FOR CONTRACT NO.: 02-1E10U**4**

INFORMATION HANDOUT

PERMITS

UNITED STATES ARMY CORPS OF ENGINEERS
404 PERMIT

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME 1602 AGREEMENT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MATERIALS INFORMATION

AERIALLY DEPOSITED LEAD AND TRAFFIC STRIPE
SITE INVESTIGATION REPORT

GEOTECHNICAL DESIGN REPORT

ROUTE: 02-Sha-299-2.5/4.3

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

RECEIVED
JUL 26 2010
By

REPLY TO
ATTENTION OF

July 22, 2010

Regulatory Division (SPK-2008-01692)

Chris Harvey
State of California
Department of Transportation, District 2
P.O. Box 496073
Redding, California 96049-6073

Dear Mr. Harvey:

We are responding to your March 18, 2010 request for a Department of the Army permit for the State Route 299 Middle of Buckhorn Curve Improvement Project. This approximately 112-acre project involves activities, including the discharge of dredged or fill material, in waters of the United States to replace and/or construct new storm water drainage systems, construct eight-foot shoulders along the roadway, extend the existing passing lane and excavate approximately 690,000 cubic yards of material to be used as embankment areas for seventeen (17) curve realignments. The project is located on State Route 299 between Post Mile (PM) 2.4 and 4.3, Section 1, Township 32 North, Range 8 West, Latitude 40.657159°, Longitude -122.703049°, MDB&M Survey, Shasta County, California.

Based on the information you provided, the proposed activity, resulting in the permanent loss of approximately 0.19 acres of Waters of the United States, is authorized by Nationwide Permit Number 14, *Linear Transportation Projects*. However, until Section 401 Water Quality Certification for the activity has been issued or waived, our authorization is denied without prejudice. Once you have provided us evidence of water quality certification, the activity is authorized and the work may proceed subject to the conditions of certification and the Nationwide Permit. Your work must comply with the general terms and conditions listed on the enclosed Nationwide Permit information sheets and the following special conditions:

Special Conditions

1. This permit is contingent upon the permittee applying for and being issued a Section 401 Water Quality Certification. Evidence of a water quality certification must be submitted to this office, prior to commencing work in waters/wetlands. All terms and conditions of the Section 401 Water Quality Certification are expressly incorporated as conditions of this permit.

2. We understand the State of California, Department of Transportation (Caltrans) is the National Environmental Policy Act (NEPA) lead federal agency for this project, and as such, will ensure the authorized work complies with the National Environmental Policy Act, the Endangered Species Act, the National Historical Preservation Act and any other applicable federal laws. This authorization is contingent upon the permittee implementing all actions necessary to comply with these requirements.

3. To mitigate for the permanent loss of 0.19 acres of Waters of the United States, you shall purchase 0.19 acres of created *Open Water* credits at Stillwater Plains Mitigation Bank (SPK-1996-00064), contact Glenn Hawes (530) 365-4233. Evidence of this purchase shall be provided to this office prior to proceeding with any activity otherwise authorized by this permit.

4. To compensate for temporary and/or indirect impacts to Waters of the United States and associated aquatic resources, you shall revegetate temporarily disturbed areas with regionally appropriate native vegetation. Removal of native trees and shrubs within temporary impact areas shall be replaced at a 2:1 ratio to insure their long-term survival.

5. To ensure avoidance and minimization measures are successful and temporary fills have been removed, you shall take pre-construction, numbered and dated, photographs of the affected Waters of the U.S. no more than one year **prior** to construction impact. You shall take post-construction, numbered and dated, photographs of the affected Waters of the U.S. within 30 days **after** construction impact. You shall submit the photographs within 30 days after construction completion. The camera positions and view angles of pre- and post-photographs shall be identical and taken from designated locations documented on the plan drawing(s).

6. Your responsibility to complete the required compensatory mitigation as set forth in Special Condition 4 will not be considered fulfilled until you have demonstrated mitigation success and have received written verification from the U.S. Army Corps of Engineers.

7. You shall design and construct all crossings of waters of the United States to retain a natural substrate and to accommodate all reasonably foreseeable wildlife passage, and expected high flows.

8. All equipment staging, including Temporary Construction Areas (TCA's), shall take place within Caltrans approved areas within the project boundary. Prior to construction implementation, you shall ensure all equipment staging, TCA's, demolition and excavation, off pavement detours, borrow and fill areas, and upland disposal areas have been evaluated under National Environmental Policy Act, Section 401 and 404 of the Clean Water Act, Section 7 of the Endangered Species Act and Section 106 of the National Historical Preservation Act and all required permits have been obtained.

9. To prevent unauthorized fills and unforeseen impacts, you shall, prior to proceeding with any activity otherwise authorized by this permit, install fencing and appropriate signage around the entire perimeter of avoided waters of the U.S. within the project area. All fencing surrounding avoidance areas shall allow unrestricted visibility of these areas to discourage vandalism, destruction or disturbance. An example of fencing includes chain link or similar type.

10. You shall employ Best Management Practices (BMP's) to avoid and minimize environmental impacts. Temporary fills, dams, and water diversion structures must be removed in their entirety and the affected areas returned to pre-construction conditions and elevations. Temporarily impacted areas must be restored to their pre-existing condition and vegetated with native trees, shrubs and/or seed mix.

11. You shall follow Caltrans specifications and standards described in the Storm Water Pollution Prevention Plan (SWPPP) and/or Water Pollution Control Plan (WPCP), to prevent erosion and

sedimentation during and after construction. Construction work within Waters of the U. S. shall be performed when the flows are at their seasonal low or when they have ceased and the areas are dry, typically late summer through early fall. Between construction seasons, ESA fencing shall remain in place and all disturbed areas will be stabilized to prevent erosion and sedimentation.

12. You shall notify the Sacramento District, Regulatory Division Office immediately if any of the above conditions are violated or unauthorized activities occur, and shall provide a description of measures taken to remedy the violation.

13. The Permittee is responsible for all work authorized herein. To ensure that involved contractors are aware of the terms, conditions and limitations of this authorization, the permittee shall post a copy of the permit authorization and associated drawings at the project site during all phases of construction to ensure that contractors are aware of the terms and conditions of this authorization.

14. The Permittee is responsible for all work authorized herein. To ensure that involved contractors are aware of the terms, conditions and limitations of this authorization, the permittee shall post a copy of the permit authorization and associated drawings at the project site during all phases of construction to ensure that contractors are aware of the terms and conditions of the authorization.

15. You shall notify this office of the start of the authorized work within seven (7) calendar days of initiating construction activities. Along with this notification, you shall submit a copy of the project construction/work schedule or similar report.

16. You must allow representatives from the Corps of Engineers to inspect the authorized activity and any mitigation, preservation, or avoidance areas 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.

17. You shall notify this office of any proposed modifications to the project, including revisions to any of the work plans or documents cited in this authorization, for review and approval prior to construction work associated with the proposed modification.

18. You must sign the enclosed *Compliance Certification* form and return it to this office within 30 days after completion of the authorized work in Waters of the U.S.

This verification is valid until the nationwide permit referenced above is modified, reissued, or revoked. All of the nationwide permits are scheduled to be modified, reissued, or revoked prior to March 18, 2012. It is incumbent upon you to remain informed of changes to the nationwide permits. We will issue a public notice when the nationwide permits are reissued. Furthermore, if you commence or are under contract to commence the authorized activity before the date that the relevant nationwide permit is modified, reissued or revoked you will have twelve (12) months from the date of the modification, reissuance, or revocation of the nationwide permits to complete the activity under the present terms and conditions of the nationwide permits.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under ***Customer Service Survey***.

Please refer to identification number SPK-2008-01692 in any correspondence concerning this project. If you have any questions, please contact me at the California South Branch Office, 1325 J Street, Room 1480, Sacramento, CA 95814-2922, email *leah.m.fisher@usace.army.mil*, or telephone 916-557-6639.

For more information regarding our program, please visit our website at *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Leah M. Fisher
Project Manager, California South Branch

Enclosure(s):
1) *Nationwide Permit Number 14, Linear Transportation Project,* Summary Sheet

Copy furnished without enclosure(s):

California Department of Fish and Game, North Region, 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670-4503
Mr. Scott Zaitz, California Regional Water Quality Control Board, 415 Knollcrest Drive, Suite 100 Redding, California 96002
Eva Begley, State of California, Department of Transportation, North Region 2800 Gateway Oaks Drive Suite 100, MS #19 Sacramento, California 95833

COMPLIANCE CERTIFICATION

Permit File Number: SPK-2008-01692

Nationwide Permit Number: 14 - *Linear Transportation Projects*

Permittee: Chris Harvey
State of California
Department of Transportation, District 2
P.O. Box 496073
Redding, California 96049-6073

County: Shasta

Date of Verification: July 22, 2010

Within 30 days after completion of the activity(s) authorized by this permit, sign this certification form and return it; along with the items identified in Special Condition #5, to the following address:

U.S. Army Corps of Engineers
Regulatory Division
1325 J Street, Room 1480
Sacramento, California 95814-2922
DLL-CESPK-RD-Compliance@usace.army.mil
FAX: (916) 557-6877

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked. If you have any questions about this certification, please contact the Corps of Engineers.

* * * * * * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

_____

Signature of Permittee Date

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

September 9, 2010

Regulatory Branch (SPK-2008-01692)

Mr. Chris Quiney
California department of Transportation
Environmental Management, R2
P.O. Box 496073
Redding, Ca 96049-6073

Dear Mr. Quiney:

This letter concerns the State Route 299 Middle of Buckhorn Curve Improvement Project (SPK-2008-01692). This project is located along Highway 299 between Post Mile (PM) 2.4 and 4.3, Section 1, Township 32 North, Range 8 West, Latitude 40.657159°, Longitude -122.703049°, MDB&M Survey, Shasta County, California.

We have received your request to modify special condition number 7, and delete special condition numbers 4 and 6 of your Department of the Army, Nationwide Permit #14 verification letter, dated July 22, 2010, for the above referenced project.

Based on our review of the project description and additional information received in your request letter, permit number SPK-2008-01692 is hereby modified as follows:

Special Conditions

4. < DELETED >

6. < DELETED >

7. Culverts placed in streams must be installed to maintain low flow conditions, and must be constructed to withstand expected high flows.

All other terms and conditions of the permit remain in full force and effect. Failure to comply with the terms and conditions of this authorization may result in the suspension or revocation of your permit.

Please refer to identification number SPK-2008-01692 in any correspondence concerning this project. If you have any questions, please contact Ms. Leah Fisher at our California South

Branch Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Leah.M.Fisher@usace.army.mil*, or telephone 916-557-6639. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/regulatory.html*.

We want to hear from you! At your earliest convenience, please tell us how we are doing by completing our Customer Service Survey at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

ORIGINAL SIGNED

Paul M. Maniccia
Chief, California South Branch

Copies Furnished:

State of California, Department of Fish and Game, North Region, 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670-4503
Mr. Scott Zaitz, California Regional Water Quality Control Board, 415 Knollcrest Drive, Suite 100 Redding, California 96002
Ms. Eva Begley, State of California, Department of Transportation, North Region, 2379 Gateway Oaks Drive, Suite 150, Sacramento, California 95833

Notice of Determination

TO: ☒ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street
Sacramento, CA 95814

FROM: Department of Fish and Game
Northern Region
601 Locust Street
Redding, CA 96001
Contact: Craig Martz
Phone: (530) 225-2281

LEAD AGENCY (if different from above):
California Department of Transportation
PO Box 496073
Redding, CA 96049-6073
Contact: Amber Kelley
Phone: (530) 225-3510

SUBJECT: Filing of Notice of Determination pursuant to § 21108 of the Public Resources Code

State Clearinghouse Number: 2010062043

Project Title: Lake or Streambed Alteration Agreement No. 1600-2010-0270-R1 Middle Buckhorn Curve Improvement Project

Project Location: State Route 299 between Post Miles 2.5 and 4.3, approximately 20 miles west of Redding, Shasta County; Section 6, T32N, R7W, Mount Diablo Base and Meridian.

Project Description: The Project proposes to replace existing culverts and drainage systems at 11 locations on unnamed tributaries to Willow Creek, Shasta County as part of a curve correction and safety improvement project.

This is to advise that the Department of Fish and Game (DFG), acting as ☐ **the lead agency** / ☒ **a responsible agency** approved the above-described project on the date signed below and has made the following determinations regarding the above described project:

1. The project ☐ **will** / ☒ **will not** have a significant effect on the environment. (This determination is limited to effects within DFG's jurisdiction when DFG acts as a responsible agency.)
2. ☐ **An environmental impact report** / ☒ **A negative declaration** / ☐ **A timber harvesting plan** was prepared for this project pursuant to CEQA.
3. Mitigation measures ☐ **were** / ☒ **were not** made a condition of DFG's approval of the project.
4. A Statement of Overriding Considerations ☐ **was** / ☒ **was not** adopted by DFG for this project.
5. Findings ☐ **were** / ☒ **were not** made by DFG pursuant to Public Resources Code § 21081(a). DFG did, however, adopt findings to document its compliance with CEQA.
6. Compliance with the environmental filing fee requirement at Fish and Game Code § 711.4 (check one):
   - ☐ Payment is submitted with this notice.
   - ☒ A copy of a receipt showing prior payment is on file with DFG.
   - ☐ A copy of the CEQA Filing Fee No Effect Determination Form signed by DFG is attached to this notice.

☐ Lead Agency certification: DFG, as Lead Agency, has made the final EIR with comments and responses and record of project approval, or the Negative Declaration, available to the General Public at the DFG office identified above.

☒ Responsible Agency statement: The final EIR, Negative Declaration, or THP that was prepared by the Lead Agency for this project is available to the General Public at the office location listed above for the Lead Agency. DFG's CEQA Findings are available at the DFG office identified above.

Signed: _____ Date: 11/17/11

Curt Babcock
Acting Habitat Conservation Program Manager
Northern Region

Date Received for filing at OPR:

CALIFORNIA DEPARTMENT OF FISH AND GAME
CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS FOR
LAKE OR STREAMBED ALTERATION AGREEMENT No. 1600-2010-0270-R1

Introduction

The California Environmental Quality Act (CEQA) (Public Resources Code Section 21000, *et seq.*) and the State CEQA Guidelines (Guidelines) (Section 15000, *et seq.*, Title 14, California Code of Regulations) require that no public agency shall approve or carry out a project for which a Negative Declaration (ND) has been completed unless a finding can be made that no significant effects will result from the project, or that changes in the project agreed to by the applicant will fully avoid any significant impacts that might otherwise result from the project.

As the lead agency for the project, the California Department of Transportation (Caltrans) adopted the ND for the Project on **July 22, 2010**. Caltrans found that the Project will not result in significant environmental effects.

The California Department of Fish and Game (DFG) is entering into Lake or Streambed Alteration Agreement (Agreement) **No. 1600-2010-0270-R1** with **Mr. Chris Harvey representing Caltrans.** The project is located on **Unnamed tributaries to Willow Creek, Shasta County, in Section 6, T32N, R7W, Mount Diablo Base and Meridian**.

Because DFG is issuing the Agreement, it is a Responsible Agency under CEQA for the Project. As a CEQA Responsible Agency, DFG is required by Guidelines Section 15096 to review the environmental document certified by the Lead Agency approving the projects or activities addressed in the Agreement and to make certain findings concerning a project's potential to cause significant, adverse environmental effects. However, when considering alternatives and mitigation measures approved by the Lead Agency, a Responsible Agency is more limited than the Lead Agency. When issuing the Agreement, DFG is responsible only for ensuring that the direct or indirect environmental effects of activities addressed in the Agreement are adequately mitigated or avoided. Consequently, the findings adopted or independently made by DFG with respect to an Agreement's activities are more limited than the findings of the Lead Agency funding, approving, or carrying out the project activities addressed in such Agreements.

Findings

DFG has considered the ND adopted by Caltrans. DFG has independently concluded that the Agreement should be issued under the terms and conditions specified therein. In this regard, DFG hereby adopts any findings of Caltrans as set forth in the ND and record of project approval, insofar as those findings pertain to the project's impacts on biological resources.

Signed: _____ Date: 11/17/10

Curt Babcock
Acting Habitat Conservation Program Manager
Northern Region

CALIFORNIA DEPARTMENT OF FISH AND GAME
NORTHERN REGION
601 LOCUST STREET
REDDING, CA 96001

RECEIVED
NOV 2010
D F G
1600 OFFICE - REDDING

LAKE OR STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2010-0270-R1
Unnamed Tributaries to Willow Creek
Tributary to Clear Creek

CALIFORNIA DEPARTMENT OF TRANSPORTATION
MIDDLE BUCKHORN CURVE IMPROVEMENT

This Lake or Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and the California Department of Transportation (Permittee) as represented by Mr. Chris Harvey.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on August 12, 2010, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG 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 Middle Buckhorn Curve Improvement Project (hereafter, the Project) is located between Post Mile (PM) 2.5 and PM 4.3 on State Route (SR) 299, approximately 20 miles west of Redding in Shasta County, California. The Project is located on the French Gulch US Geological Survey (USGS) 7.5 minute quadrangle, Mt. Diablo Base and Meridian, 40.66256° north, 122.70081° west.

PROJECT DESCRIPTION

The Project will realign seventeen curves, provide eight foot shoulders, improve roadway geometrics, connect two truck climbing lanes, and improve sight distance to

increase safety on this segment of SR 299. Sixteen unnamed, ephemeral and/or intermittent watercourses and 12 non-jurisdictional drainages traverse the Project area. These drainages are currently conveyed through culverts under the existing roadway. Existing culverts will be removed or abandoned and new drainage segments and culverts will be constructed to accommodate the realigned road prism. Eleven new culverts will convey runoff under the roadway to rock and gabion lined ditches. Check dams and settling basins with slotted risers will be constructed to reduce sediment and provide detention.

