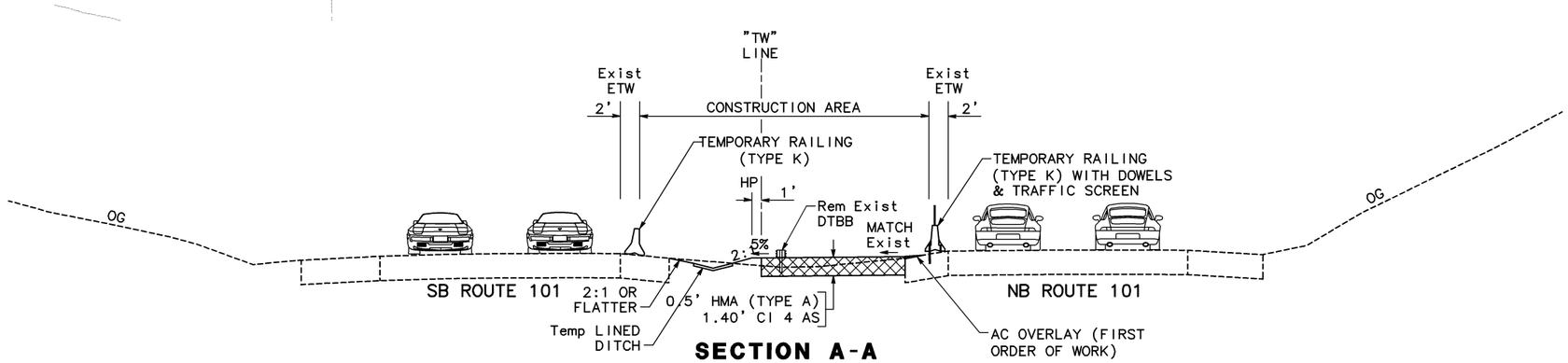
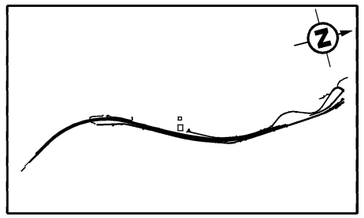




SECTION A-A
NO SCALE

KEYMAP



REGISTERED PROFESSIONAL ENGINEER
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NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	122 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-2

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

CURVE DATA

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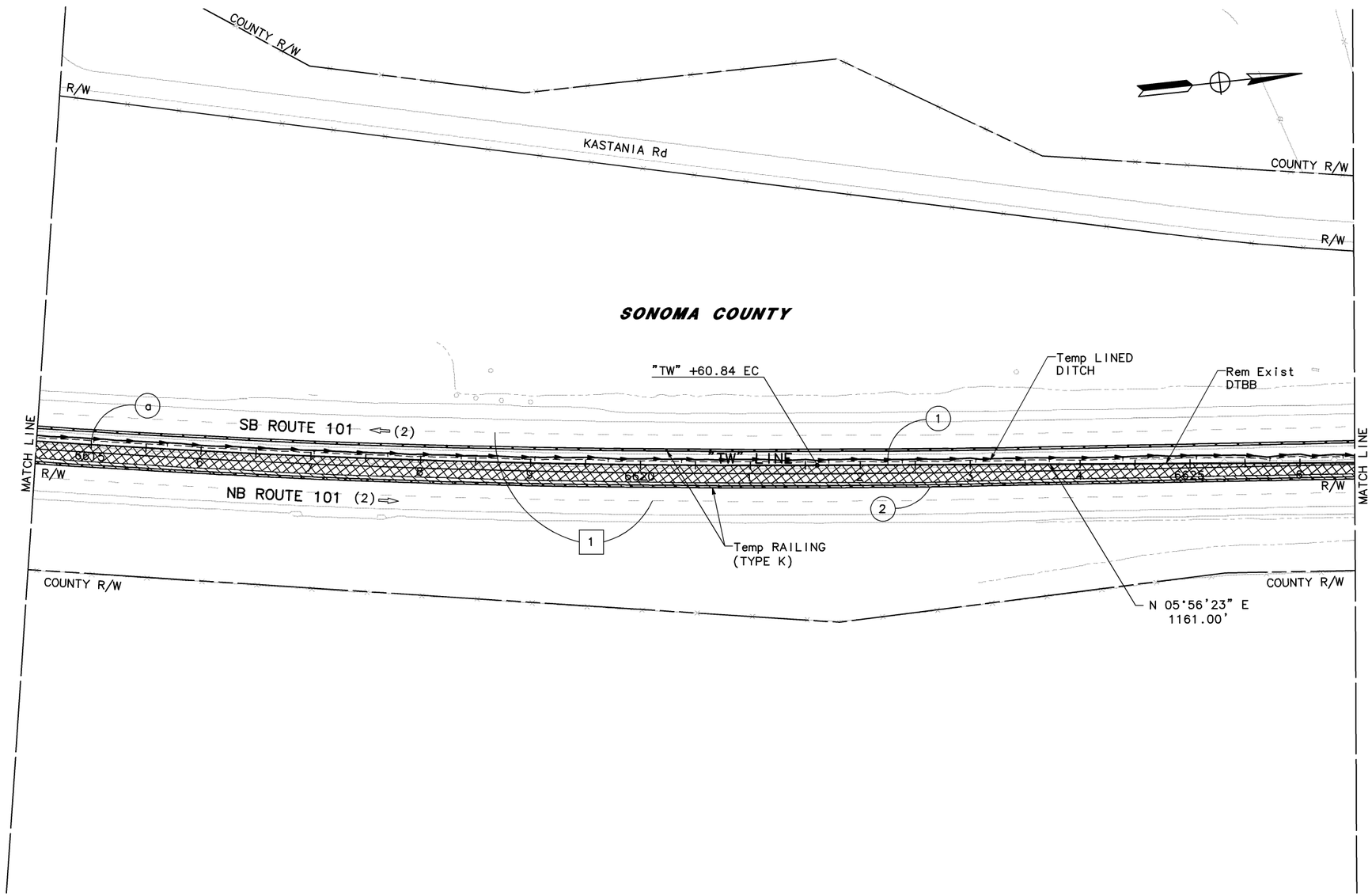

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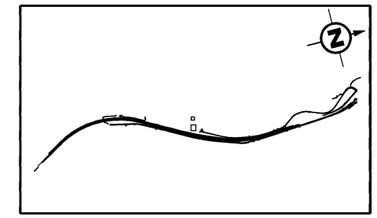

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	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	123 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-3

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

CURVE DATA

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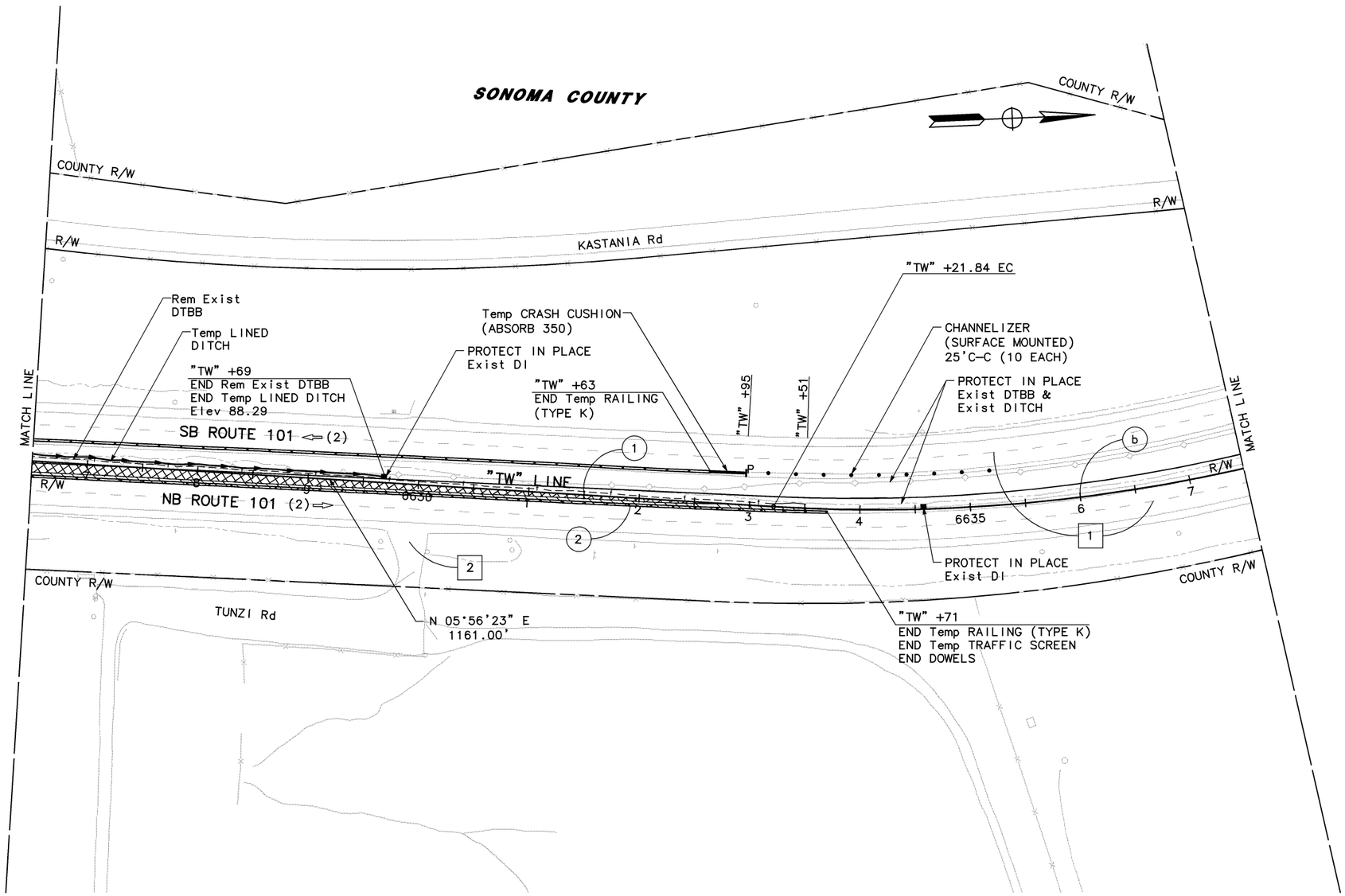

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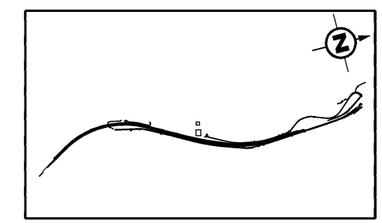

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NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	124 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-4

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

CURVE DATA

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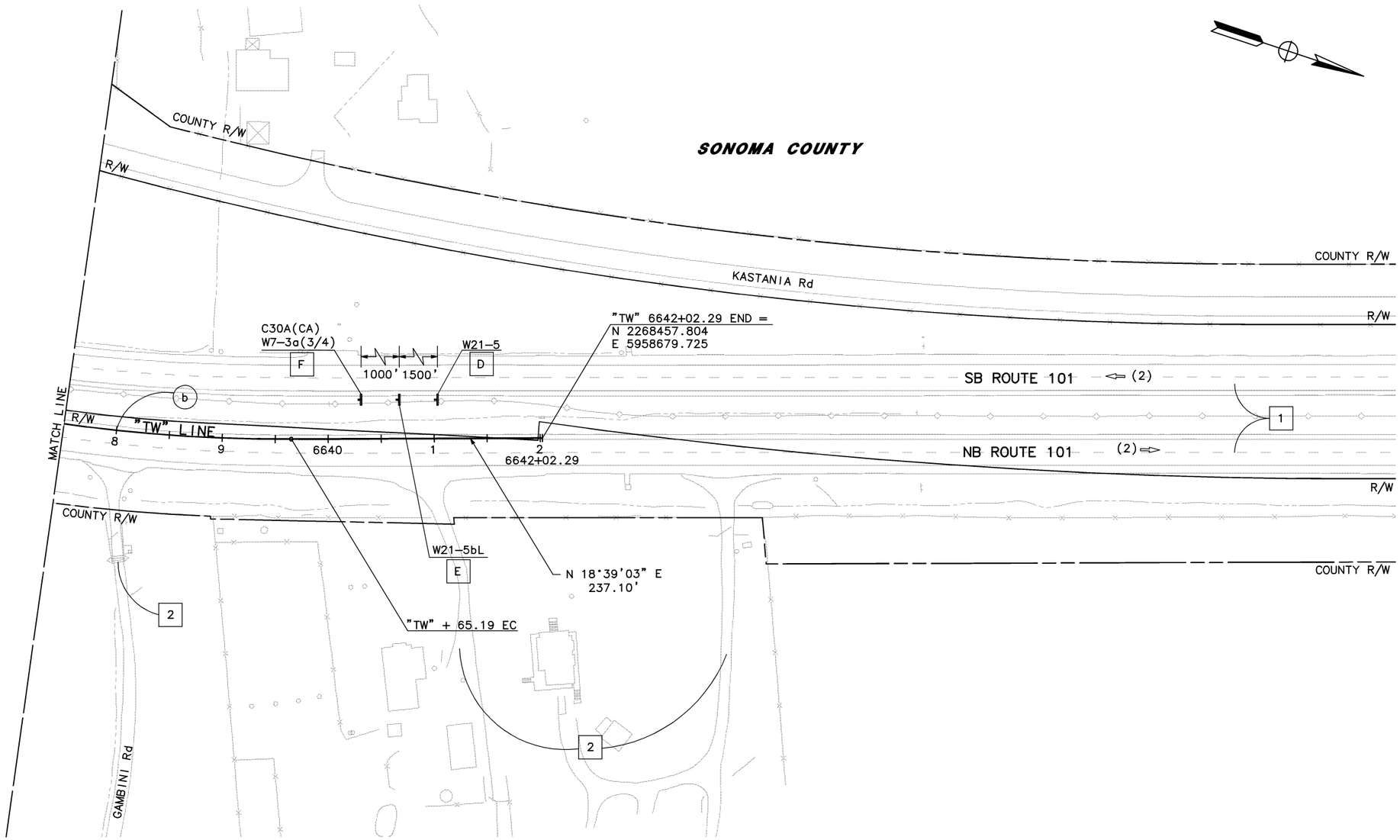

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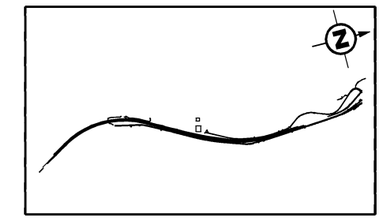

REGISTERED PROFESSIONAL ENGINEER
S. D. DANSKY
No. 60220
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

MARK THOMAS & COMPANY, INC.
Providing Engineering, Surveying and Planning Services
3000 OAK ROAD, SUITE 650
WALNUT CREEK, CALIFORNIA 94597
TEL: (925) 938-0383 FAX: (925) 938-0389

NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	125 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-5

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

Temp LINED DITCH

STATION	OFFSET	FL Elev
"WT" 6602+15.59	5.58 Lt	114.90
"WT" 6602+50	5.32 Lt	116.06
"WT" 6603+00	5.61 Lt	117.99
"WT" 6603+50	5.33 Lt	120.46
"WT" 6604+00	5.77 Lt	122.58
"WT" 6604+50	5.72 Lt	124.93
"WT" 6605+00	4.82 Lt	127.36
"WT" 6605+50	4.97 Lt	129.49
"WT" 6606+00	4.44 Lt	131.71
"WT" 6606+50	4.79 Lt	133.81
"WT" 6607+00	4.88 Lt	135.70
"WT" 6607+50	4.37 Lt	137.71
"WT" 6608+00	4.70 Lt	139.52
"WT" 6608+50	4.11 Lt	141.23
"WT" 6609+00	4.16 Lt	142.84
"WT" 6609+50	4.80 Lt	144.13
"WT" 6610+00	4.42 Lt	145.14
"WT" 6610+50	4.72 Lt	145.96
"WT" 6611+00	4.78 Lt	146.93
"WT" 6611+50	4.82 Lt	147.39
"WT" 6612+00	4.94 Lt	147.87
"WT" 6612+50	5.32 Lt	148.24
"WT" 6613+00	5.91 Lt	148.27
"WT" 6613+28.38	5.30 Lt	148.29
"WT" 6613+50	5.27 Lt	148.28
"WT" 6614+00	5.43 Lt	148.25
"WT" 6614+50	5.27 Lt	148.21
"WT" 6615+00	5.49 Lt	147.67
"WT" 6615+50	5.59 Lt	147.19

Temp LINED DITCH

STATION	OFFSET	FL Elev
"WT" 6616+00	5.01 Lt	146.42
"WT" 6616+50	5.10 Lt	145.56
"WT" 6617+00	5.24 Lt	144.52
"WT" 6617+50	5.19 Lt	143.39
"WT" 6618+00	5.36 Lt	142.07
"WT" 6618+50	5.24 Lt	140.61
"WT" 6619+00	5.36 Lt	138.87
"WT" 6619+50	6.09 Lt	136.91
"WT" 6620+00	5.43 Lt	134.98
"WT" 6620+50	5.14 Lt	132.92
"WT" 6621+00	5.50 Lt	130.88
"WT" 6621+50	5.27 Lt	128.59
"WT" 6622+00	5.39 Lt	126.41
"WT" 6622+50	5.25 Lt	124.24
"WT" 6623+00	5.98 Lt	121.90
"WT" 6623+50	5.92 Lt	119.25
"WT" 6624+00	5.65 Lt	116.69
"WT" 6624+50	6.90 Lt	113.90
"WT" 6625+00	7.46 Lt	110.93
"WT" 6625+50	7.32 Lt	108.20
"WT" 6626+00	8.09 Lt	105.27
"WT" 6626+50	6.53 Lt	102.56
"WT" 6627+00	6.94 Lt	100.26
"WT" 6627+50	5.52 Lt	98.00
"WT" 6628+00	6.59 Lt	95.39
"WT" 6628+50	5.78 Lt	93.50
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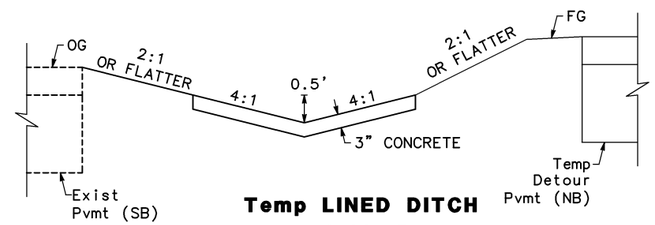
"WT" 6629+50	6.50 Lt	89.59
"WT" 6629+68.50	5.44 Lt	88.29



Temp LINED DITCH
NO SCALE

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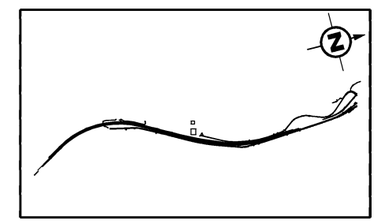

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	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

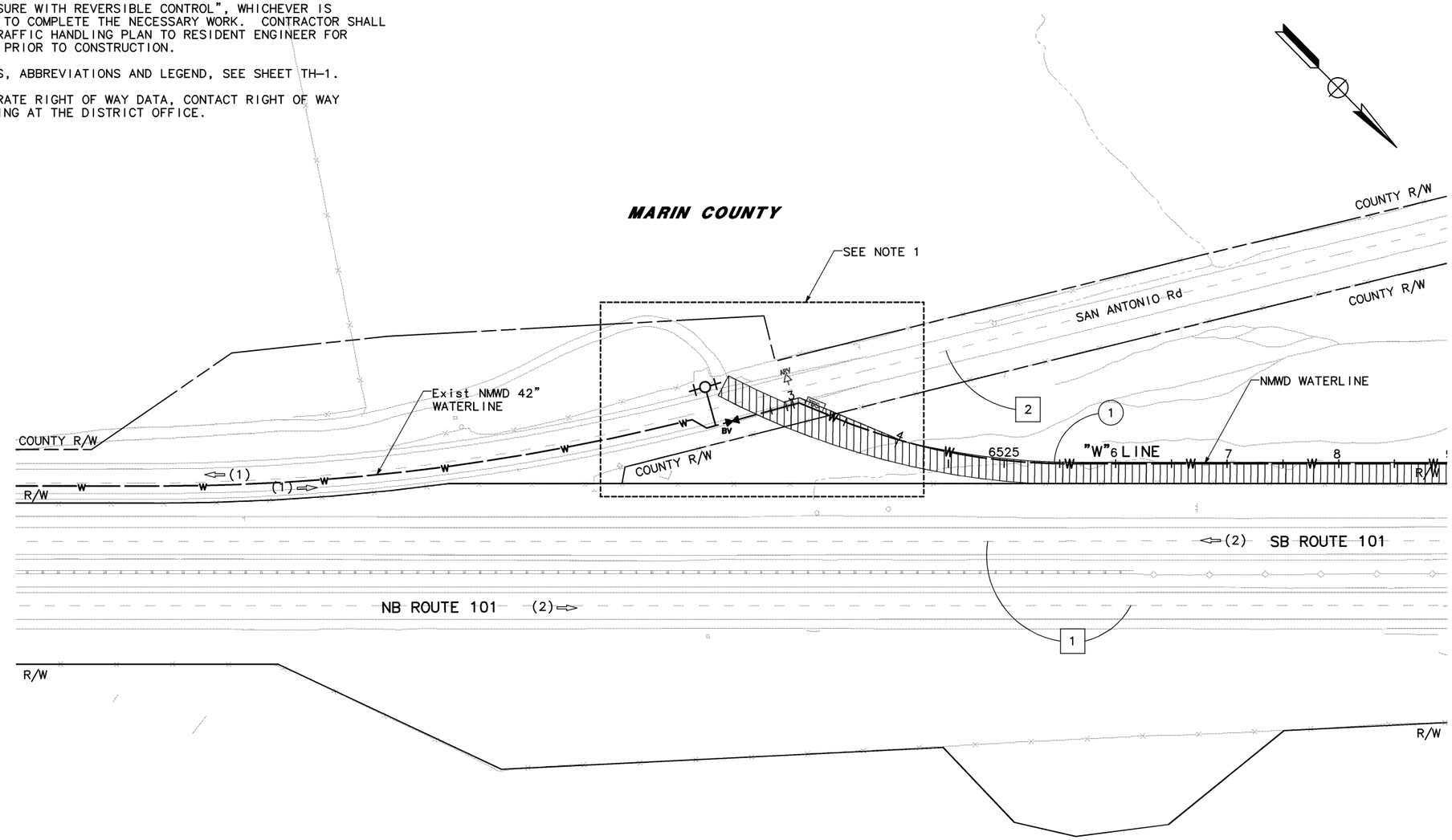
TRAFFIC HANDLING PLAN (STAGE 1)

DES	DR	CH	SCALE		
DAC	JKS		DATE AUGUST 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 126 OF 149		SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09	T-6

Dec 06, 2013 - 9:07am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 1.dwg User: ACROSKEY

NOTES:

1. FOR WATERLINE CONSTRUCTION ON SAN ANTONIO Rd AND KASTANIA Rd, CONTRACTOR SHOULD USE CALTRANS Std PLAN T10A "SHOULDER CLOSURE" OR Std PLAN T13 "TYPICAL LANE CLOSURE WITH REVERSIBLE CONTROL" OR Std PLAN T13 "TYPICAL ROAD CLOSURE WITH REVERSIBLE CONTROL", WHICHEVER IS REQUIRED TO COMPLETE THE NECESSARY WORK. CONTRACTOR SHALL SUBMIT TRAFFIC HANDLING PLAN TO RESIDENT ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
2. FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET TH-1.
3. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



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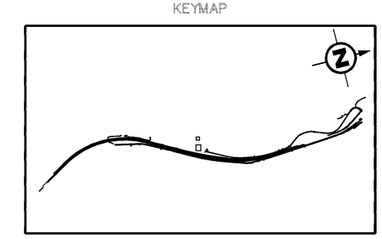

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STAGE 2 CONSTRUCTION:

(1) CONSTRUCT 36"/42" NMWD WATERLINE AND REPAVE NB OUTSIDE 8' SHOULDER WHERE NEEDED (SEE GR SHEETS)

STAGE 2 TRAFFIC:

1. MAINTAIN Exist TRAFFIC CONDITION ON ROUTE 101. USE DETOUR FOR BIKES (SEE BIKE DETOUR SHEET).
2. MAINTAIN Exist TRAFFIC CONDITION ON SAN ANTONIO Rd.
3. SHIFT NB ROUTE 101 TRAFFIC ONTO Temp DETOUR Pvmt.
4. MAINTAIN LOCAL TRAFFIC DURING CONSTRUCTION.
5. MAINTAIN ONE LANE OF TRAFFIC FOR KASTANIA Rd.

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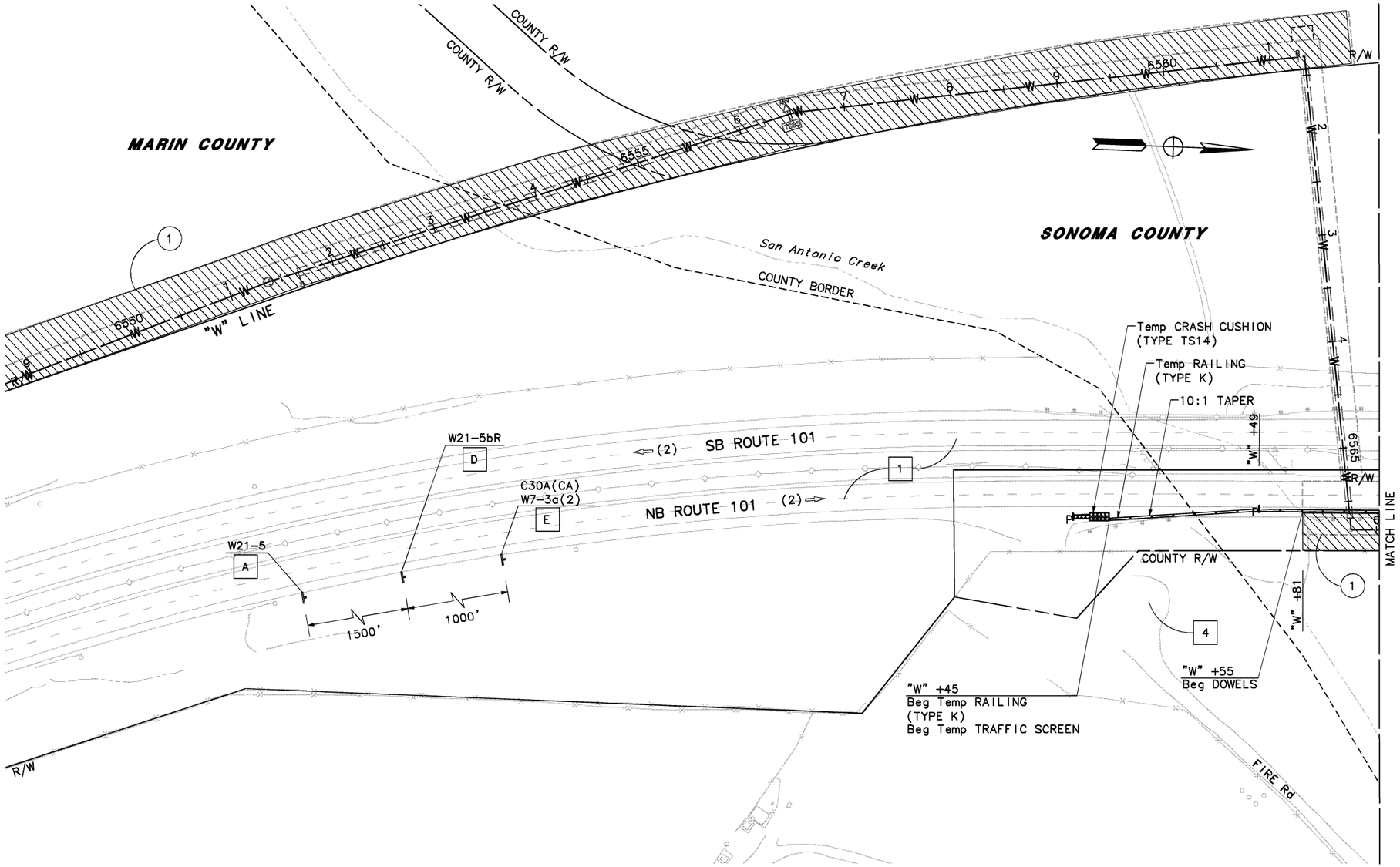
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	127 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-7

Dec 06, 2013 - 9:10am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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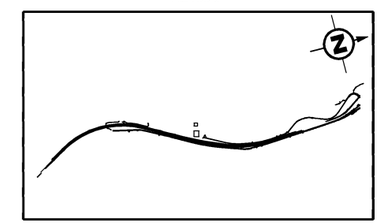

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	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
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AQUEDUCT RELOCATION
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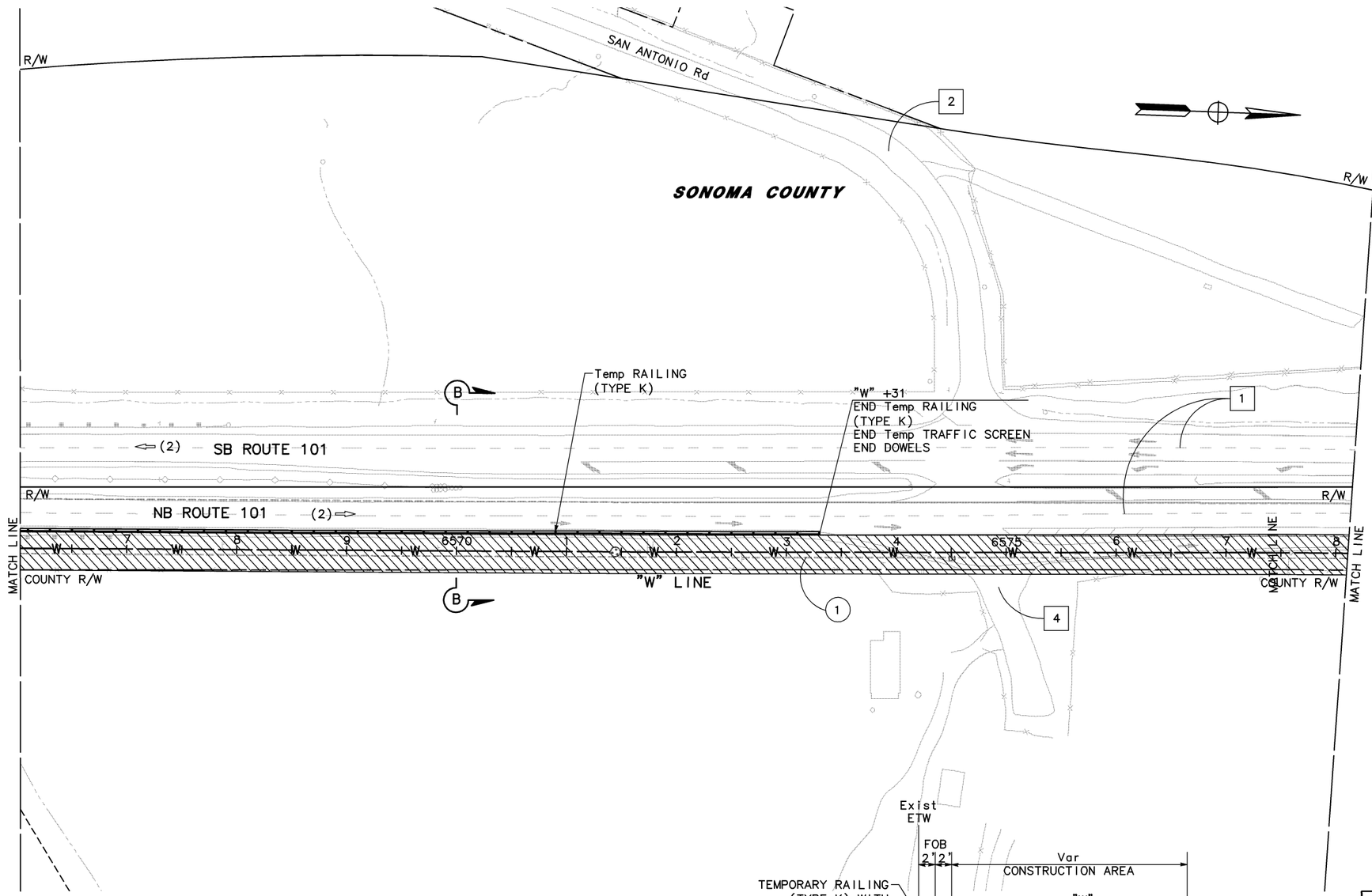
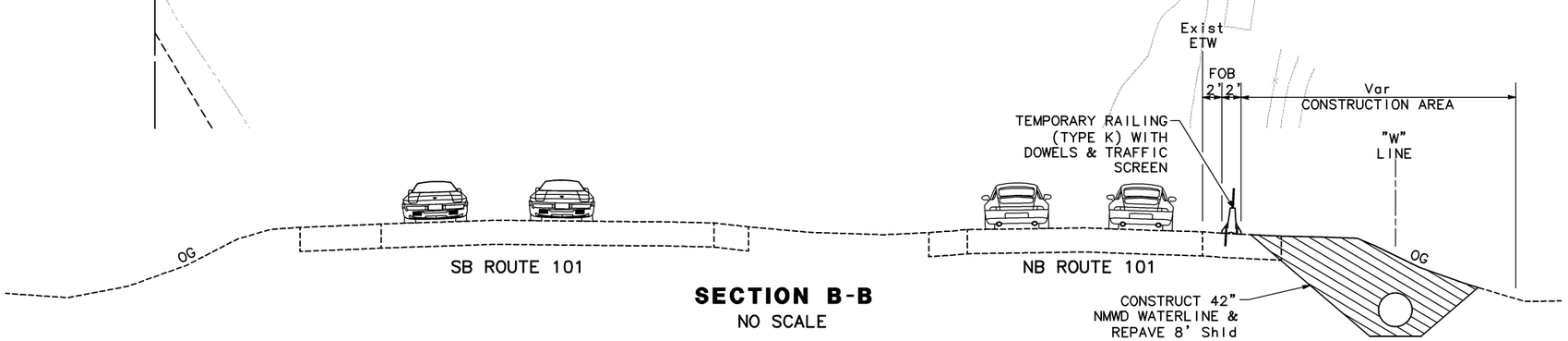
TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	128 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09	T-8

Dec 06, 2013 - 9:10am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NNWD-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY





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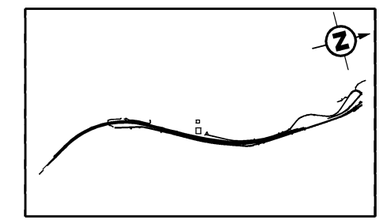

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NORTH MARIN WATER DISTRICT
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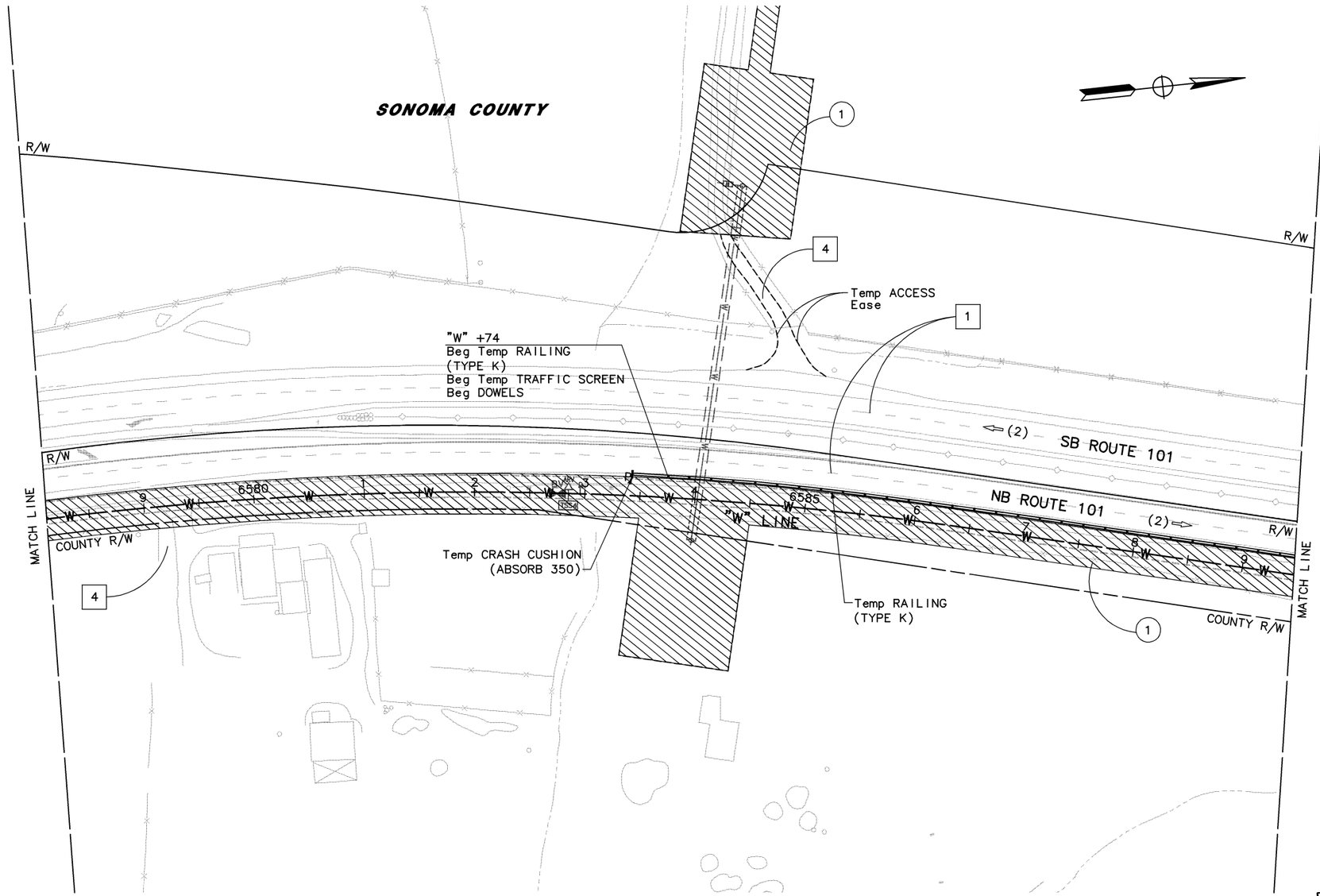
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	129 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-9