All work shall be in accordance with submitted plans and diagrams and any subsequent revisions approved by the DFG in writing. Specific drainage and culvert replacement work will take place at the following locations:

- Replace existing culverts C3 (18" CMP), C4 (24" CMP), and C5 (36" CMP) with a single 36" diameter culvert at PM 2.67,
- Replace existing culverts C6 (18" CMP) and C7 (48" Steel) with a single 36" diameter culvert at PM 2.89,
- Replace existing non-jurisdictional culvert NJC 4 (18" CMP) with a 24" diameter culvert at PM 2.93,
- Replace existing culverts C8 (18" CMP) and C9 (18" CMP) with a single 24" diameter culvert at PM 3.12,
- Replace existing culvert C10 (36" CMP) with a 36" diameter culvert at PM 3.2,
- Replace existing non-jurisdictional culvert NJC 8 (18" CMP) with a 24" diameter culvert at PM 3.26,
- Replace existing culvert C11 (18" CMP) with a 24" diameter culvert at PM 3.45,
- Replace existing culvert C12 (36" CMP) with a 36" diameter culvert at PM 3.70,
- Replace existing culverts C13 (18" CMP), C14 (18" CMP), and C15 (24" CMP), with a single 24" culvert at PM 4.04,
- Replace existing culverts C16 (18" CMP) and C17 (18" CMP) with a single 24" diameter culvert, and
- Replace existing culvert C8 (12" CMP) with a 24" diameter culvert at PM 4.28.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: Pacific fisher (*Martes pennanti*), ringtail (*Bassariscus astutus*), silverhaired bat (*Lasionycteris noctivagans*) and other mammal species, as well as amphibians, reptiles, Neotropical nesting birds, and other riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include: loss of mesic forest habitat along intermittent drainages, loss of roosting habitat for bats, and loss of occupied passerine habitat and nests, including eggs and/or nestlings, as a result of vegetation removal; as well as temporary and/or permanent impacts to downstream aquatic species due to suspended sediment and the smothering of egg masses and benthic invertebrate communities due to sediment deposition.

The project will result in the permanent loss of approximately 0.19 acre of un-vegetated ephemeral/intermittent stream channel routed into culverts and covered with roadway fill.

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 DFG 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 DFG 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, DFG shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time, after notifying the Resident Engineer, to verify compliance with the Agreement.

1.5 Permittee's notification (Notification of Lake or Streambed Alteration together with all maps, plans, photographs, drawings, and all other supporting documents submitted with notification to describe the activity) is hereby incorporated by reference into this Agreement. Permittee shall conduct project activities within the work areas and using the mitigative features described in the notification and supporting documents, unless such project activities, work areas or mitigative features are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this 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.

2.1 All work within the channel or on the stream banks shall be confined to the period commencing May 15 and ending October 15, provided the streams are dry. If weather conditions permit and streams remain dry, the Permittee may perform work within the stream channel or on the banks outside of the above referenced work window, contingent on conditions at the time of construction. A written request for a work period variance must be submitted to DFG at least five (5) days prior to beginning or continuing work. Written approval from DFG must be received by the Permittee prior to the start or the continuation of work outside of the above referenced work window. Variance requests may be approved or denied by DFG based on site conditions at the time of construction.

2.2 If work is performed within the stream channel or on the banks outside of the above referenced work window, the Permittee shall do all of the following:

a. Stage erosion and sediment control materials at the work site.

b. Monitor the seventy-two (72) hour forecast from the National Weather Service.

c. When the 72-hour forecast indicates a probability of precipitation of 60% or greater, or at the onset of any precipitation, ground disturbing activities shall cease and erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetland or riparian areas.

2.3 Notwithstanding Condition 2.1 above, removal of the above-ground portions of existing vegetation shall occur after November 1 and before March 16 to avoid impacts to nesting birds and roosting bats. If vegetation must be removed during the nesting season (March 15 to August 31) nest surveys shall be conducted prior to vegetation clearing.

2.4 The Permittee shall instruct all persons who will be completing any ground disturbing activity at a work site to comply with the conditions set forth in this Agreement and shall inspect each work site before, during, and after completion of any ground-disturbing activity at the work site.

HABITAT AND SPECIES PROTECTION

2.5 Prior to initiating channel- vegetation- or ground-disturbing Project activities, Permittee shall clearly delineate the limits of the work area. Permittee shall restrict all Project activities to the designated work area and shall maintain all fencing, stakes and flags until the completion of Project activities.

2.6 Disturbance or removal of vegetation adjacent to watercourses shall not exceed the minimum necessary to complete operations. Where feasible, hand tools (chain

saws, etc.) shall be used to trim woody riparian vegetation to the extent necessary to gain access to work sites. Whenever possible, root systems shall be left intact to facilitate more rapid recovery following temporary construction impacts.

2.7 Except where provided for within this agreement, the removal of vegetation from the streambed or streambanks is prohibited without prior written approval from DFG. The work area shall be identified to all workers, as represented in plans.

2.8 All equipment used during construction of this Project shall be cleaned (i.e. free of dirt and debris that may harbor noxious weed seeds and plant parts) prior to its arrival on site and before leaving the Project area.

2.9 Upon completion of construction, decommissioned portions of the roadway, slopes, and other suitable areas shall be restored to montane hardwood-conifer habitat by revegetating with a regionally appropriate mix of native trees and shrubs. Revegetation plans shall be approved by DFG prior to implementation.

CULVERTS AND INSTREAM STRUCTURES

2.10 Culverts shall extend beyond the road fill and shall not be perched (shotgunned). Culverts shall be installed at watercourse gradient or have downspouts or energy dissipaters (rock rip-rap or boulders) at the outfall to prevent erosion of the downstream channel.

2.11 All work within the channel or on the banks shall be performed when the channel is dry. If subsurface flow is present during construction, all work shall be performed in isolation from subsurface flow.

2.12 Any turbid water pumped from the work area shall be disposed of in an upland area where it will not drain directly to surface waters.

EROSION AND SEDIMENT CONTROL

2.13 The project shall include adequate erosion and sediment control devices to prevent the degradation of water quality at all times.

2.14 Soils exposed by project operations shall be treated to prevent sediment runoff and transport. Erosion control measures shall include the proper installation and maintenance of approved Best Management Practices (BMPs) and may include applications of seed, certified weed-free straw, compost, fiber, commercial fertilizer, stabilizing emulsion and mulch, or combinations thereof.

2.15 Erosion control measures shall be monitored and maintained during and after each storm event. Modifications, repairs, and improvements to erosion control

measures shall be made following each storm event to prevent sediment from entering surface waters or wetlands.

2.16 Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall is reasonably expected during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channel or adjacent riparian areas. National Weather Service forecasts shall be monitored by the Permittee to determine the chance of precipitation.

2.17 Following construction, all disturbed upland areas shall be stabilized and reseeded with an erosion control mix consisting of regionally appropriate, native grass and forb species.

PETROLEUM, CHEMICAL AND OTHER POLLUTANTS

2.18 All construction-related materials and equipment shall be stored in designated staging areas located outside of the floodplain unless approved in writing by DFG.

2.19 Refueling and vehicle maintenance shall be performed at least 100 feet from streams or other water bodies unless approved in writing by DFG.

2.20 No equipment or machinery shall be operated within any flowing stream.

2.21 Any equipment or vehicles driven and/or operated within or adjacent to the stream channel shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat.

2.22 Stationary equipment such as motors, pumps, generators, and welders that contain deleterious materials, located adjacent to the stream channel shall be positioned over drip pans.

2.23 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

CONTACT INFORMATION

Any communication that Permittee or DFG 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 DFG specifies by written notice to the other.

To Permittee:

Mr. Chris Harvey
Department of Transportation
District 2
P.O. Box 496073
Redding, California 96049-6073
Fax: (530) 225-3019
chris.harvey@dot.ca.gov

To DFG:

Department of Fish and Game
Northern Region
601 Locust Street, California 96001
Attn: Lake and Streambed Alteration Program – Craig Martz
Notification #1600-2010-0270-R1
Fax: (530) 225-0324
cmartz@dfg.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 DFG'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

DFG 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 DFG 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 DFG 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 DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG 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 DFG'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

DFG may amend the Agreement at any time during its term if DFG 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 DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG'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 DFG 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 DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG'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 DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG 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 DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG 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.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2013, 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 DFG in accordance with FGC section 1602.