Dec 06, 2013 - 9:10am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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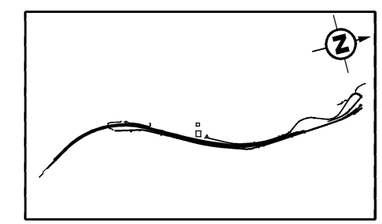

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

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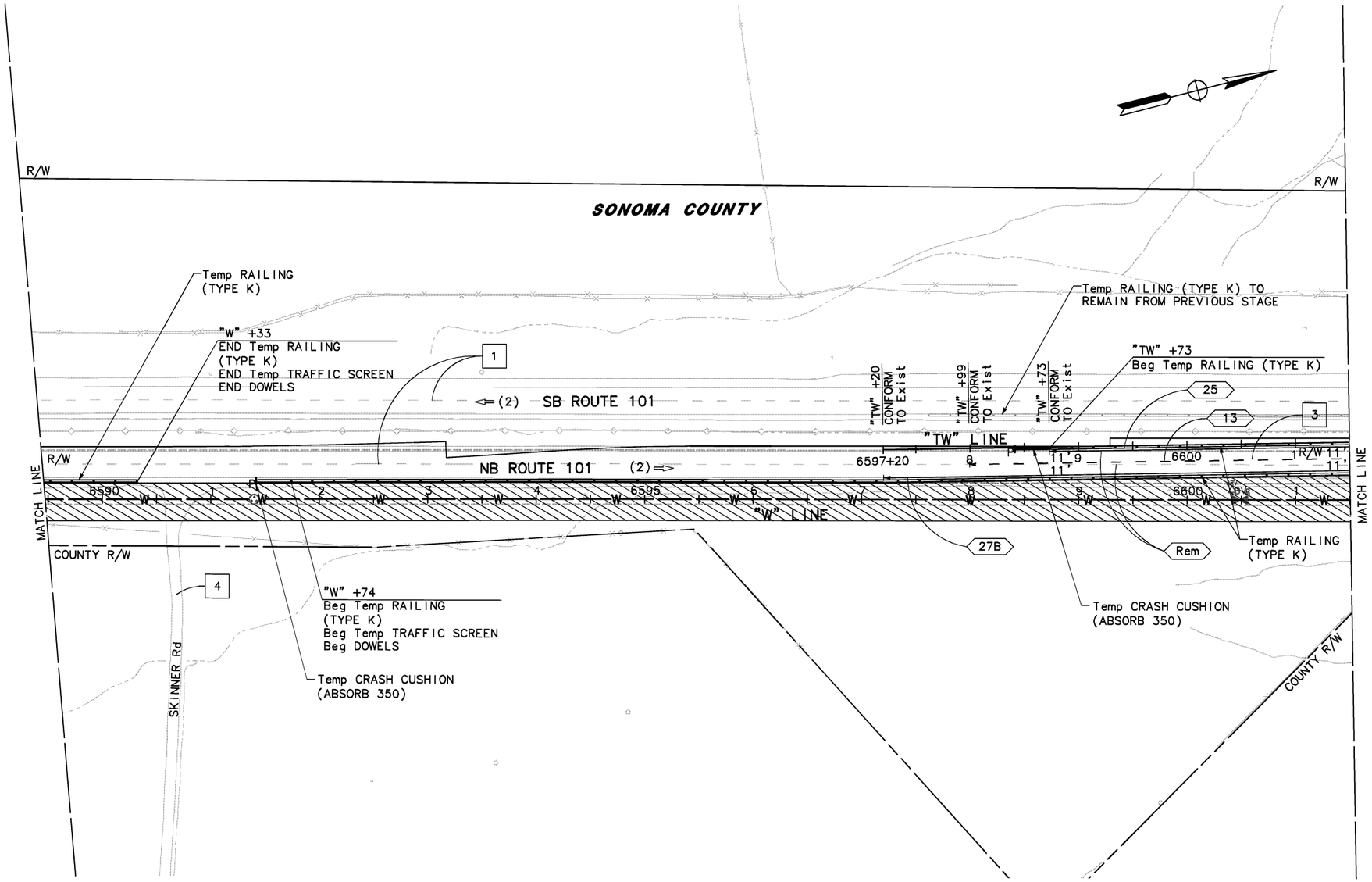
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE	
DAC	JKS		DATE	AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	130 OF 149 SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 T-10

Dec 06, 2013 - 9:10am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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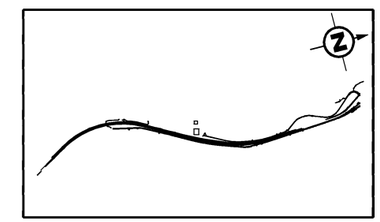

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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	131 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09	T–11

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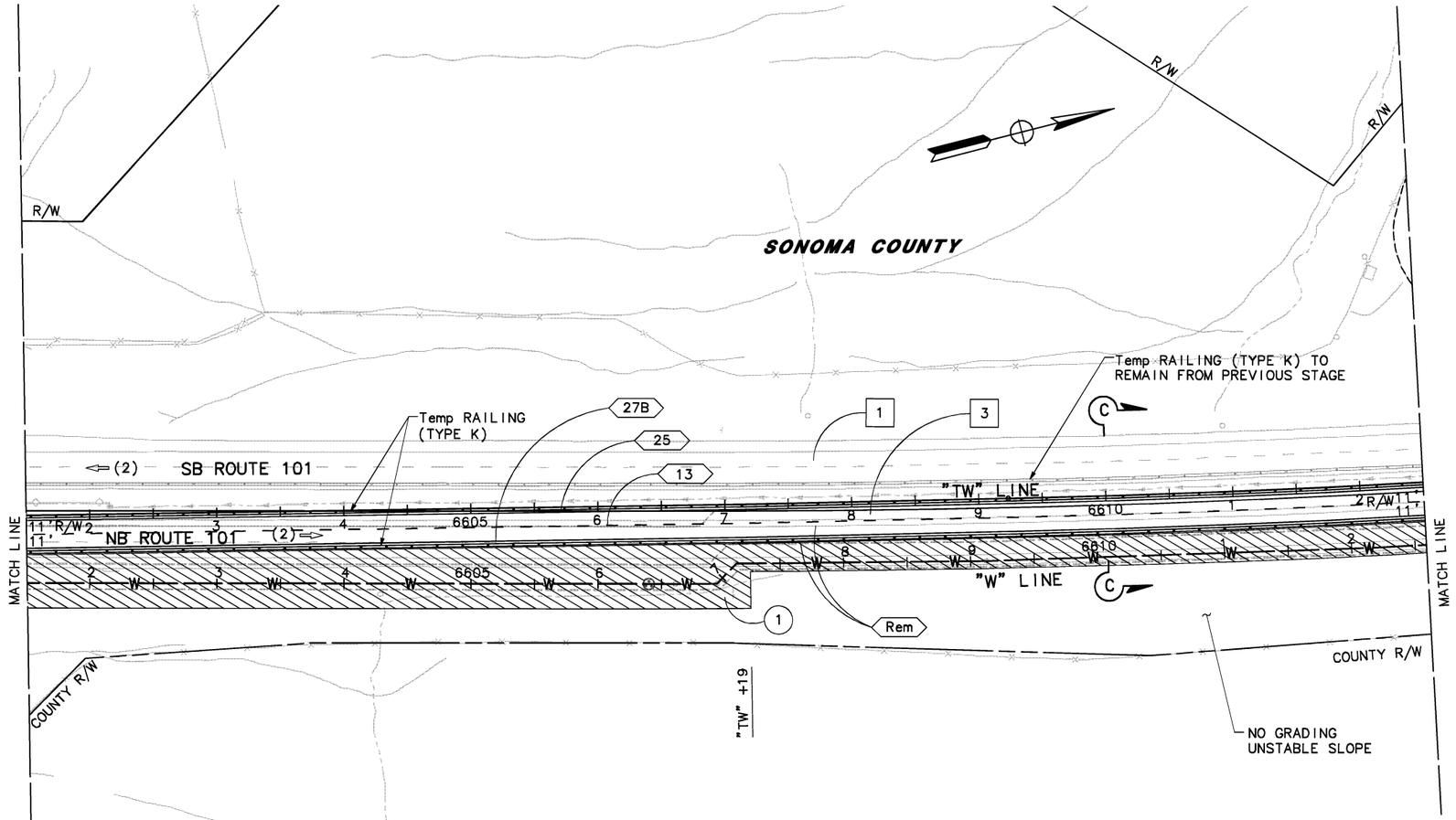

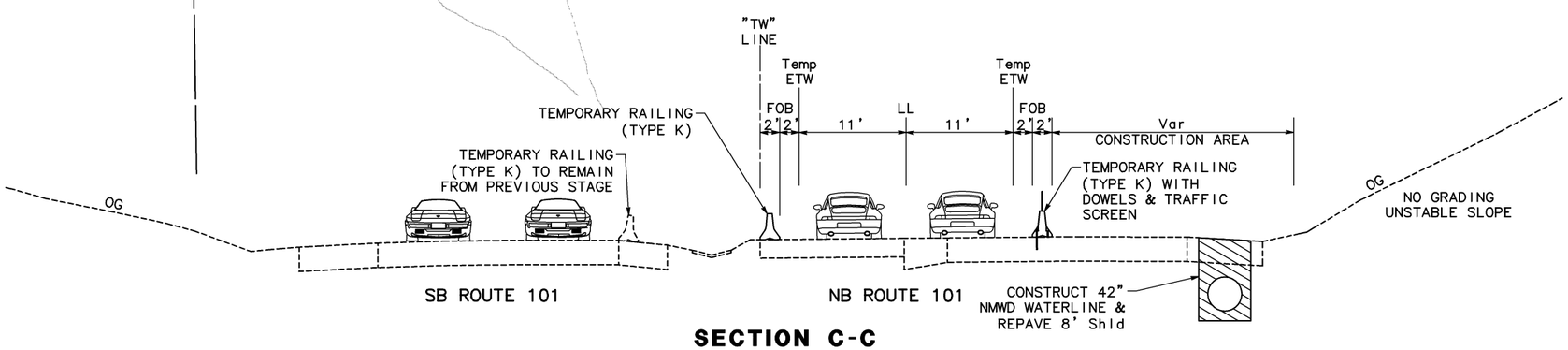

SECTION C-C

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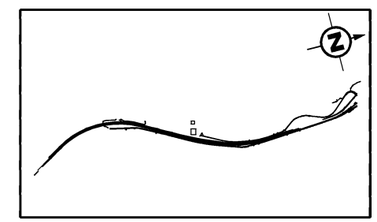

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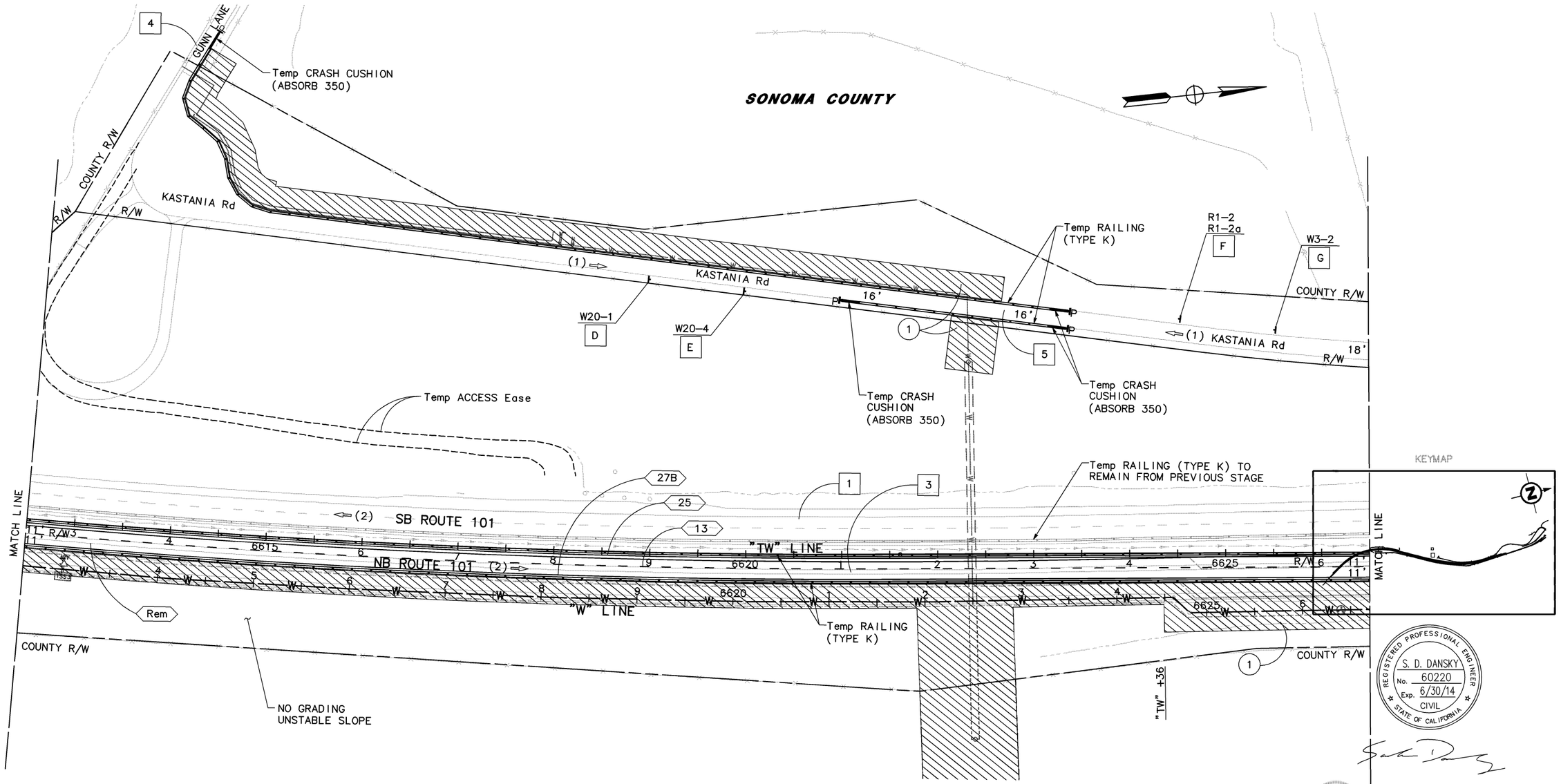
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE	
DAC	JKS		DATE	AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 132 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09 T-12

Dec 06, 2013 - 9:10am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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TRAFFIC HANDLING PLAN (STAGE 2)

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APPROVED: CHIEF ENGINEER			SHEET NO. 133 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09 T-13

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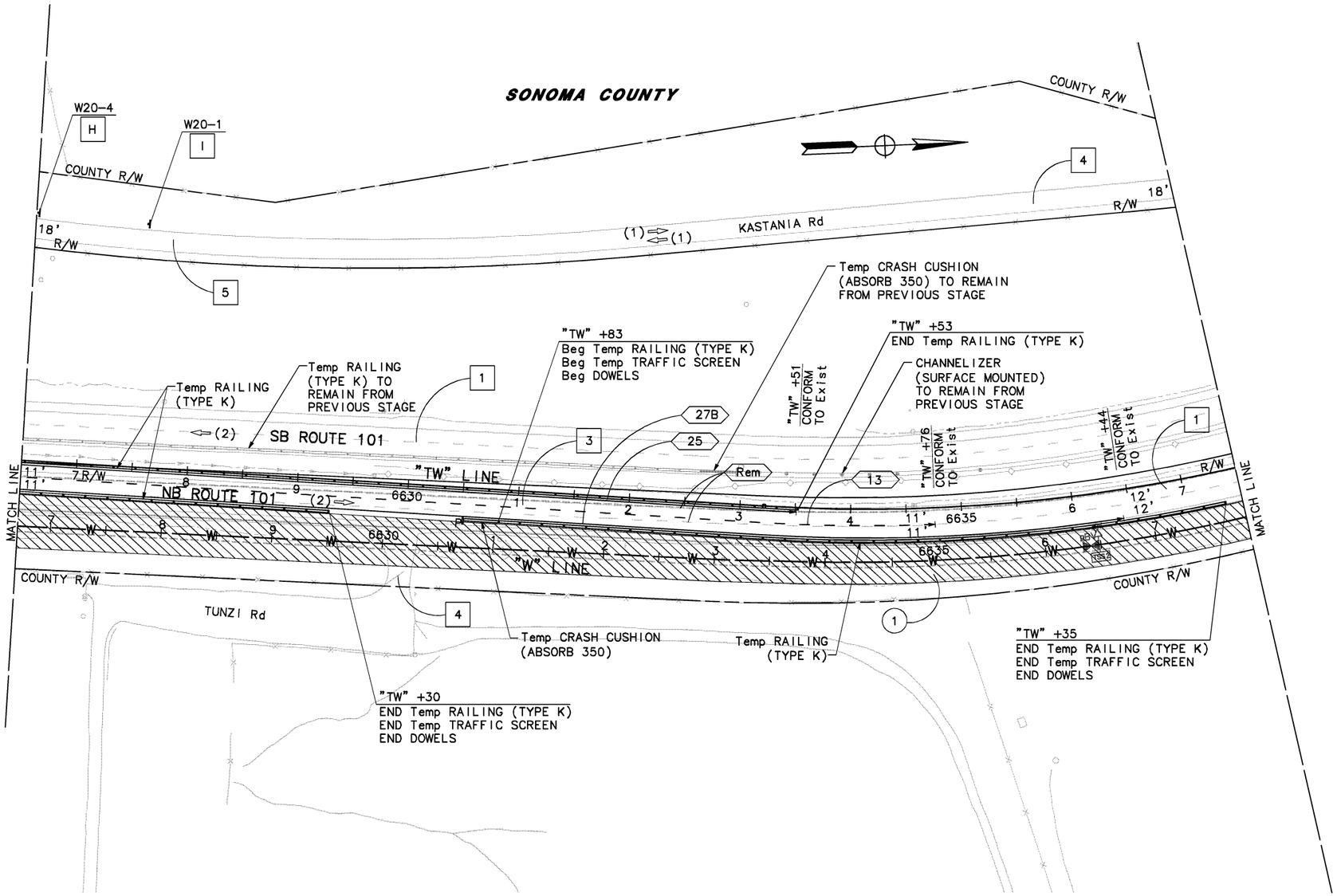

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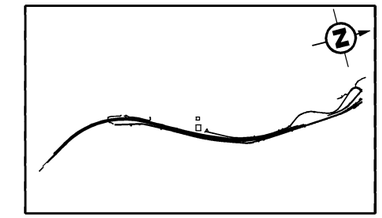

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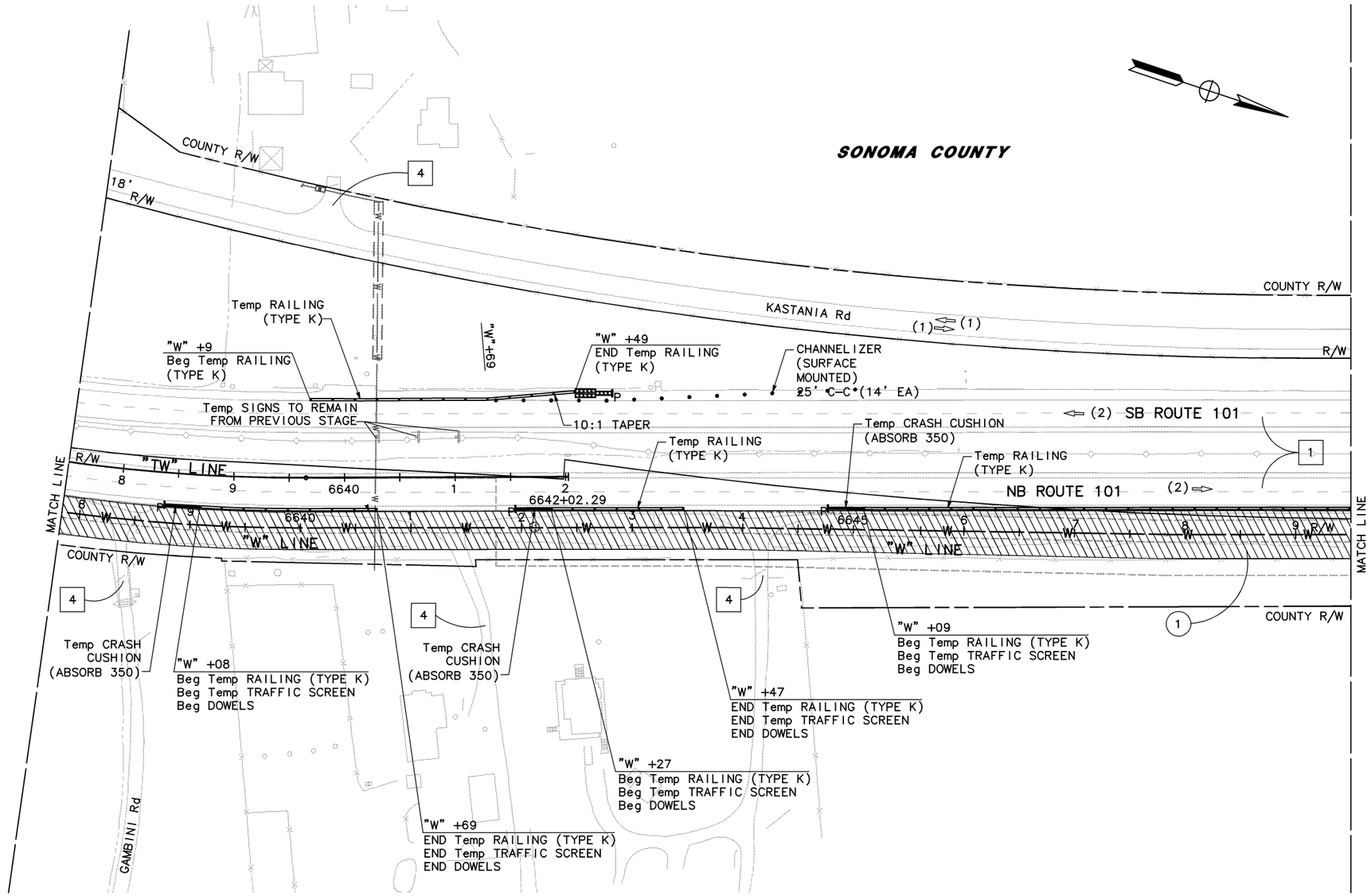
Dec 06, 2013 - 9:11am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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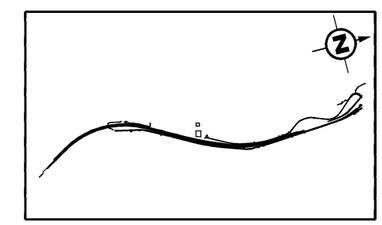

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WALNUT CREEK, CALIFORNIA 94597
TEL: (925) 938-0383 FAX: (925) 938-0389

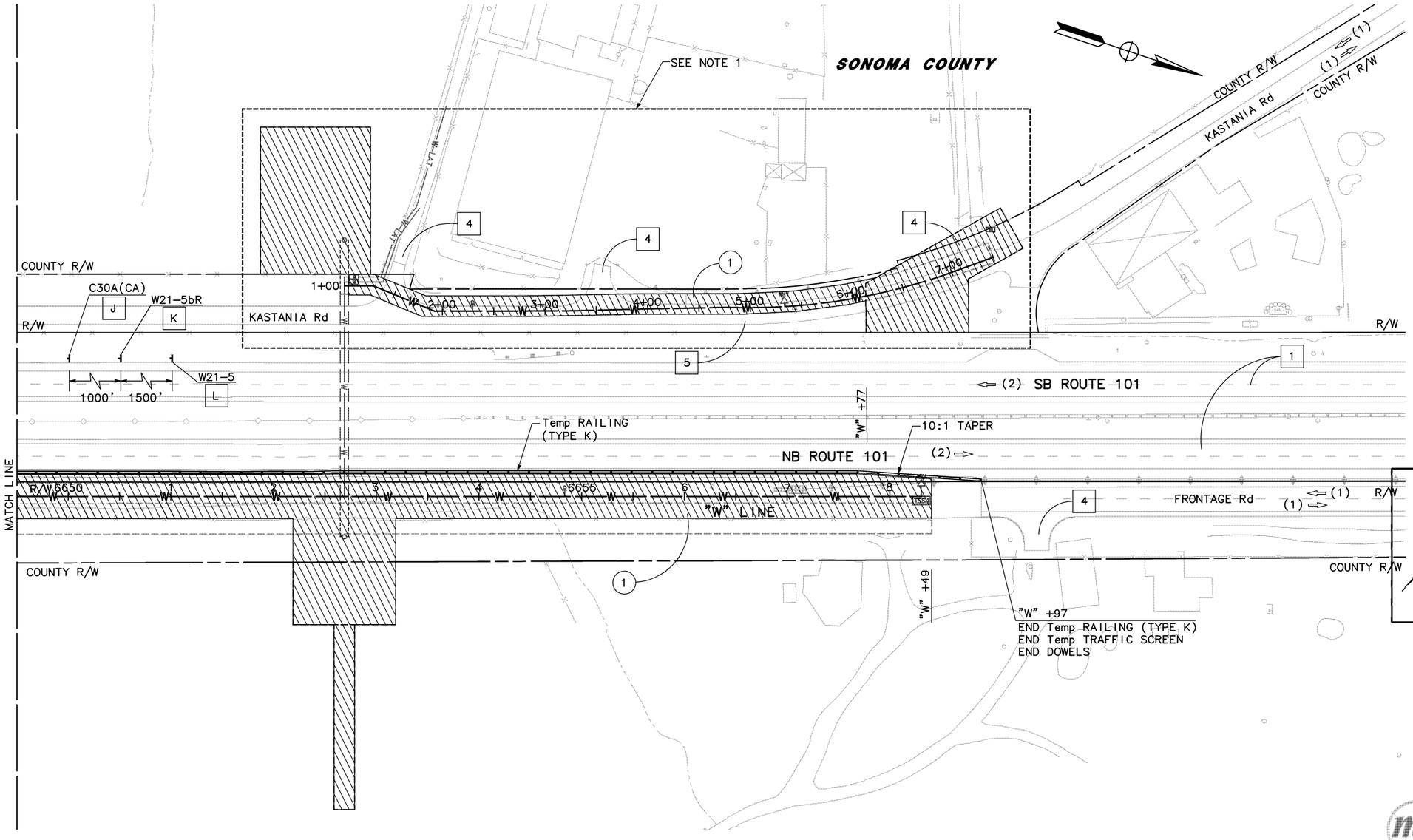
NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	135 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-15

Dec 06, 2013 - 9:11am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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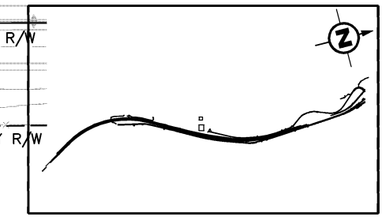

REGISTERED PROFESSIONAL ENGINEER
S. D. DANSKY
No. 60220
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

MARK THOMAS & COMPANY, INC.
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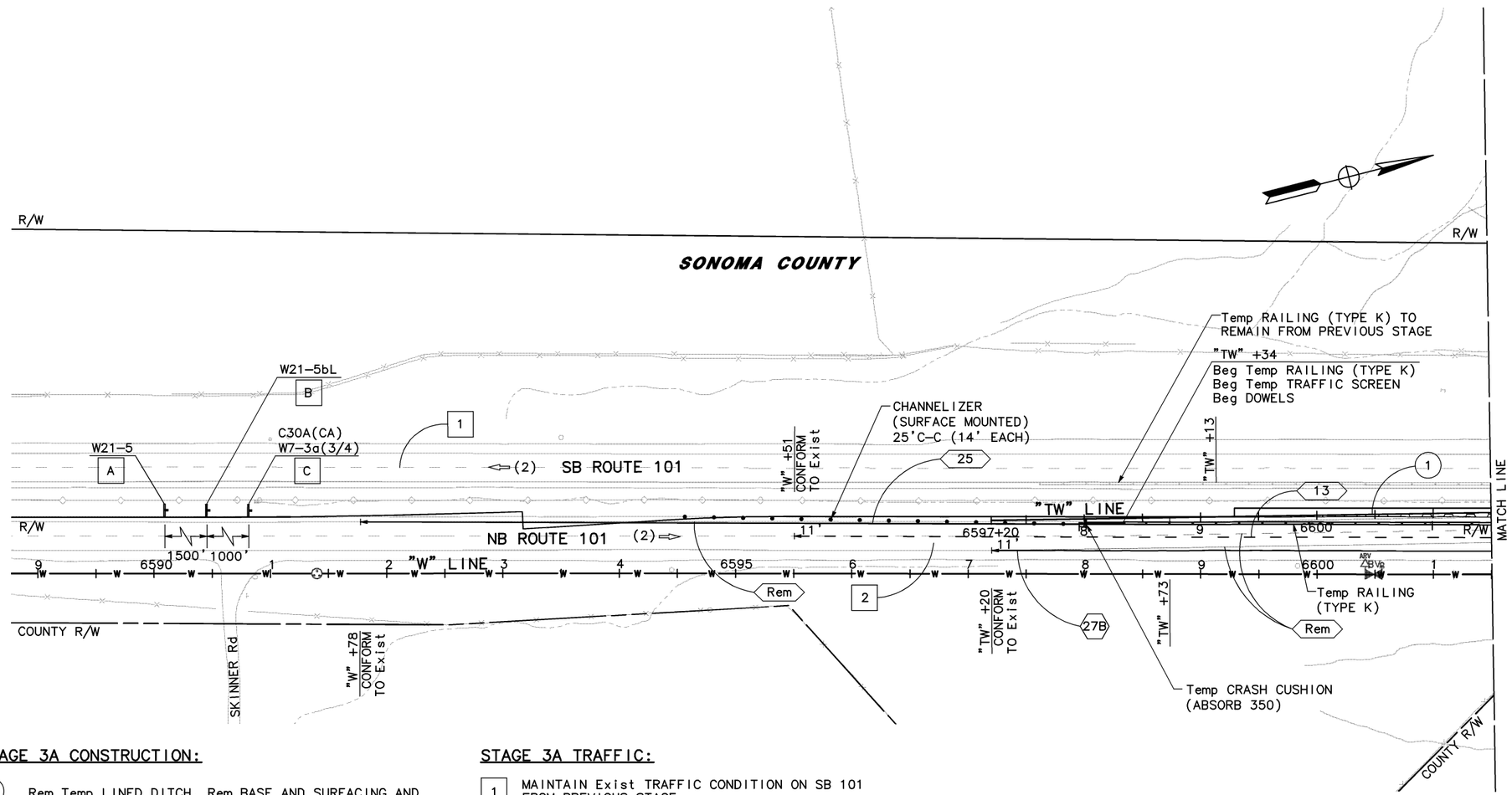
NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 2)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	136 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-16

Dec 06, 2013 - 9:11am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 2.dwg User: ACROSKEY



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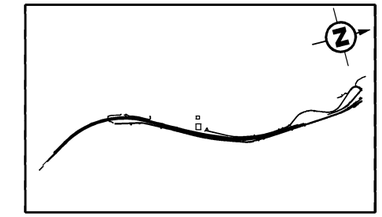

STAGE 3A CONSTRUCTION:

(1) Rem Temp LINED DITCH, Rem BASE AND SURFACING AND Rem AC OVERLAY. RESTORE MEDIAN, 5' INSIDE Shld & DTBB TO ORIGINAL CONDITIONS.

STAGE 3A TRAFFIC:

1 MAINTAIN Exist TRAFFIC CONDITION ON SB 101 FROM PREVIOUS STAGE.

2 SHIFT NB 101 TRAFFIC ONTO TEMPORARY STRIPINGS.

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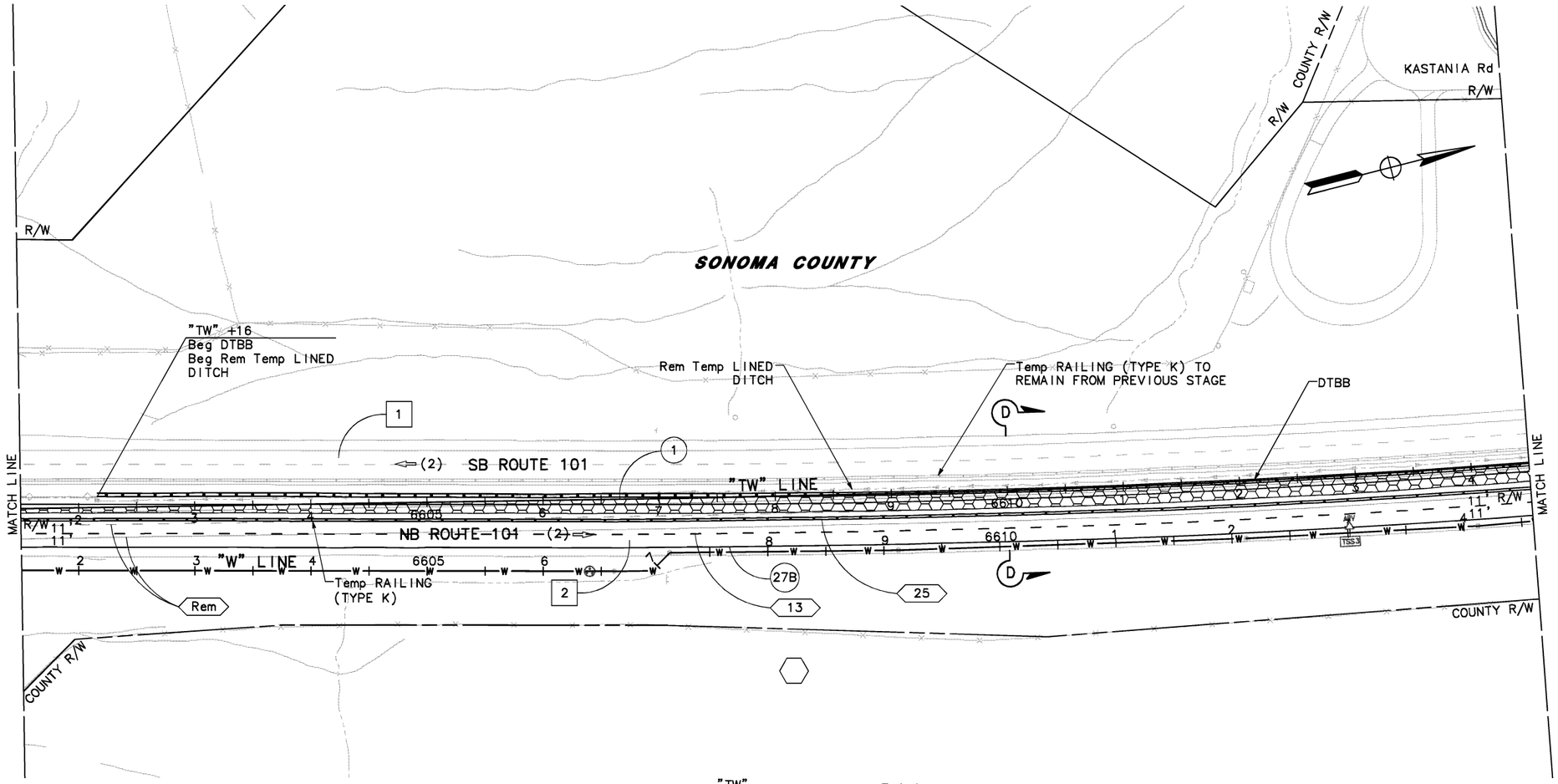
NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