CONCURRENCE

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

FOR DEPARTMENT OF TRANSPORTATION

Chris Harvey — 11/3/10

Chris Harvey
Project Manager

Date

FOR DEPARTMENT OF FISH AND GAME

11/17/10

Curt Babcock
Acting Habitat Conservation Program Manager

Date

Prepared by: Craig Martz
Staff Environmental Scientist

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Acting Secretary for Environmental Protection

Redding Office
415 Knollcrest Drive, Suite 100, Redding, California 96002
(530) 224-4845 • Fax (530) 224-4857
http://www.waterboards.ca.gov/centralvalley

Edmund G. Brown Jr.
Governor

21 January 2011

Mr. Chris Harvey
California Department of Transportation
P.O. Box 496073
Redding, CA 96049-6073

CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE MIDDLE OF BUCKHORN PROJECT (WDID#5A45CR00383), WHISKEYTOWN, SHASTA COUNTY

ACTION:

1. ☐ Order for Standard Certification
2. ■ Order for Technically-conditioned Certification
3. ☐ Order for Denial of Certification

WATER QUALITY CERTIFICATION STANDARD CONDITIONS:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and §3867 of Title 23 of the California Code of Regulations (23 CCR).

2. 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 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR §3833, unless otherwise stated in writing by the certifying agency.

4. Certification is valid for the duration of the described project. This certification is no longer valid if the project (as currently described) is modified, or coverage under Section 404 of the Clean Water Act has expired.

ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the four standard conditions, Caltrans shall satisfy the following:

1. The California Department of Transportation (Caltrans) shall notify the Central Valley Regional Water Quality Control Board (Central Valley Water Board) in writing 7 days in advance of the start of any in-water activities.

2. Except for activities permitted by the U.S. Army Corps under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

3. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete the project.

4. All areas disturbed by project activities shall be protected from washout or erosion.

5. All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.

6. Caltrans shall provide a copy of this Order, associated attachments, and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ to the contractor, all subcontractors, and all utility companies conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its employees, contractors, subcontractors, and utility companies.

7. All personnel (employees, contractors, and subcontractors) performing work on the proposed project shall be adequately informed and trained regarding the conditions of this Certification. Caltrans shall document the training by maintaining dated sign-in sheets for attendees, and shall make the sign-in sheets available to the Central Valley Water Board on request.

8. Best management practices (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. An effective combination of erosion and sediment control BMPs shall be implemented year round, regardless of season or time of year. Caltrans shall stage erosion and sediment control materials at the work site.

9. Caltrans shall perform surface water sampling: 1) When performing any in-water work; 2) In the event that project activities result in any material reaching surface waters; or 3) When any activities result in the creation of a visible plume in surface waters. The following monitoring shall be conducted immediately upstream out of the influence of the project and 300 feet downstream of the active work area. Sampling results shall be submitted to this office within two weeks of initiation of sampling and every two weeks thereafter. The sampling frequency may be modified for certain projects with written permission from the Central Valley Water Board.

10. The following monitoring shall be conducted immediately upstream out of the influence of the project and 300 feet downstream of the active work area. Sampling results shall be submitted to this office within two weeks of initiation of sampling and every two weeks thereafter. The sampling frequency may be modified for certain projects with written permission from the Central Valley Water Board.

Parameter	Unit	Type of Sample	Frequency of Sample
Turbidity	NTU	Grab	Every 4 hours during in water work
Settleable Material	ml/l	Grab	Same as above.
Visible construction related pollutants	Observations	Visible Inspections	Continuous throughout the construction period

11. Activities shall not cause turbidity increases in surface water to exceed:

    (a) where natural turbidity is less than 1 Nephelometric Turbidity Units (NTUs), controllable factors shall not cause downstream turbidity to exceed 2 NTU;
    (b) where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU;
    (c) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
    (d) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
    (e) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

    Except that these limits will be eased during in-water working periods to allow a turbidity increase of 15 NTU over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be assessed by prior permission of the Central Valley Water Board.

12. Activities shall not cause settleable matter to exceed 0.1 ml/l in surface waters as measured in surface waters 300 feet downstream from the project.

13. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this Order. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, 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 Order, shall be allowed to enter into or be placed where it may be washed by rainfall into waters of the State.

14. If, at any time, the above criteria for turbidity or settleable material are exceeded, or an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, the associated project activities shall cease immediately until adequate BMPs are implemented. The Central Valley Water Board shall be notified promptly and in no case more than 24 hours after the exceedance or unauthorized discharge occurs.

15. All conditions required by this Order shall be included in the Plans and Specifications prepared by Caltrans for the Contractor. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this project.

16. Post-Storm Photographs: Caltrans shall take photos of all areas disturbed by project activities, including all excess materials disposal areas, after rainfall events that generate visible runoff from these areas in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and successfully. A brief report containing these photos shall be submitted within 30 days of the rainfall event that generated runoff from the disturbed areas. Once the site has demonstrated appropriate and effective erosion and sediment control, Caltrans may request a reprieve from this condition from the Central Valley Water Board.

17. Caltrans must comply with all of the conditions of California Department of Fish and Game Streambed Alteration Agreement 1600-2010-0363-R1.

18. Caltrans must comply with all requirements of U.S. Army Corps of Engineers Nationwide Permit Number 14, Linear Transportation Projects.

19. Caltrans shall comply with their Statewide Storm Water NPDES Permit Order No 99-06-DWQ (NPDES No. CAS 000003) issued by the State Water Resources Control Board.

20. Caltrans shall comply with all conditions of the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board.

21. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and section 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Order.

    a. If Caltrans or a duly authorized representative of the project fails or refuses to furnish technical or monitoring reports, as required under this Order, or falsifies any information provided in the monitoring reports, the applicant is subject to civil, for each day of violation, or criminal liability.
    b. In response to a suspected violation of any condition of this Order, the Central Valley Water Board may require Caltrans to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from the reports.
    c. Upon the presentation of credentials and other documents as may be required by law, Caltrans shall allow the staff of the Central Valley Water Board or their authorized representative, to enter the project premises for inspection; including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this certification and determining the ecological success of the project.

22. Caltrans shall provide a Notice of Completion (NOC) no later than 30 days after the project completion. The NOC shall demonstrate that that the project has been carried out in accordance with the project's description (and any amendments approved). The NOC shall include a map of the project location and representative pre and post construction photographs. Each photograph shall include a descriptive title, date taken, photographic site, and photographic orientation.

REGIONAL WATER QUALITY CONTROL BOARD CONTACT PERSON:

Dannas J. Berchtold, Engineering Associate, Redding Branch Office, 415 Knollcrest Drive, Suite 100, Redding, California 96002, dberchtold@waterboards.ca.gov, (530) 224-4783

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that any discharge from Caltrans, Middle of Buckhorn Project (WDID# 5A45CR00383) will comply with the applicable provisions of §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. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification (General WDRs)".

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with Caltrans project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Water Quality Control Plan *for the Sacramento River and San Joaquin River*, Fourth Edition, revised September 2009.

George D. Day
(for) Pamela C. Creedon
Executive Officer

DJB: knr

Enclosure: Project Information

cc: Mr. Matt Kelley, U.S. Army Corp of Engineers, Redding
U.S. Fish and Wildlife Service, Sacramento
Ms. Donna Cobb, Department of Fish and Game, Region 1, Redding
Mr. Bill Jennings, CALSPA, Stockton
Ms. Amber Kelley, Office of Environmental Management, Redding

cc by email: Mr. Dave Smith, U.S. EPA, Region 9, San Francisco
Mr. Bill Orme, SWRCB, Certification Unit, Sacramento

PROJECT INFORMATION

Application Date: 6 August 2010

Applicant: Caltrans, Attn: Mr. Chris Harvey

Applicant Representatives: Office of Environmental Management, Attn: Ms. Amber Kelley

Project Name: Middle of Buckhorn Project

Application Number: WDID No. 5A45CR00383

Type of Project: Highway safety project, including curve realignment and other highway improvements.

Project Location: Section 6&7, Township 32 North, Range 7 West, MDB&M. Latitude: 40°39'45" and Longitude: -122°42'03"

County: Shasta County

Receiving Water(s) (hydrologic unit): Unnamed tributary to Willow Creek, which is tributary to Whiskeytown Reservoir. Shasta Bally Hydrologic Unit-Middle Clear Hydrologic Area No. 524.63

Water Body Type: Riparian, Streambed

Designated Beneficial Uses: The *Water Quality Control Plan for the Sacramento River and San Joaquin River*, Fourth Edition, revised September 2009 (Basin Plan), has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Groundwater Recharge, Water Contact Recreation (REC-1); Non-Contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Cold Freshwater Migration (MIGR); Warm Freshwater Spawning (SPWN); Cold Freshwater Spawning (SPWN); and Wildlife Habitat (WILD).

Project Description (purpose/goal): The Middle of Buckhorn Project consists of safety improvements on a segment of State Route 299, in Shasta County near Buckhorn Summit, approximately 20 miles west of Redding (post mile 2.5 to post mile 4.3). The proposed safety project will realign seventeen curves, provide eight foot shoulders, improve the roadway geometrics, connect two existing passing lanes, and improve sight distance. The project requires 25 acres of vegetation removal, approximately 690,000 cubic yards of excavation, and replacement of multiple culverts. The project is estimated to take two construction seasons (200 working days) to complete. Cuts and fills will be constructed the first season, base and asphalt will be placed the second season.