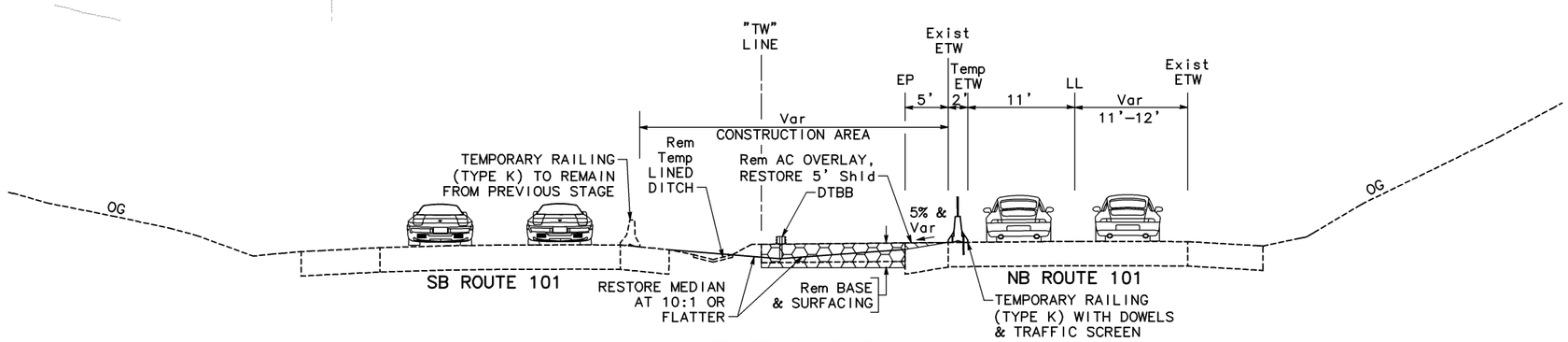
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3A)

DES	DR	CH	SCALE		
DAC	JKS		DATE AUGUST 2013		
APPROVED: CHIEF ENGINEER			SHEET NO. 137 OF 149		SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-17

Dec 06, 2013 - 9:13am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3A.dwg User: ACROSKEY





SECTION D-D
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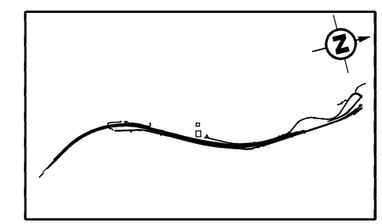

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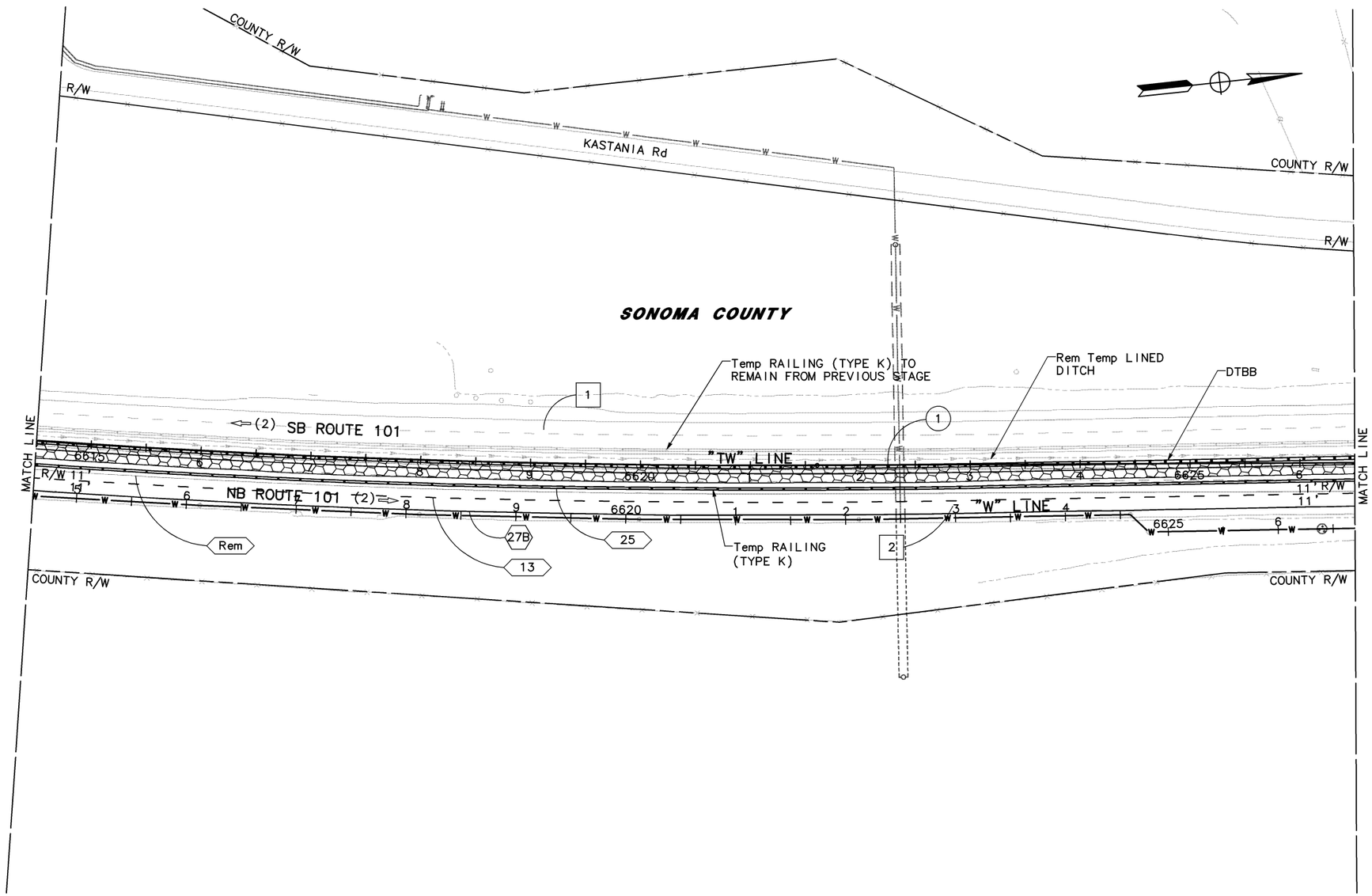
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3A)

DES	DR	CH	SCALE	
DAC	JKS		DATE AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 138 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09 T-18

Dec 06, 2013 - 9:13am V:\TAM-58-00958-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3A.dwg User: ACROSKEY



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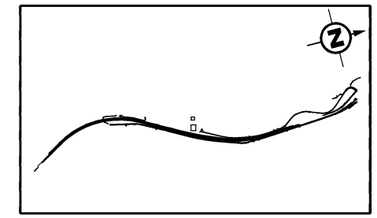

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NO.	DATE	REVISION	BY	APP.
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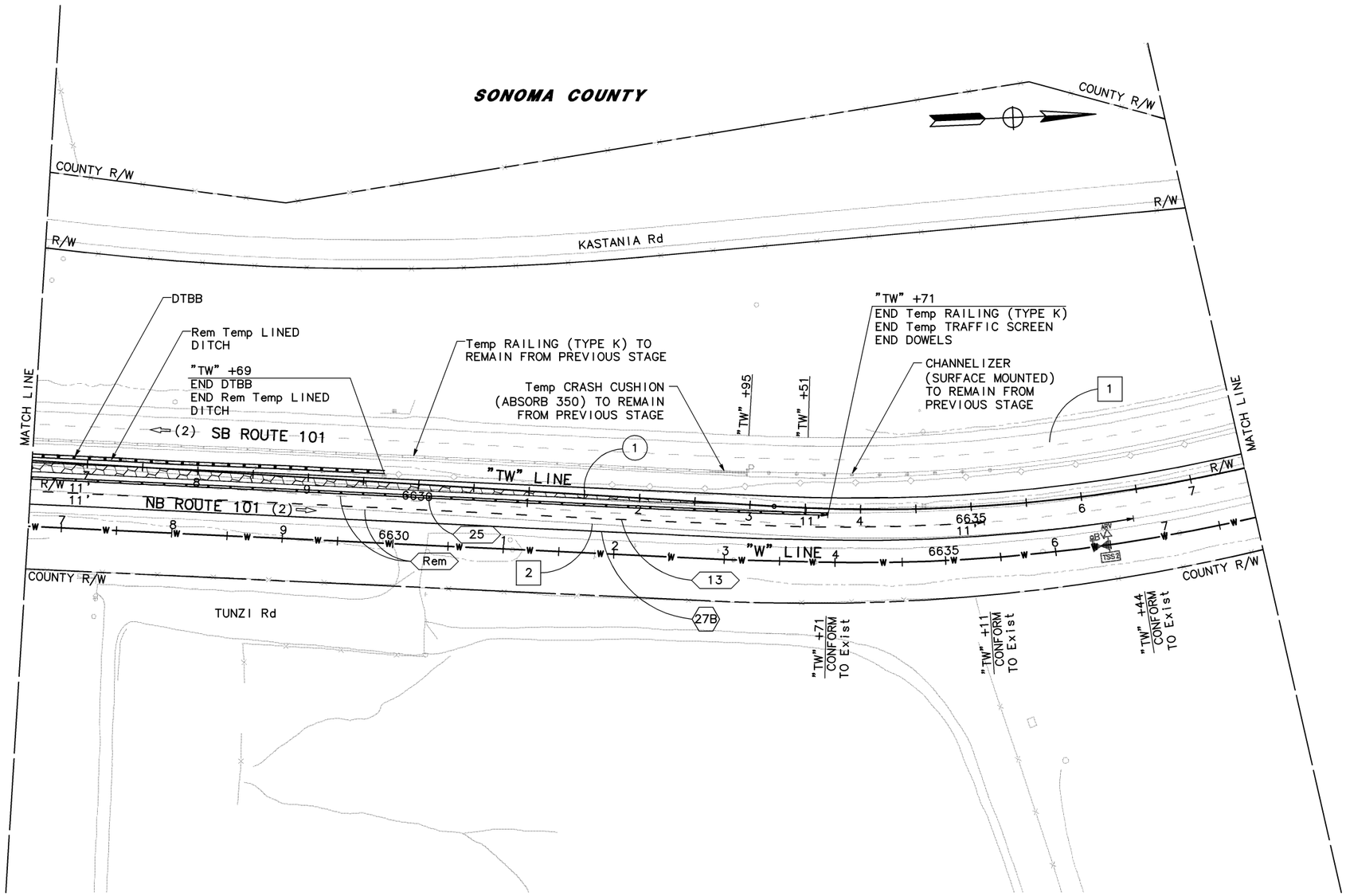
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3A)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	139 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO.1.7118.09	T-19

Dec 06, 2013 - 9:13am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3A.dwg User: ACROSKEY



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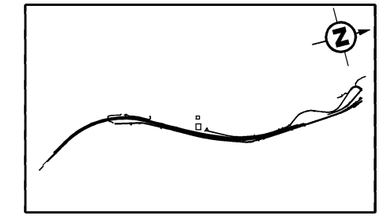

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NO.	DATE	REVISION	BY	APP.
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NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3A)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	140 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-20

Dec 06, 2013 - 9:13am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3A.dwg User: ACROSKEY

CURVE DATA

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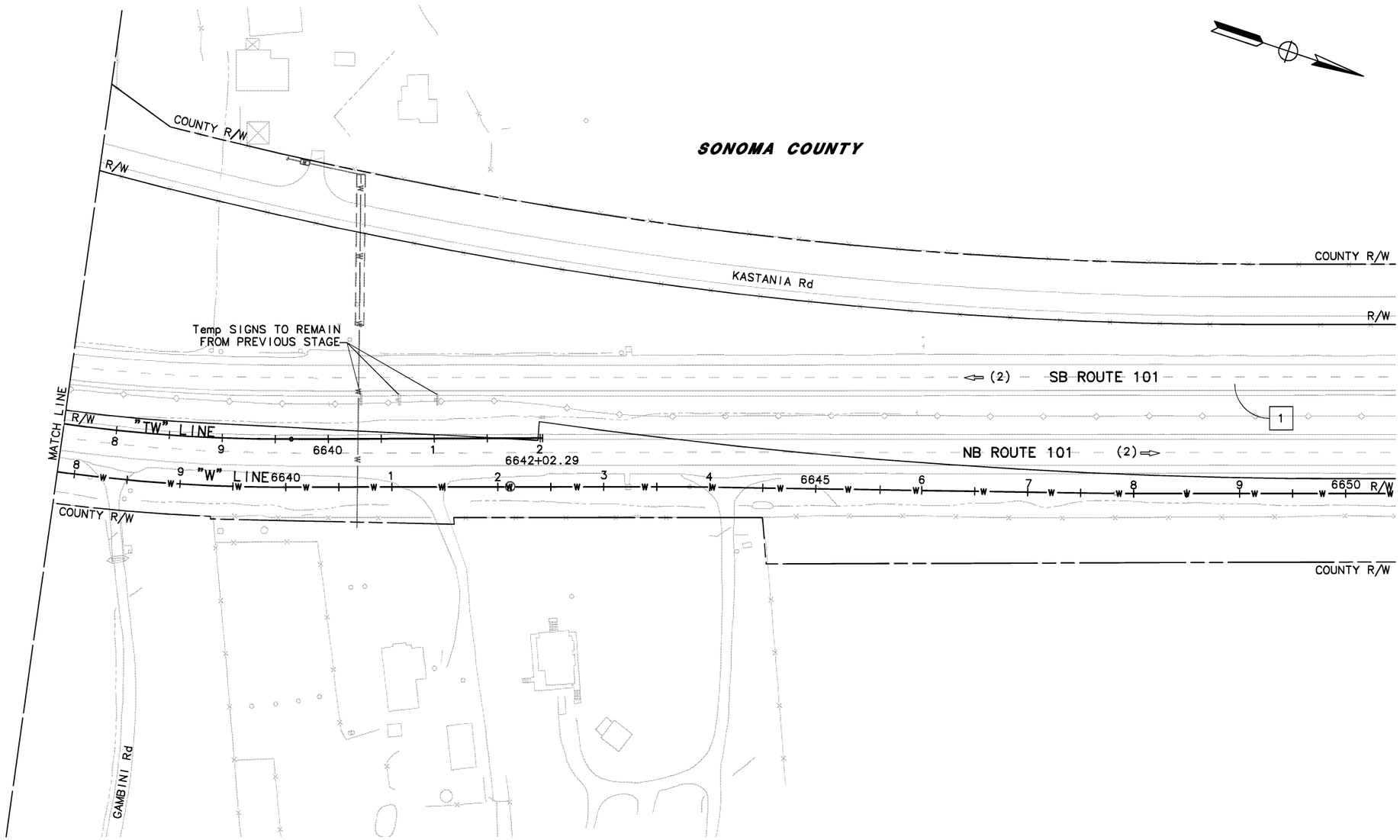

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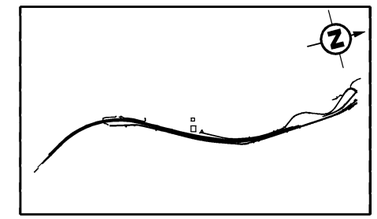

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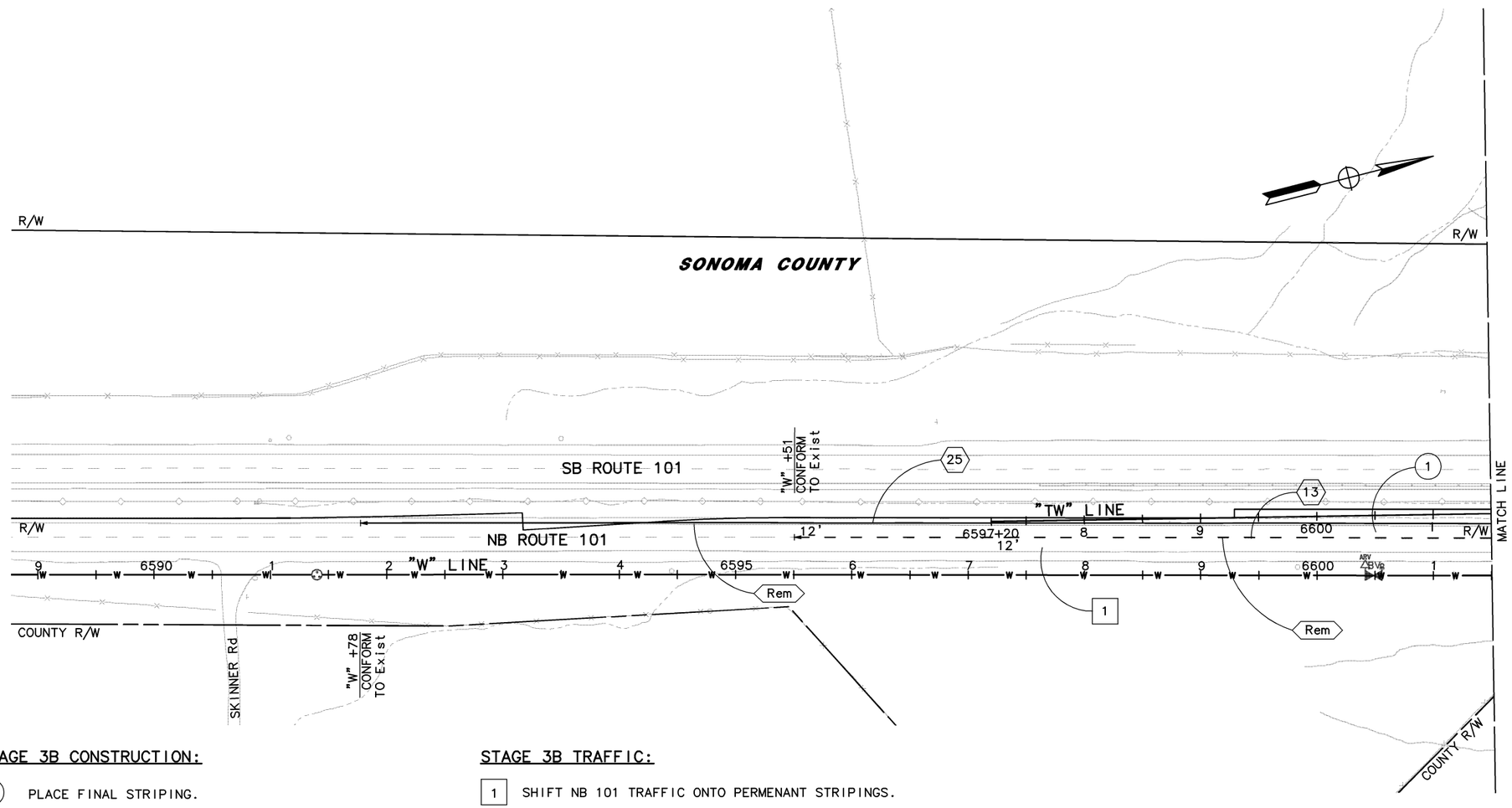
NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3A)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	141 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-21

Dec 06, 2013 - 9:13am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3A.dwg User: ACROSKEY



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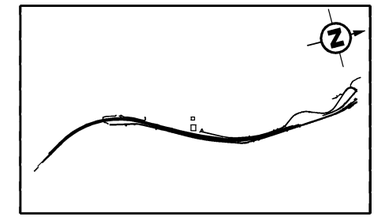

REGISTERED PROFESSIONAL ENGINEER
S. D. DANSKY
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Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

STAGE 3B CONSTRUCTION:

(1) PLACE FINAL STRIPING.