Earthwork for the cuts and fills will be balanced within the project limits, so an off-site disposal area is not required. The culverts currently conveying ten un-named ephemeral and intermittent drainages under the existing highway will be removed or abandoned, and new drainage systems will be installed. Drainage work is limited to areas required for construction,

and work in jurisdictional areas will occur during low-flow, no-flow conditions. Dewatering will not be required. The new culverts will be installed to convey storm water runoff under the roadway to rock and gabion lined ditches. Check dams and settling basins with slotted risers will also be constructed, with access provided for maintenance.

Sections of the existing highway pavement will be removed and the areas will be planted with native vegetation. Erosion control seed mix will be applied to disturbed areas after construction. Construction equipment will be staged, and materials will be stored, in an existing upland area within the project limits.

Temporary construction Best Management Practices (BMPs) will be implemented under a contractor prepared Storm Water Pollution Prevention Plan. Temporary concrete washouts, stabilized construction entrances/exits, fiber roll, and street sweeping/vacuuming have been identified as project BMPs. Water trucks will be used for compaction and dust control. Additional items may be identified during preparation of a contract.

Preliminary Water Quality Concerns: The project may impact surface waters with increased levels of turbidity, settleable material, and roadway pollutants. Erosion of the cut slopes may occur for several years after the project has been completed

Proposed Mitigation to Address Concerns: An erosion control and sediment transport BMP combination will be implemented to address potential sediment and turbidity discharges. These include disturbed ground protection to prevent erosion and linear barriers for reducing sediment transport. The project contract will contain provisions for chemical pollution source control.

Measures will be implemented to reduce long term sedimentation and turbidity impacts to receiving water caused by erosion of the cut slopes. These measures include: capping fill slopes with rock, paving roadside ditches to eliminate channel erosion, providing wide paved shoulders for collecting eroded material, and creating benches on cut slopes to reduce their length. Gabion lined ditches, check dams, and settling basins with slotted risers will be constructed to provide detention and allow sediment to settle. Access will be provided for regular maintenance of these features.

Fill/Excavation Area: Project implementation will permanently impact 0.018 acres of riparian habitat and 0.172 acres of un-vegetated streambed.

Dredge Volume: Not Applicable

U.S. Army Corps File Number: SPK-2008-01692

U.S. Army Corps of Engineers Permit Number: Nationwide Permit No. 14 (Linear Transportation Projects)

Department of Fish and Game Streambed Alteration Agreement: Caltrans applied for a Streambed Alteration Agreement on 4 August 2010 (Lake & Streambed Alteration Agreement Number: 1600-2010-0270-R1).

Possible Listed Species: Caltrans conducted biological studies and surveys of the project area and determined no special status plant or animal species will be affected by the project.

Status of CEQA Compliance: Caltrans, acting as a responsible agency issued a Notice of Determination approving a Negative Declaration on 22 July 2010 in compliance with Section 21108 of the Public Resources Code stating the project will not have a significant effect on the environment. Mitigation measures were not made a condition of approval. (State Clearinghouse Number 2010062043).

Compensatory Mitigation: Caltrans has agreed to purchase 0.19 acres of created open water credits at the Stillwater Plains Mitigation Bank, at a cost of $28,500. The project also includes design features that will improve a number of drainages and upland areas within the project limits. When the existing highway culverts are removed several drainages will be re-established. Sections of the existing highway will be removed and the less gradient areas will be planted with native upland vegetation.

Application Fee Provided: Total fees of $20,115 have been submitted as required by 23 CCR §3833b(3)(A) and by 23 CCR §2200(e).

AERIALLY DEPOSITED LEAD AND TRAFFIC STRIPE PAINT SITE INVESTIGATION REPORT

State Route 299 (02-SHA-299)
Post Mile 2.5 to 4.4
Shasta County, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 3
ENVIRONMENTAL ENGINEERING OFFICE
703 B STREET, P.O. BOX 911
MARYSVILLE, CALIFORNIA 95901

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON PROJECT NO. S9300-06-118
TASK ORDER NO. 118, EA NO. 02-1E1001

MAY 2010

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9300-06-118
May 10, 2010

Mr. Rajive Chadha
California Department of Transportation - District 3
Environmental Engineering Office
P.O. Box 911
Marysville, California 95901

Subject: STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA
CONTRACT NO. 03A1368, TASK ORDER NO. 118, EA 02-1E1001
AERIALLY DEPOSITED LEAD AND TRAFFIC STRIPE PAINT
SITE INVESTIGATION REPORT

Dear Mr. Chadha:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order Number 118, and Expense Authorization 02-1E1001, Geocon Consultants, Inc. has performed environmental engineering services for the subject project. The Site consists of Caltrans right-of-way along State Route 299 from Post Mile 2.5 to 4.4 in Shasta County, California. The accompanying report summarizes the services performed, including the advancement of 118 direct-push and 24 hand-auger borings for shallow soil sampling, traffic stripe paint sampling and analytical testing.

The contents of this report reflect the views of the author, 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.

Please contact us if there are any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Gemma G. Reblando
Project Geologist

John E. Juhrend, PE, CEG
Project Manager

REGISTERED PROFESSIONAL ENGINEER
JOHN JUHREND
No. 46681
Exp. 06/30/11
CIVIL
STATE OF CALIFORNIA

GGR:JEJ:krh

(3 + 3 CDs) Addressee

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AERIALLY DEPOSITED LEAD AND TRAFFIC STRIPE PAINT SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Aerially Deposited Lead (ADL) and Traffic Stripe Paint Site Investigation report for the State Route 299 (SR-299) Post Mile (PM) 2.5 to 4.4 project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order (TO) Number 118, and Expense Authorization (EA) 02-1E1001.

1.1 Project Description and Proposed Improvements

The project area consists of the shoulder areas of SR-299 from PM 2.5 to 4.4 (the Site) in Shasta County, California. Caltrans proposes to improve and re-align the existing roadway within the project limits. The approximate project location is depicted on the Vicinity Map, Figure 1. The approximate sample locations are depicted on the Site Plans, Figures 2-1 through 2-8.

1.2 General Objectives

The purpose of the scope of services outlined in TO No. 118 was to evaluate whether impacts due to aerial lead deposition from motor vehicle exhaust exist in the surface and near surface soils within the project boundaries and to determine whether the yellow traffic stripe paint on the roadway at the Site contains lead. The investigative results will be used by Caltrans to inform the construction contractor(s) if lead-impacted soil and/or lead-containing yellow traffic stripe paint are present within the project boundaries for construction worker health and safety, and soil management/disposal purposes.

2.0 BACKGROUND

2.1 Potential Lead Soil Impacts

Ongoing testing by Caltrans throughout California has indicated that ADL exists along major freeway routes due to emissions from vehicles powered by leaded gasoline.

2.2 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 total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard

Waste Extraction Test (WET). A waste may have 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 soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP). The TTLC value for lead is 1,000 milligrams per kilogram (mg/kg). The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

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., 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 corrosivity. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

3.0 SCOPE OF SERVICES

We performed the following scope of services as requested by Caltrans in TO No. 118:

3.1 Pre-field Activities

- Conducted a pre-work site visit on January 21, 2010, to discuss the TO scope of services. Caltrans representative Rajive Chadha and Geocon representative Michael O'Brien performed the site visit to observe the project boundaries and conditions and identify buried utility lines with Underground Service Alert (USA) members. The project limits were further marked out with wooden stakes due to wet ground for subsequent utility clearance.
- Utilized the *Health and Safety Plan* from previous task order (TO No. 47, Caltrans Contract 03A1368) dated June 1, 2008, to provide guidelines on the use of personal protective equipment during the field activities.

- Provided 48-hour notification to USA prior to job site mobilization.
- Retained the services of Advanced Technology Laboratories (ATL) to perform the chemical analysis of soil and traffic stripe paint samples.

3.2 Field Activities

The field activities consisted of collecting soil samples along the unpaved shoulders of SR-299 between PM 2.5 and 4.4. On January 27 through 29, 2010, 372 soil samples were collected from 118 direct-push borings (WB1 through WB58 and EB59 through EB118) and 24 hand-auger borings (HA119 through HA142) at the Caltrans designated soil sampling locations. The direct-push borings were excavated to an approximate maximum sampling depth of 3.0 feet. Soil samples were collected at general depths of 0.0 to 1.0 foot, 1.0 to 2.0 feet and 2.0 to 3.0 feet. The hand-auger borings were excavated to a depth of 0.5 foot. One soil sample was obtained from each hand-auger boring from a depth interval of 0.0 to 0.5 foot.