STAGE 3B TRAFFIC:

[1] SHIFT NB 101 TRAFFIC ONTO PERMENANT STRIPINGS.

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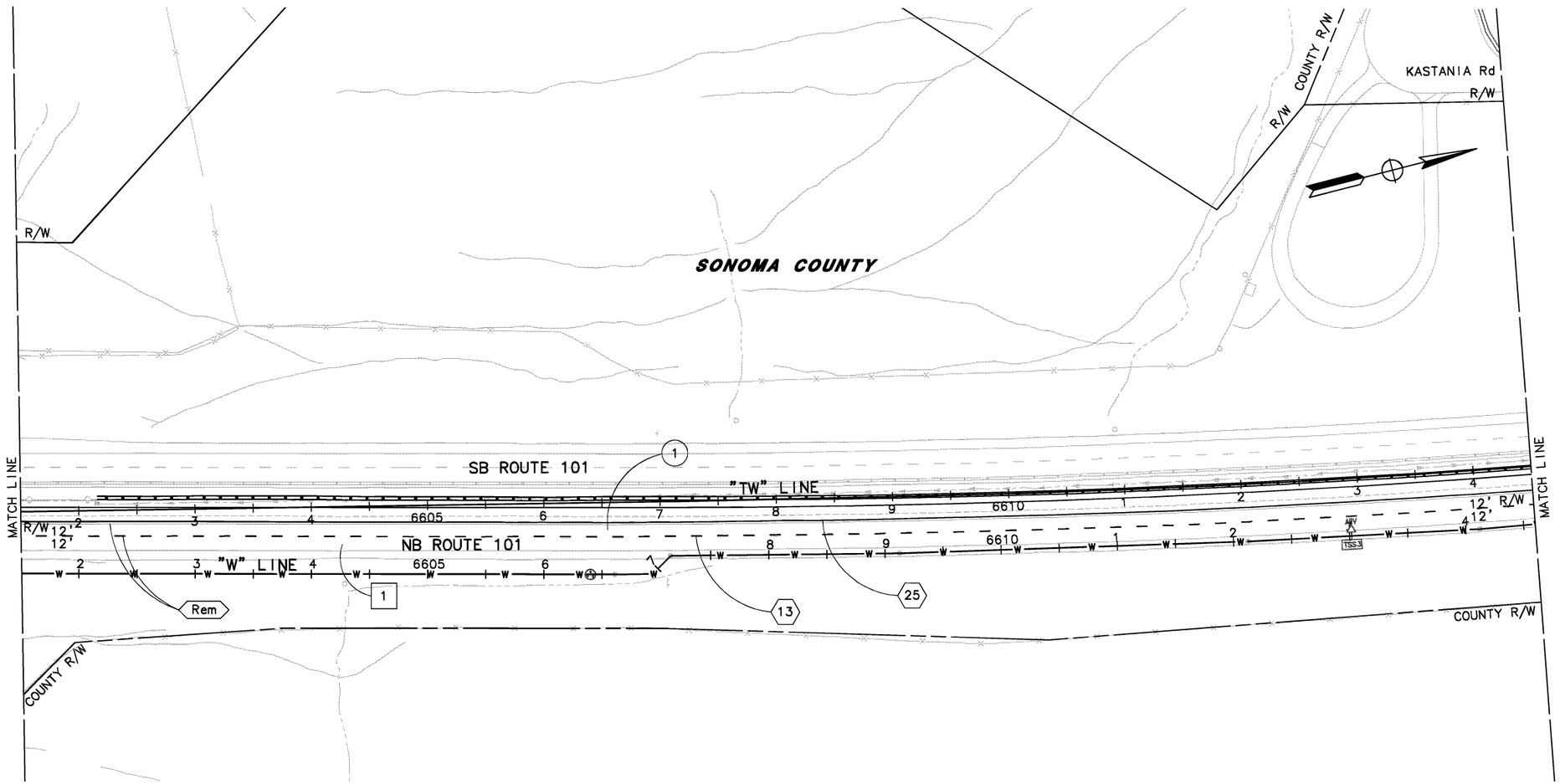
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE	
DAC	JKS		DATE	AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	142 OF 149 SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 T-22

Dec 06, 2013 - 9:16am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B.dwg User: ACROSKEY



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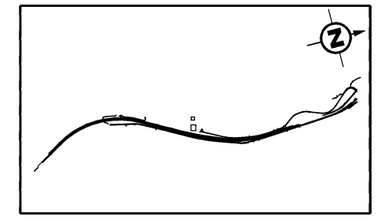

REGISTERED PROFESSIONAL ENGINEER
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NO.	DATE	REVISION	BY	APP.
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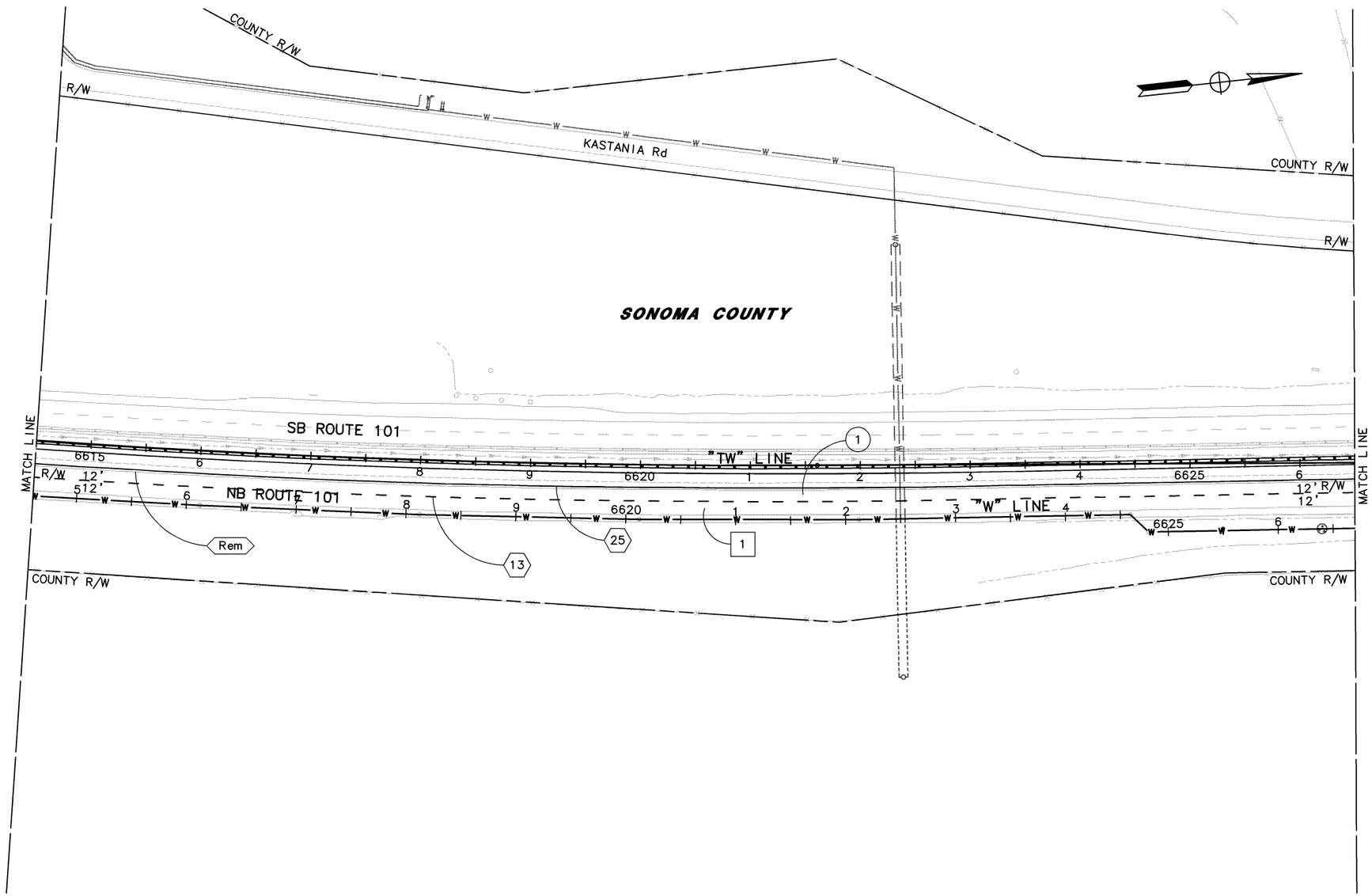
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	143 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-23

Dec 06, 2013 - 9:16am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B.dwg User: ACROSKEY



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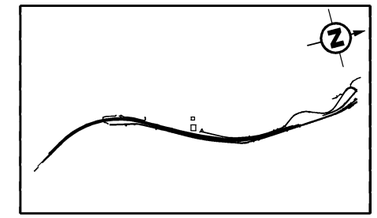

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NO.	DATE	REVISION	BY	APP.
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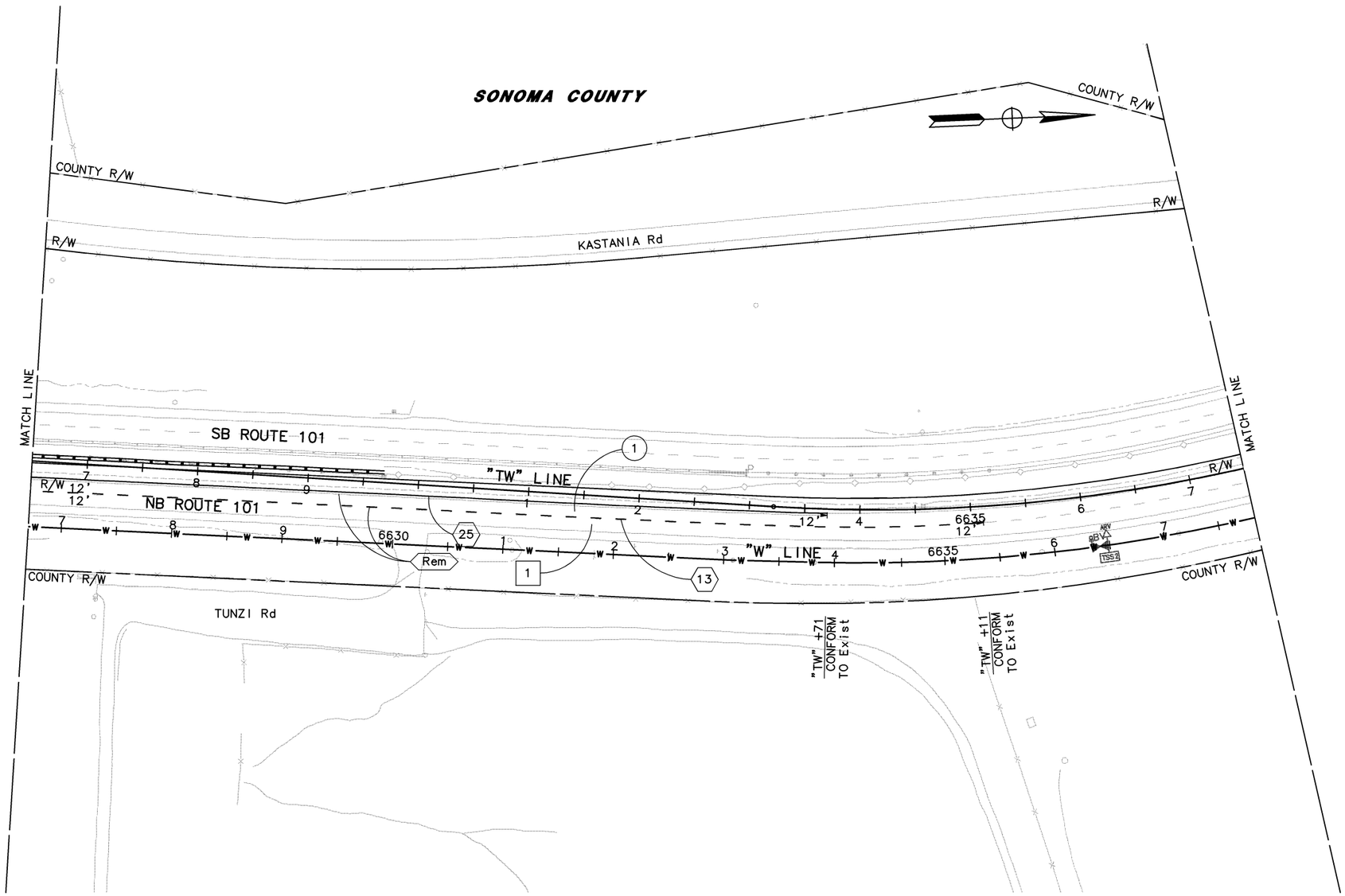
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE	
DAC	JKS		DATE	AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	144 OF 149 SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 T-24

Dec 06, 2013 - 9:16am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B.dwg User: ACROSKEY



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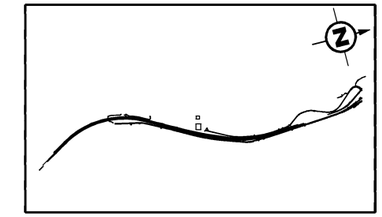

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NORTH MARIN WATER DISTRICT
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AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	145 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-25

Dec 06, 2013 - 9:16am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B.dwg User: ACROSKEY

CURVE DATA

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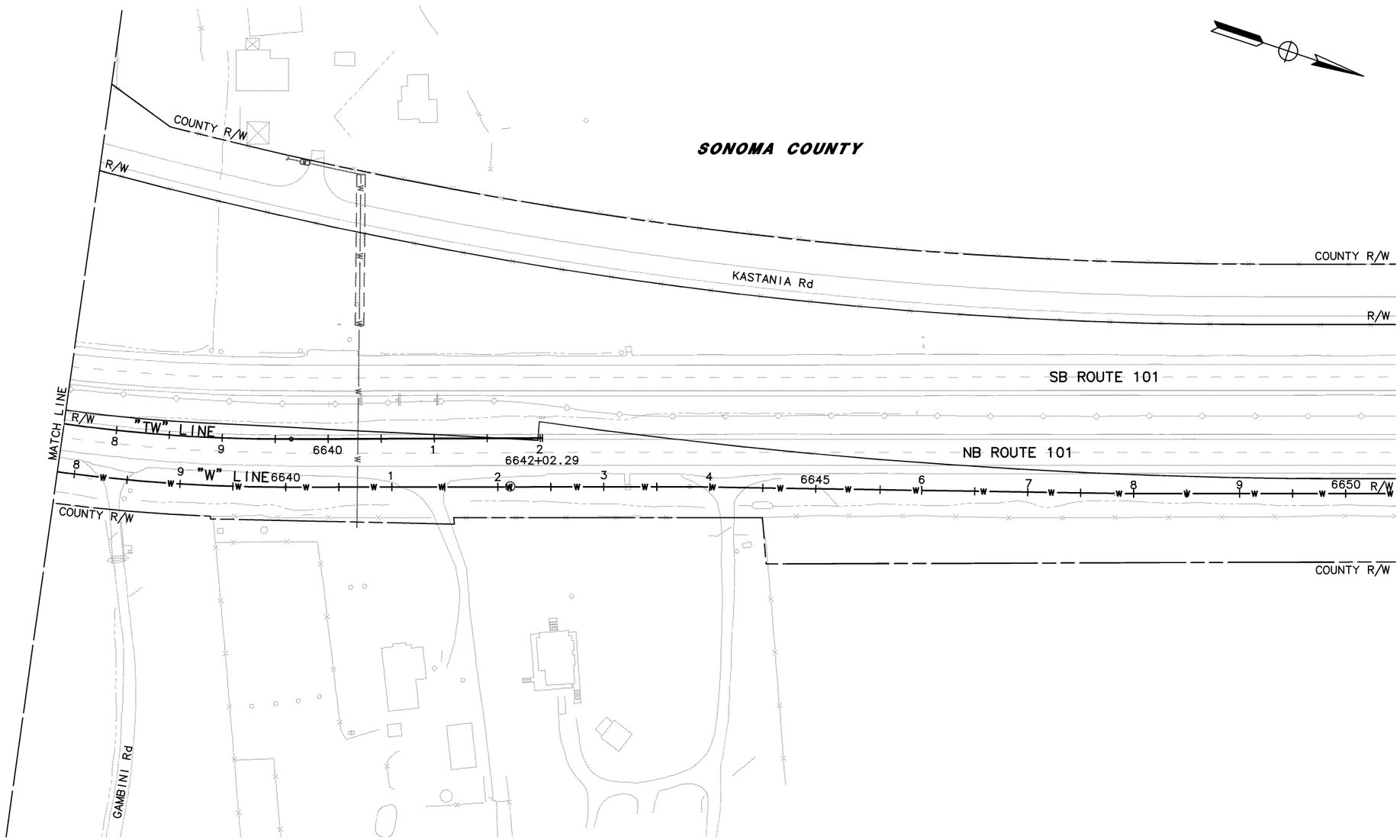

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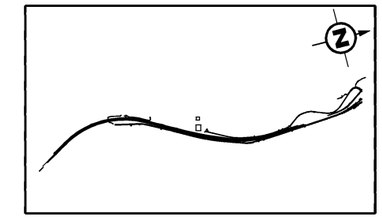

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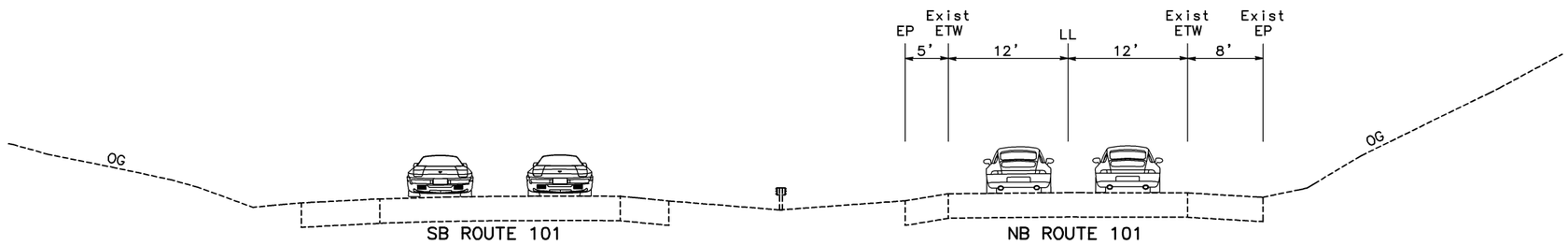
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE	
DAC	JKS		DATE	AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO.	146 OF 149 SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09 T-26