We also collected four yellow traffic stripe paint samples (PC1, PC2, PC3 and PC4) at the Caltrans designated sampling locations.

4.0 INVESTIGATIVE METHODS

4.1 Boring and Traffic Stripe Paint Sample Location Rationale

The boring locations were designated by Caltrans in the vicinity of proposed improvements. Borings WB1 through WB58 were advanced along the westbound (WB) shoulders of SR-299. Borings EB59 through EB118 were advanced along the eastbound (EB) shoulders of SR-299. Hand-auger borings HA119 through HA142 were advanced in the slope approximately 10 to 50 feet from the highway shoulder. Refusal was encountered in several of the direct-push borings at depths between 1.5 and 2.5 feet. The approximate soil boring locations are depicted on Figures 2-1 through 2-8.

Yellow traffic stripe paint samples PC1 through PC4 were collected at locations designated by Caltrans within the proposed construction area. The approximate traffic paint sample locations are depicted on Figures 2-1, 2-2, 2-4 and 2-8.

The coordinates of the boring locations were determined using a differential global positioning system (GPS). GPS data could not be obtained for borings WB16, WB17, EB113 and HA133 due to failed satellite reception during sampling at these locations. The GPS was utilized during the field activities to locate the horizontal position of each location with an error of no more than 3.3 feet. The latitude and longitude of the boring locations are summarized in Table 1.

4.2 Soil Sampling Procedures

A total of 372 soil samples were collected from 118 direct-push and 24 hand-auger borings excavated at the Site. Soil samples obtained from the borings were collected in cellulose thermoplastic (acetate) liners driven by the direct-push rig. The acetate liners were cut to separate the sample by depth, then the sample from a particular interval was opened and the soil sample was transferred to a Ziploc® re-sealable plastic bag. Soil samples obtained using a hand-auger were transferred directly from the hand-auger to Ziploc® re-sealable plastic bags. The soil samples were field homogenized within the sample bags and subsequently labeled, placed in an ice chest, and delivered to ATL for analytical testing under chain-of-custody (COC) documentation.

Quality assurance/quality control (QA/QC) procedures were performed during the field exploration activities. These procedures included decontamination of sampling equipment before each boring was advanced and providing COC documentation for each sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing the equipment with an Alconox™ solution followed by a double rinse with deionized water. The field sampling activities were performed under the supervision of Geocon's field manager.

The borings were backfilled with the excess soil cuttings. The decontamination water was discharged to the ground surface away from surface water bodies or storm drain inlets.

4.3 Traffic Stripe Paint Sampling Procedures

Four yellow traffic stripe paint samples (PC1, PC2, PC3 and PC4) were collected using a hammer to break a chip off the traffic stripe paint. The paint samples were placed in a Ziploc® re-sealable plastic bags and subsequently labeled, and delivered to ATL under standard COC documentation.

4.4 Laboratory Analyses

The soil and traffic stripe paint samples collected within the project boundaries were submitted to ATL for the following analyses under standard turn-around-time. The laboratory was instructed to homogenize the soil samples prior to analysis in accordance with Contract 03A1368 requirements.

- Three-hundred-seventy-two soil samples were analyzed for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B.
- Four yellow traffic stripe paint samples were analyzed for total lead following EPA Test Method 6010B.

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 the spike made at ten times the detection limit or at the analyte level.

Prior to submitting the soil samples to the laboratory, the COC documentation was reviewed for accuracy and completeness. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

5.0 FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Site Conditions

Soil encountered during the excavation of borings was generally comprised of gravelly sand to a depth of 1.0 foot and underlain by gravelly clay materials to the maximum sampling depth of approximately 3.0 feet. Groundwater was not encountered in the soil borings.

5.2 ADL Soil Analytical Results

A summary of the soil analytical results are presented in Table 1. The laboratory report and COC documentation are presented in Appendix A.

Total lead was detected in 156 of the 372 soil samples analyzed at concentrations ranging from 5.0 to 84 mg/kg. Only seven of the 372 soil samples had total lead concentrations greater than or equal to 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

5.3 Traffic Stripe Paint Sample Analytical Result

Total lead was detected in each of the yellow traffic stripe paint samples at concentrations ranging from 4.7 to 920 mg/kg. Caltrans elected not to further analyze the traffic stripe paint samples with total lead level exceeding 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) for WET and TCLP soluble lead since the current construction design plans do not specify grinding of the yellow traffic stripe paint, which would create a paint waste stream. The laboratory report and COC documentation are presented in Appendix A.

5.4 Laboratory Quality Assurance/Quality Control

We reviewed the laboratory QA/QC provided with the laboratory report. Relative percent difference for duplicates, matrix spikes, and matrix spike duplicates were outside criteria for several samples. However, the analytical batch was validated by the Laboratory Control Sample. 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.

5.5 Statistical Evaluation for Lead Detected in Soil Samples

Statistical methods were applied to the total lead data to evaluate the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for the soil samples collected from depth interval of 0.0 to 1.0 foot. UCLs were not calculated for the samples collected from depth intervals of 1.0 to 2.0 feet and 2.0 to 3.0 feet since the total lead concentrations are less than 50 mg/kg.

The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring,* by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications,* by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

5.5.1 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 used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap.* 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 reporting limit was used in the UCL calculation. The bootstrap results are included in Appendix B. The calculated UCLs and statistical results are summarized in the table below:

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 1.0	19.1	19.7	17.3	2.5	84

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 ADL

Soil materials excavated to a depth of 3.0 feet or shallower within the project boundaries would not be classified as a California hazardous waste since the calculated 90% and 95% total lead UCLs or the total lead concentrations are less than 50 mg/kg. Consequently, soil generated from excavations to 3.0 feet or shallower could be reused or disposed of as non-hazardous soil with respect to lead content.

6.2 Traffic Stripe Paint Waste Classification/Disposal

The yellow traffic stripe paint was sampled per Caltrans' request to provide contractors with preliminary analytical data of the yellow traffic stripe paint.

Two of the four yellow traffic stripe paint samples (PC1 and PC2) collected at the Site had total lead levels of 440 and 920 mg/kg, less than the TTLC value for lead of 1,000 mg/kg. According to Caltrans, the current design plans do not specify grinding of the yellow traffic stripe paint, which would create a paint waste stream. Thus, the yellow traffic stripe paint samples were not analyzed for WET and TCLP soluble lead. If future construction design plans change, and grinding of the yellow traffic stripe paint is required, additional analytical testing of the traffic stripe paint or generated waste stream may be required to determine appropriate disposal options.

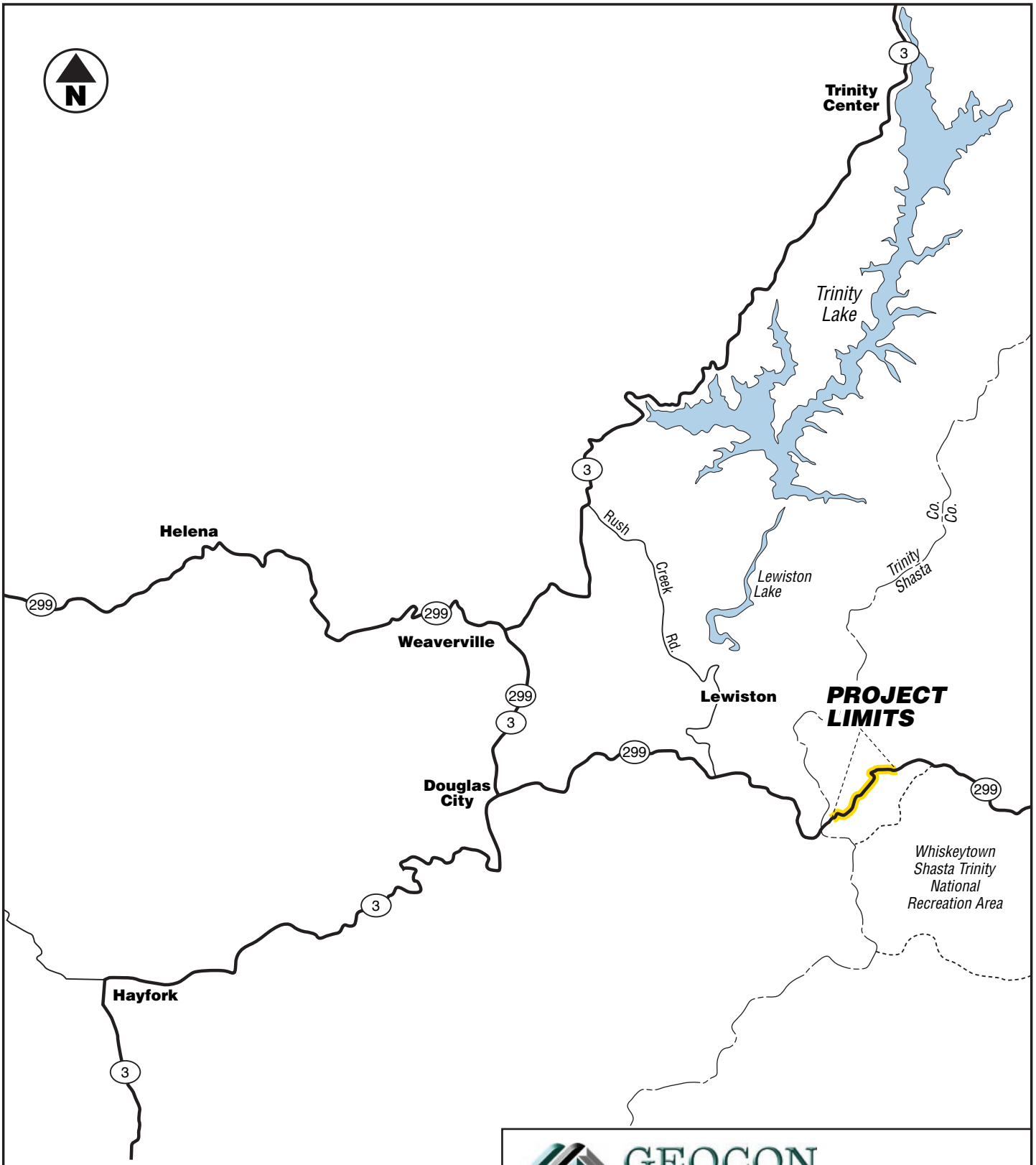
6.3 Worker Protection

Per Caltrans' requirements, the contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-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 lead-impacted soil.

7.0 REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report 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. We 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.



0 5
Scale in Miles

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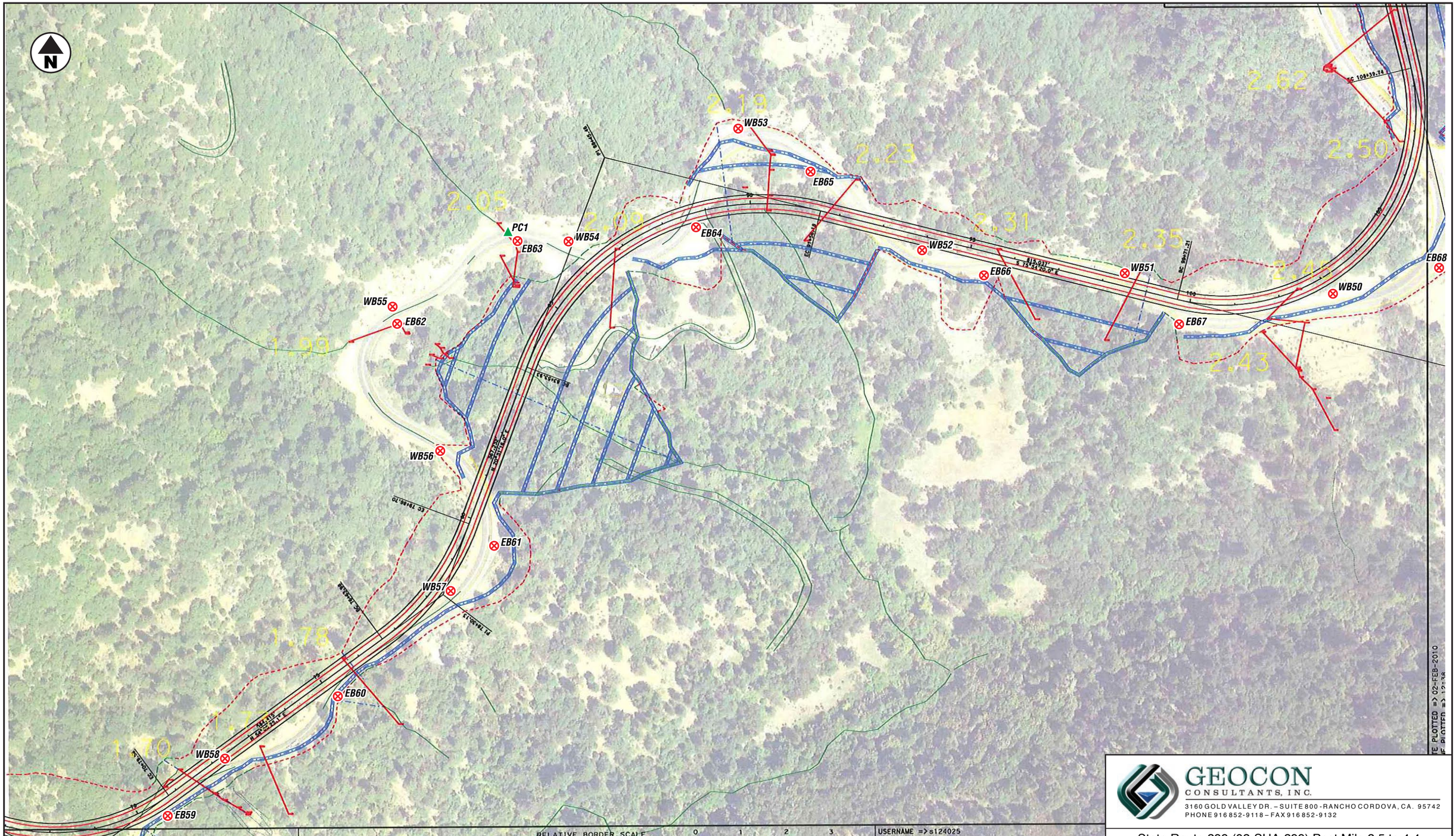
Shasta County, California	**VICINITY MAP**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 1



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

PC1 ▲ Approximate Paint Chip Sample Location

0 200
Scale in Feet

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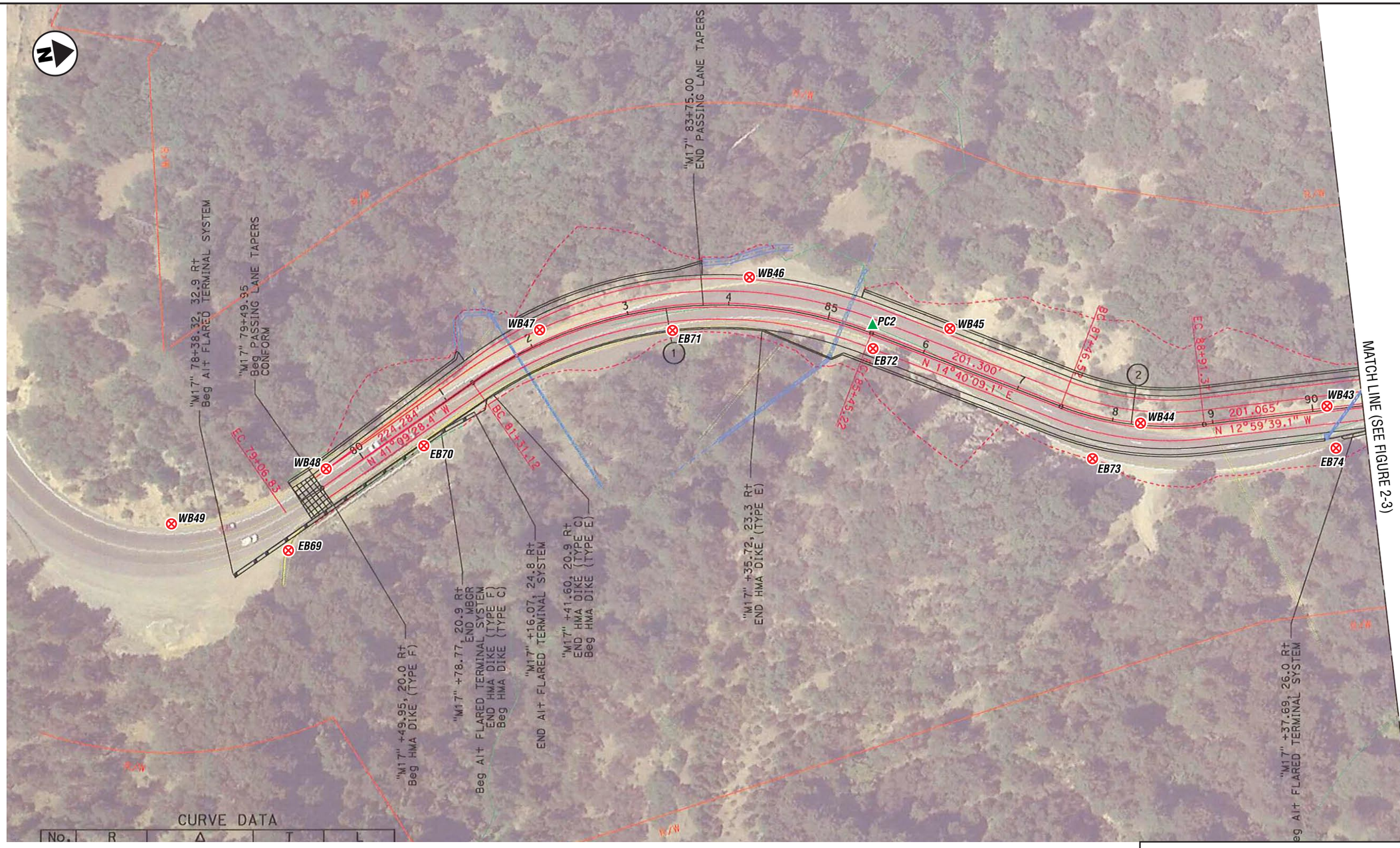
Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-1