Dec 06, 2013 - 9:16am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B.dwg User: ACROSKEY



STAGE 3B TYPICAL SECTION

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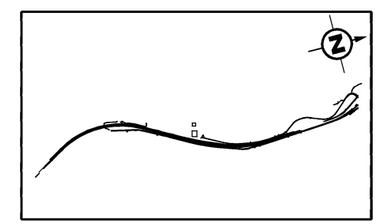

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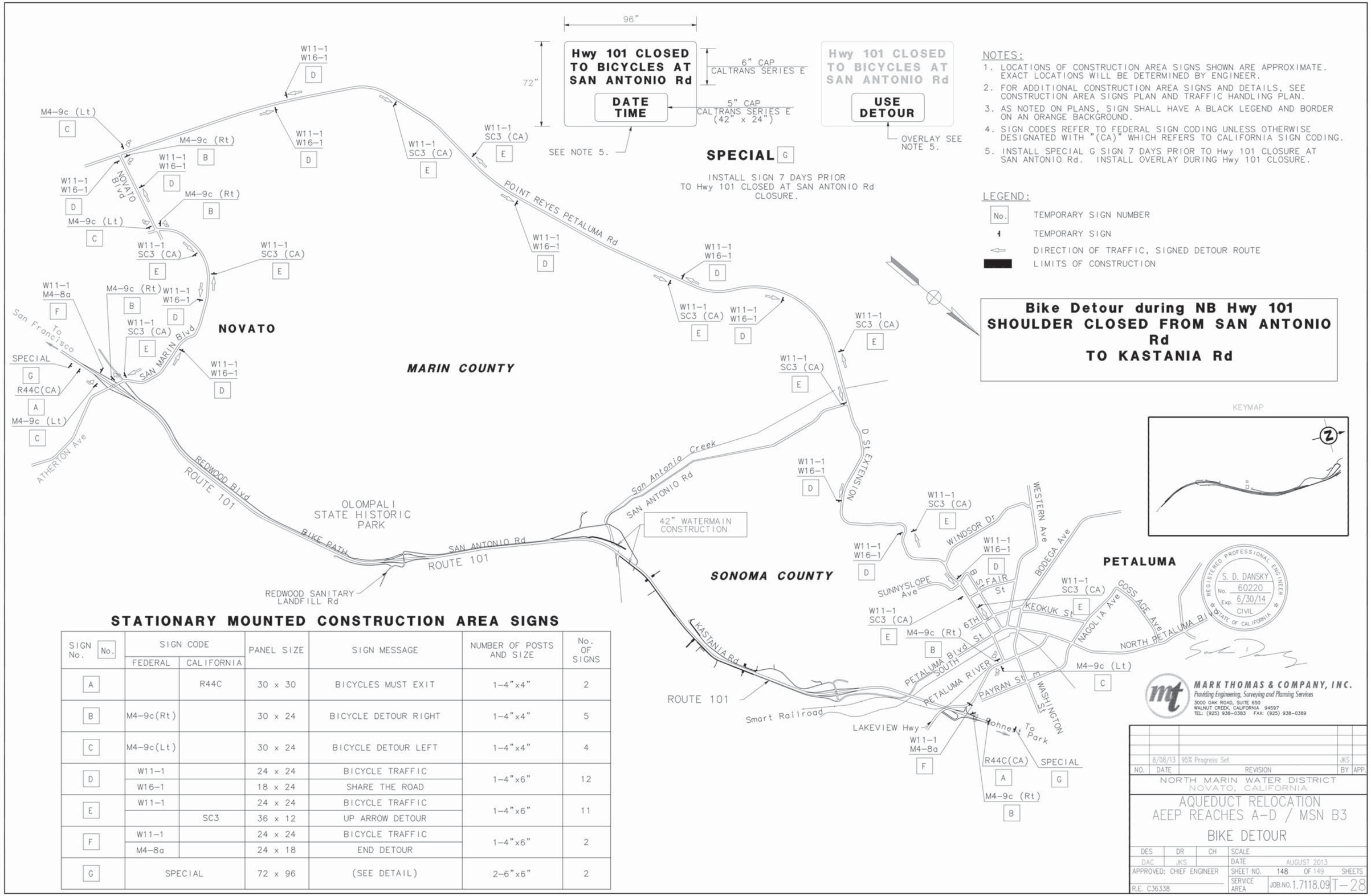
NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3
TRAFFIC HANDLING PLAN (STAGE 3B)

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO. 147 OF 149 SHEETS		
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T-27

Dec 06, 2013 - 9:19am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% STAGE 3B_Section.dwg User: ACROSKEY



STATIONARY MOUNTED CONSTRUCTION AREA SIGNS

SIGN No.	No.	SIGN CODE FEDERAL	SIGN CODE CALIFORNIA	PANEL SIZE	SIGN MESSAGE	NUMBER OF POSTS AND SIZE	No. OF SIGNS
A			R44C	30 x 30	BICYCLES MUST EXIT	1-4"x4"	2
B		M4-9c(Rt)		30 x 24	BICYCLE DETOUR RIGHT	1-4"x4"	5
C		M4-9c(Lt)		30 x 24	BICYCLE DETOUR LEFT	1-4"x4"	4
D		W11-1		24 x 24	BICYCLE TRAFFIC	1-4"x6"	12
		W16-1		18 x 24	SHARE THE ROAD		
E		W11-1		24 x 24	BICYCLE TRAFFIC	1-4"x6"	11
			SC3	36 x 12	UP ARROW DETOUR		
F		W11-1		24 x 24	BICYCLE TRAFFIC	1-4"x6"	2
		M4-8a		24 x 18	END DETOUR		
G		SPECIAL		72 x 96	(SEE DETAIL)	2-6"x6"	2

REGISTERED PROFESSIONAL ENGINEER S. D. DANSKY No. 60220 Exp. 6/30/14 CIVIL STATE OF CALIFORNIA

MARK THOMAS & COMPANY, INC.
Providing Engineering, Surveying and Planning Services
3000 OAK ROAD, SUITE 650
WALNUT CREEK, CALIFORNIA 94597
TEL: (925) 938-0383 FAX: (925) 938-0389

NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

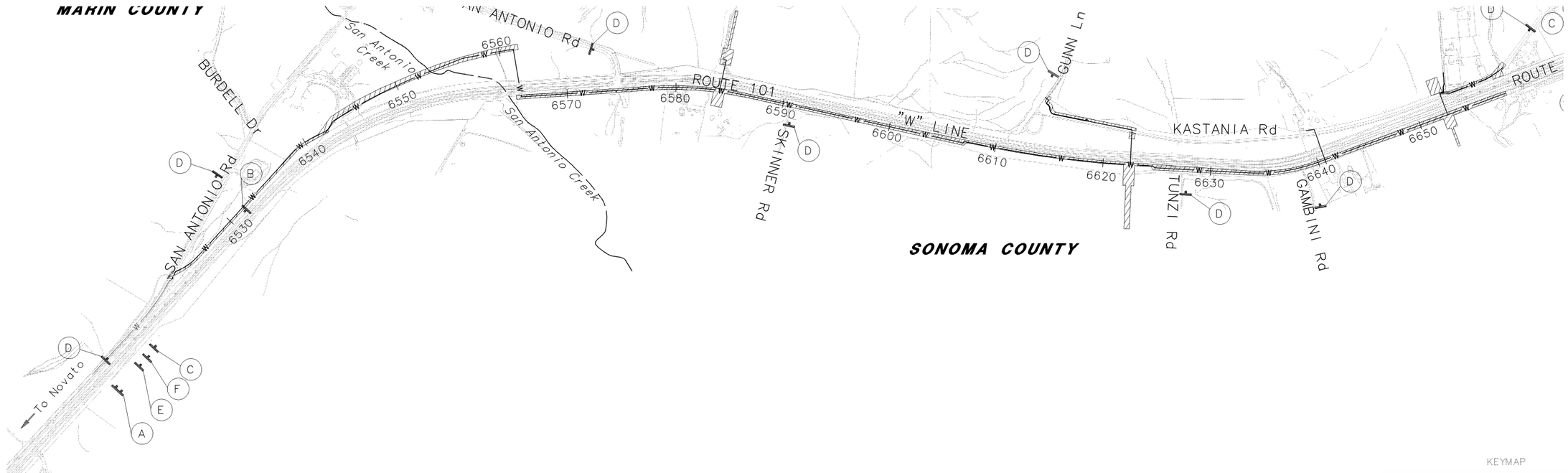
AQUEDUCT RELOCATION
AEEP REACHES A-D / MSN B3

BIKE DETOUR

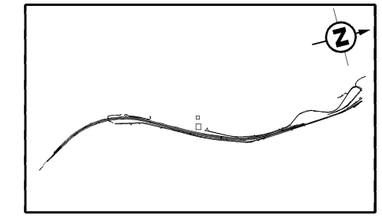
DES	DR	CH	SCALE
DAC	JKS		DATE AUGUST 2013
APPROVED: CHIEF ENGINEER			SHEET NO. 148 OF 149 SHEETS
R.E. C36338			SERVICE AREA / JOB.NO. 1.7118.09

T-28

Dec 06, 2013 - 9:27am V:\TAM-58-00958-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% CS_Bike Detour.dwg User: ACROSKEY



KEYMAP



NOTES:

1. LOCATIONS OF CONSTRUCTION AREA SIGNS SHOWN ARE APPROXIMATE. EXACT LOCATION TO BE DETERMINED BY THE ENGINEER.
2. ALL EXISTING SIGNS IN CONFLICT WITH CONSTRUCTION AREA SIGNS SHALL BE COVERED WITH MATERIALS OTHER THAN PLASTIC UNDER THE DIRECTION OF THE ENGINEER.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO LOCAL PROPERTIES IN ALL AREAS WITHIN CONSTUCTION LIMITS AT ALL TIMES.
4. ALL CONSTRUCTION AREA SIGNS SHOWN ON THIS SHEET SHALL REMAIN IN PLACE THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.

LEGEND:

- CAS (ONE POST)
- CAS (TWO POST)
- CONSTRUCTION AREA

STATIONARY MOUNTED CONSTRUCTION AREA SIGNS

SIGN LETTER (X)	SIGN CODE		PANEL SIZE	SIGN MESSAGE	NUMBER OF POSTS AND SIZE	No. OF SIGNS	REMARKS
	FEDERAL	CALIFORNIA					
A		C40	144" x 60"	TRAFFIC FINES DOUBLED IN CONSTRUCTION ZONES	2 – 6" x 8"	2	500' ADVANCE OF FIRST SIGN
B	G20–2		24" x 48"	END ROAD WORK	1 – 4" x 6"	2	
C	W20–1		48" x 48"	ROAD WORK AHEAD	1 – 4" x 6"	2	
D	W20–1		36" x 36"	ROAD WORK AHEAD	1 – 4" x 6"	8	
E	W3–5a		48" x 48"	55 MPH SPEED ZONE AHEAD	1 – 4" x 6"	1	
F		G20–5aP	36" x 24"	WORK ZONE	2 – 4" x 6"	2	
	R2–1		48" x 60"	SPEED LIMIT 55 MPH			

REGISTERED PROFESSIONAL ENGINEER
S. D. DANSKY
No. 60220
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

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3000 OAK ROAD, SUITE 650
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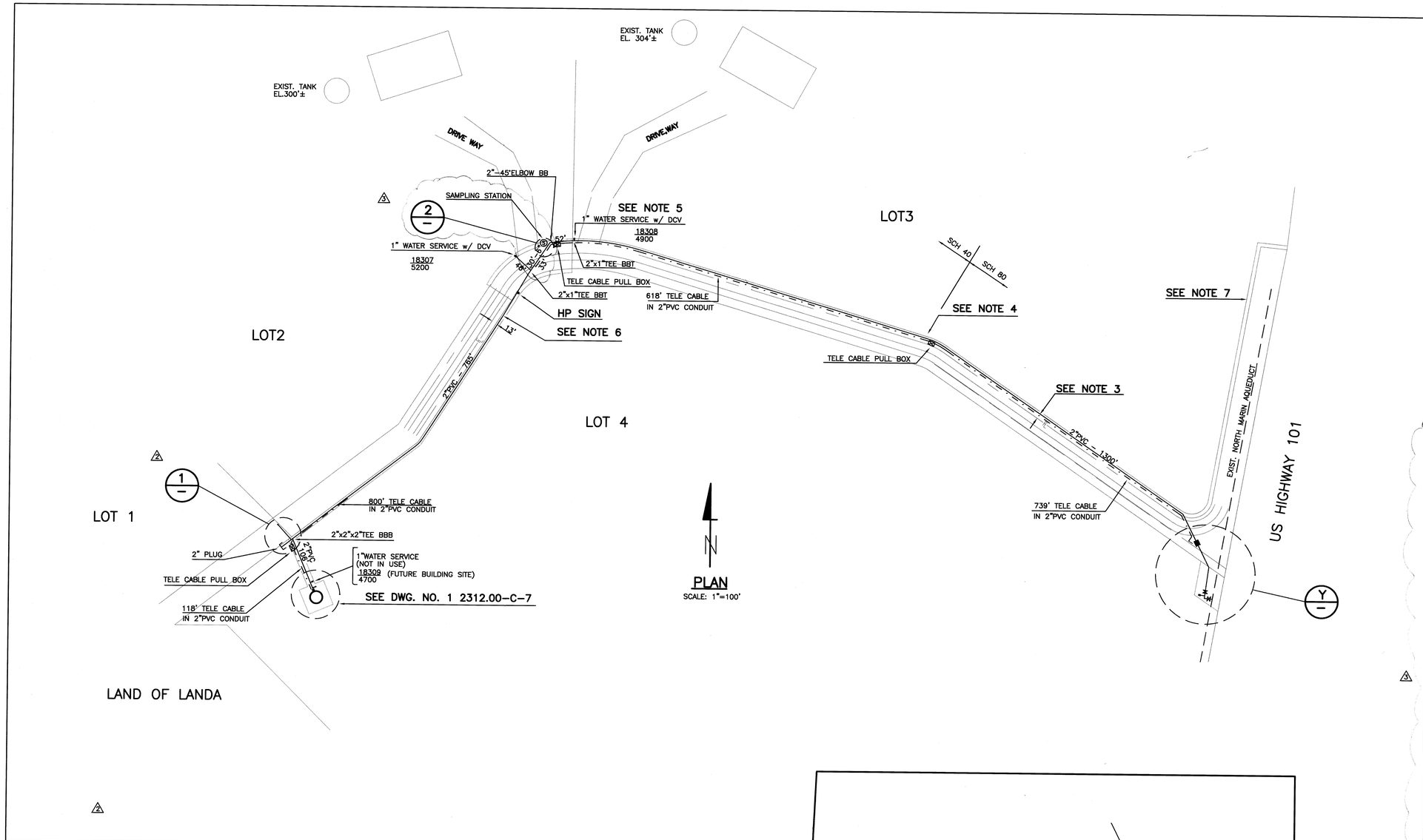
NO.	DATE	REVISION	BY	APP.
	8/08/13	95% Progress Set	JKS	

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

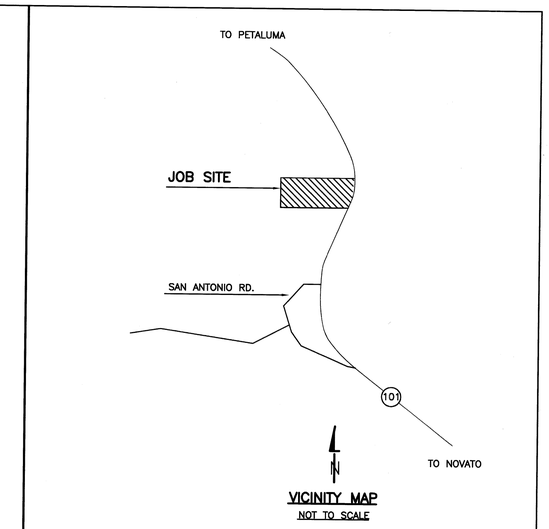
AQUEDUCT RELOCATION
AEEP REACHES A–D / MSN B3
CONSTRUCTION AREA SIGNS

DES	DR	CH	SCALE		
DAC	JKS		DATE	AUGUST 2013	
APPROVED: CHIEF ENGINEER			SHEET NO.	149 OF 149	SHEETS
R.E. C36338			SERVICE AREA	JOB.NO. 1.7118.09	T–29

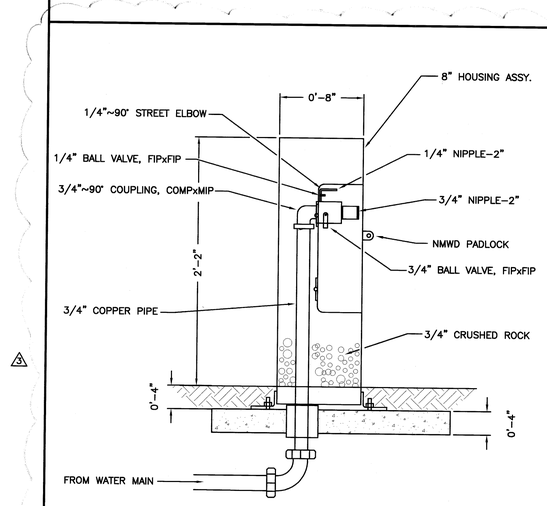
Dec 06, 2013 – 9:22am V:\TAM-58-0095B-MSN B3\CADD\Work\SL\CSW-NMWD-TH\CSW-TH\CSW-TH 95% CS.dwg User: ACROSKEY



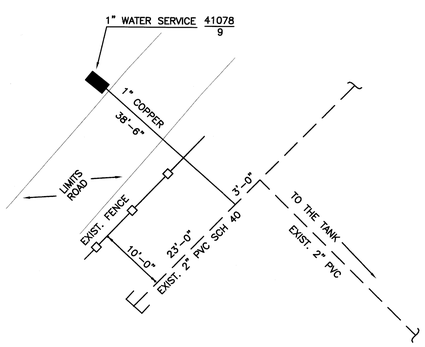
PLAN
SCALE: 1"=100'



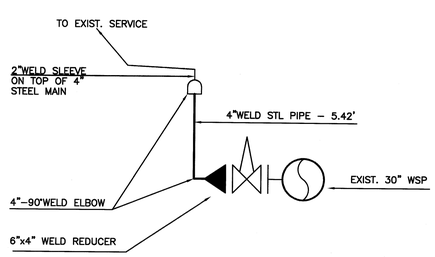
VICINITY MAP
NOT TO SCALE



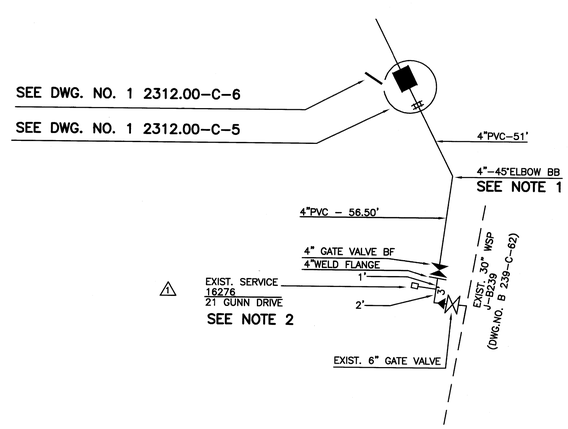
DETAIL 2
N.T.S.



DETAIL 1



PROFILE
NOT TO SCALE



DETAIL Y
N.T.S.

NOTES:

1) HP SIGN ON TOP OF 45°ELBOW
2) INSTALLED: 1-1/2" COPPER LATERAL - 2'
   1-1/2" METER STOP REDUCED TO 1"
   1-1/2" CORP. STOP
3) FROM BEGINNING OF ROAD TO TOP OF HILL WATER MAIN IS 10' NORTH OF FENCE LINE
4) SCH 80 PVC WATER STOPS 20' UP HILL PAST TELE CABLE PULL BOX
5) SERVICE IS TAPPED OFF OF TOP OF MAIN
6) FROM ABOUT THIS POINT UP HILL MAIN LINE IS 13' SOUTH OF FENCE LINE
7) FOR WATERLINE EASEMENT SEE FILE 2312-E WINDHAVEN

AS-BUILT

0' 50' 100' 150' 200'
SCALE: 1"=100'

NO.	DATE	REVISION	BY	APP.
3	5/11/02	INSTALLED SAMPLING STATION (J-8637)	UU	J.K.
2	2/2/02	INSTALLED 1" SERVICE (J-2560)	UU	JK
1	12/2/92	ADDED EXIST. SERVICE ADDRESS	MS	JK

DES	DR	CH	REC
ES	MS	JK	

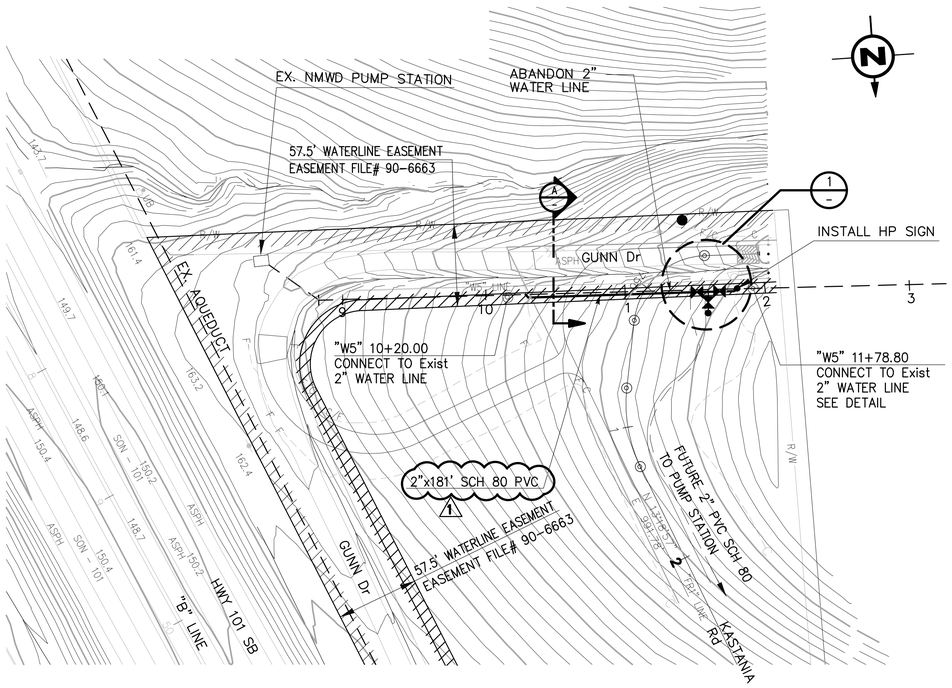
APPROVED: CHIEF ENGINEER Original Signed by Chris DeGabrielly
R.E. C36338

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

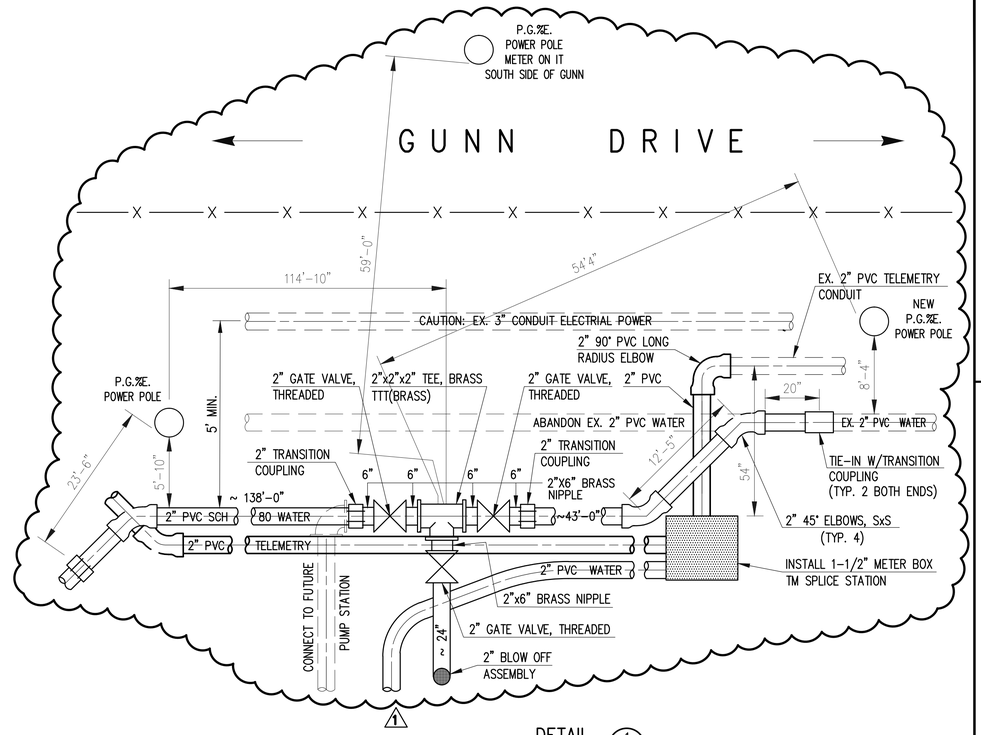
WINDHAVEN
LOTS 2, 3 AND 4
WILSON / SMAGALSKI / PRIM

SCALE 1" = 100'
DATE 7\31\91
SHEET NO. 1 OF 4 SHEETS
NO. 1 2312.00-C-4

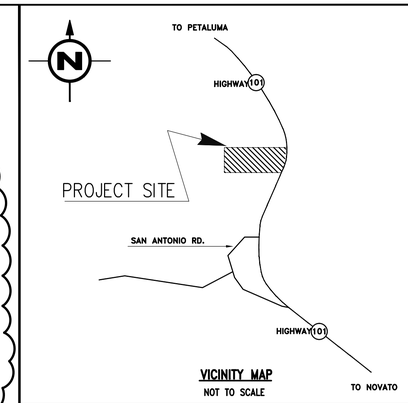
W:\JOB\1_NOVATO\2312\AS-BUILT\2312c4c.dwg, 05/15/2002 04:12:38 PM



PLAN VIEW
SCALE: 1"=50'-0"



DETAIL 1
N.T.S.



VICINITY MAP
NOT TO SCALE

LEGEND:

EXIST. PIPE LINE
EX. STREETS/HIGHWAY
NEW PIPE LINES
PROPERTY LINES/R.O.W.
PROPOSED WATERLINE EASEMENT
EXISTING WATERLINE EASEMENT

REFERENCE DRAWINGS:

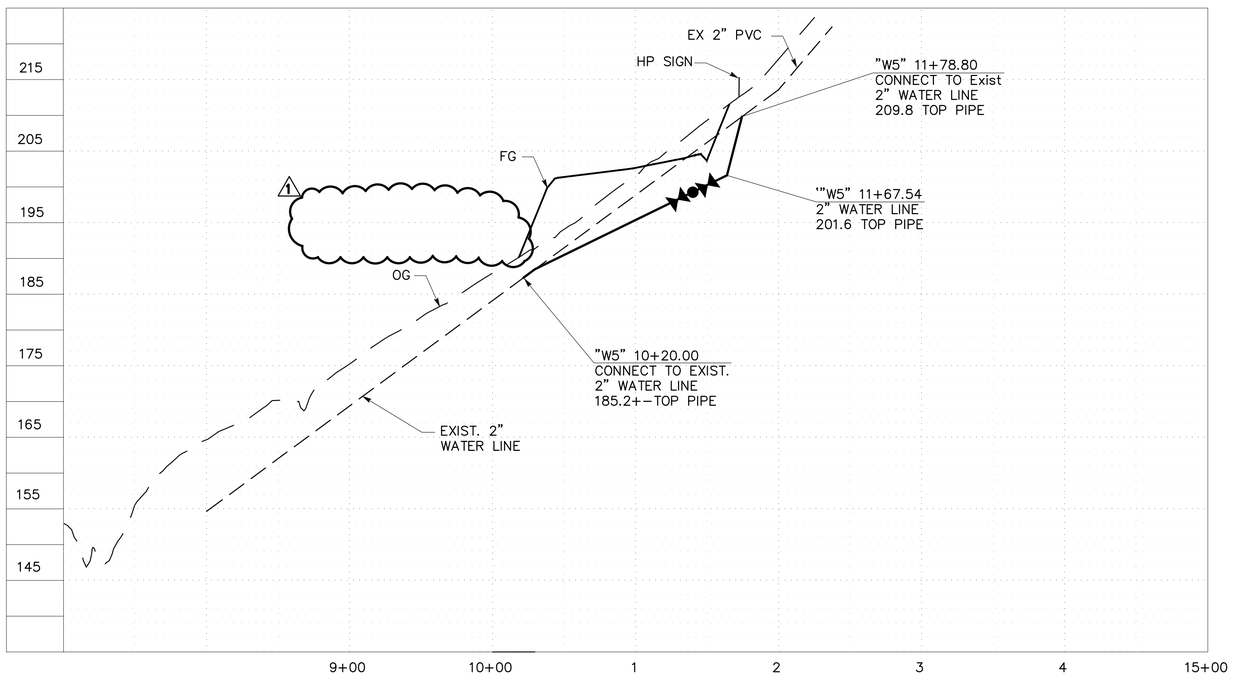
1.2312-C-4

GENERAL NOTES:

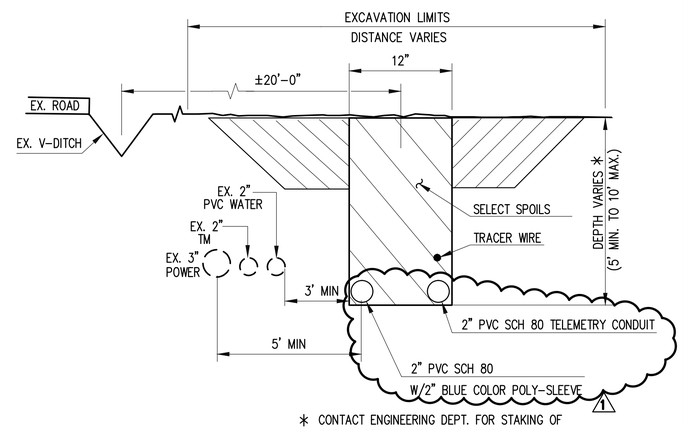
1. ALL PVC IS SCH 80 UNLESS NOTED OTHERWISE. REFER TO NMWD SPECIFICATION 15064.
2. HOT TAPS AND TIE-INS BY NMWD.
3. EXCAVATIONS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL LAWS.
4. FOR VALVE RISER REFER TO NMWD STD. NO.2
5. FOR CONCRETE THRUST BLOCKING REFER TO NMWD STD. NO.3
6. FOR CONCRETE ANCHOR BLOCKS FOR VERTICAL BENDS REFER TO NMWD STD. NO.4
7. FOR VALVE MARKINGS REFER TO NMWD STD. NO.22
8. FOR LEAKAGE CHART REFER TO NMWD STD. NO.23
9. FOR SYMBOLS AND ABBREVIATIONS REFER TO NMWD STD. NO.24
10. FOR APPROXIMATE DEPTH OF WATERMAIN FROM VALVE NUT REFER TO NMWD STD. NO.25

NOTES:

COORDINATING WITH OPERATIONS
A) TOP-OFF WINDHAVEN TANK PRIOR TO LOWERING
B) WATER TRUCK TO BE ON JOB SITE FOR FILLING TANK
C) NOTICE TO HOMEOWNERS TO CONSERVE WATER AND TOP-OFF PRIVATE WATER TANKS



PROFILE
HORIZONTAL SCALE: 1"=50'-0"
VERTICAL SCALE: 1"=10'-0"



* CONTACT ENGINEERING DEPT. FOR STAKING OF ACTUAL DEPTH ALONG ALIGNMENT

SECTION A
N.T.S.

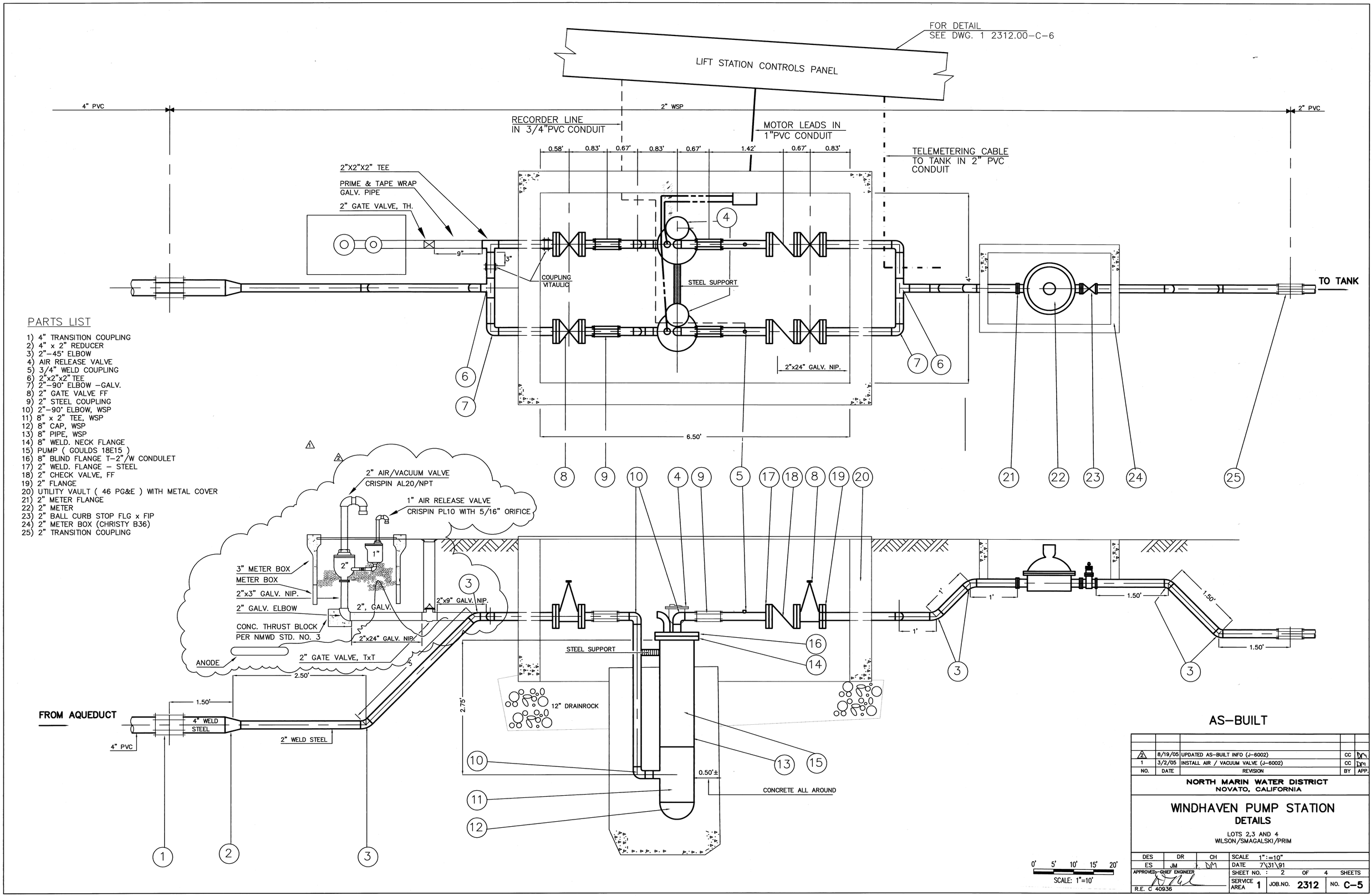
NO.	DATE	REVISION	BY	APP.
1	10/04/13	INCORPORATED AS-BUILT INFORMATION		
0	11/29/12	EXHIBIT "A", ISSUED FOR CONSTRUCTION	AC	JK

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

LOWER 2" WATER MAIN AT WINDHAVEN-GUNN DR.
B-3 HWY 101 AQUEDUCT RELOCATION
2013

DES	DR	CH	SCALE : AS SHOWN
JK	MM		DATE : 11/27/12
APPROVED: CHIEF ENGINEER			SHEET NO. : 1 OF 1 SHEETS
R.E. C40936			SERVICE AREA 1 JOB.NO. 7118.10 NO. 001

Oct 07, 2013 - 10:40am F:_DRAFTING\NORTH MARIN__JOE_SCHOOLS\7118001\7118.01-001.dwg User: ADMINISTRATOR



AS-BUILT

NO.	DATE	REVISION	BY	APP.
2	8/19/05	UPDATED AS-BUILT INFO (J-6002)	CC	DM
1	3/2/05	INSTALL AIR / VACUUM VALVE (J-6002)	CC	DM

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

WINDHAVEN PUMP STATION
DETAILS

LOTS 2,3 AND 4
WILSON/SMAGALSKI/PRIM

DES	DR	CH	SCALE 1"=10"
ES	JM	DM	DATE 7\31\91
APPROVED: CHIEF ENGINEER R.E. C 40936			SHEET NO. 2 OF 4 SHEETS
			SERVICE AREA 1 JOB.NO. 2312 NO. C-5

Sep 09, 2005 - 2:44pm W:\JOB\1_NOVATO\2312\AS-BUILT\2312C5A.DWG User: ACANTILLER