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

PC1 ▲ Approximate Paint Chip Sample Location

0 100
Scale in Feet

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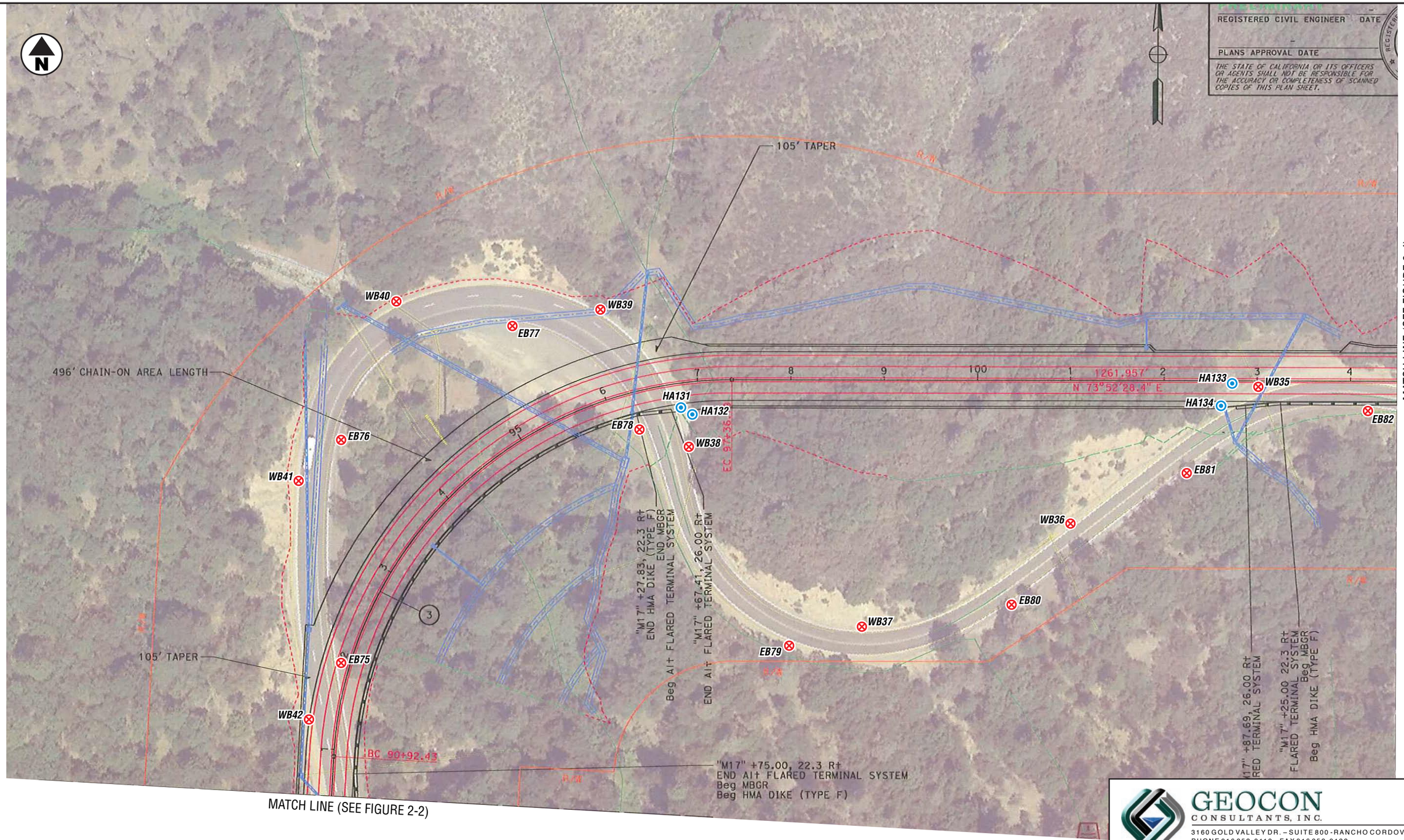
GEOCON Proj. No. S9300-06-118

Task Order No. 118

SITE PLAN

May 2010

Figure 2-2



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

HA133 ⊙ Approximate Hand-Auger Boring Location

0 100
Scale in Feet

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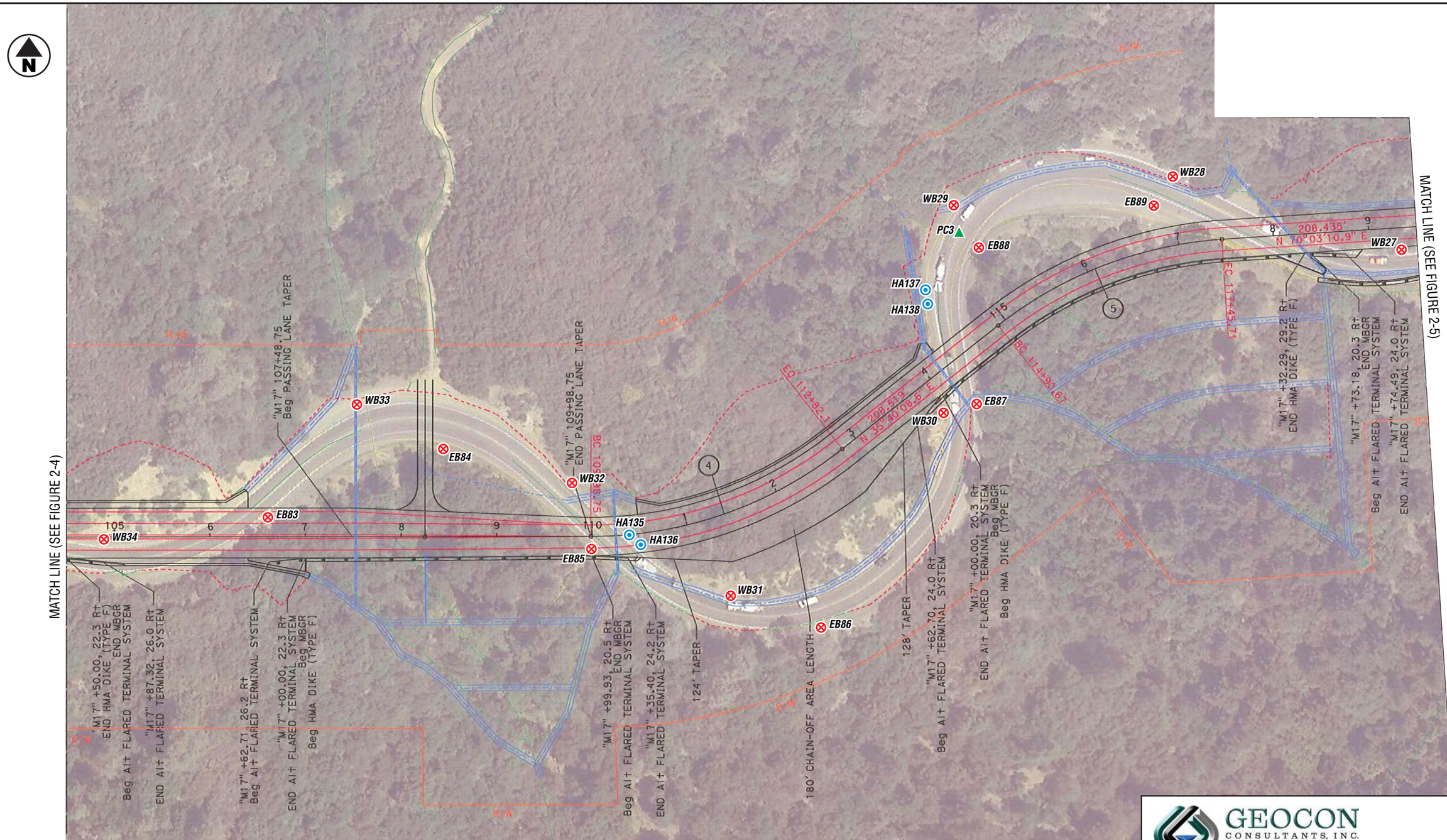
State Route 299 (02-SHA-299) Post Mile 2.5 to 4.4		
Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-3



LEGEND:

- WB1 ⊗ Approximate Direct-Push Boring Location
- HA133 ⊙ Approximate Hand-Auger Boring Location
- PC1 ▲ Approximate Paint Chip Sample Location

0 100
Scale in Feet

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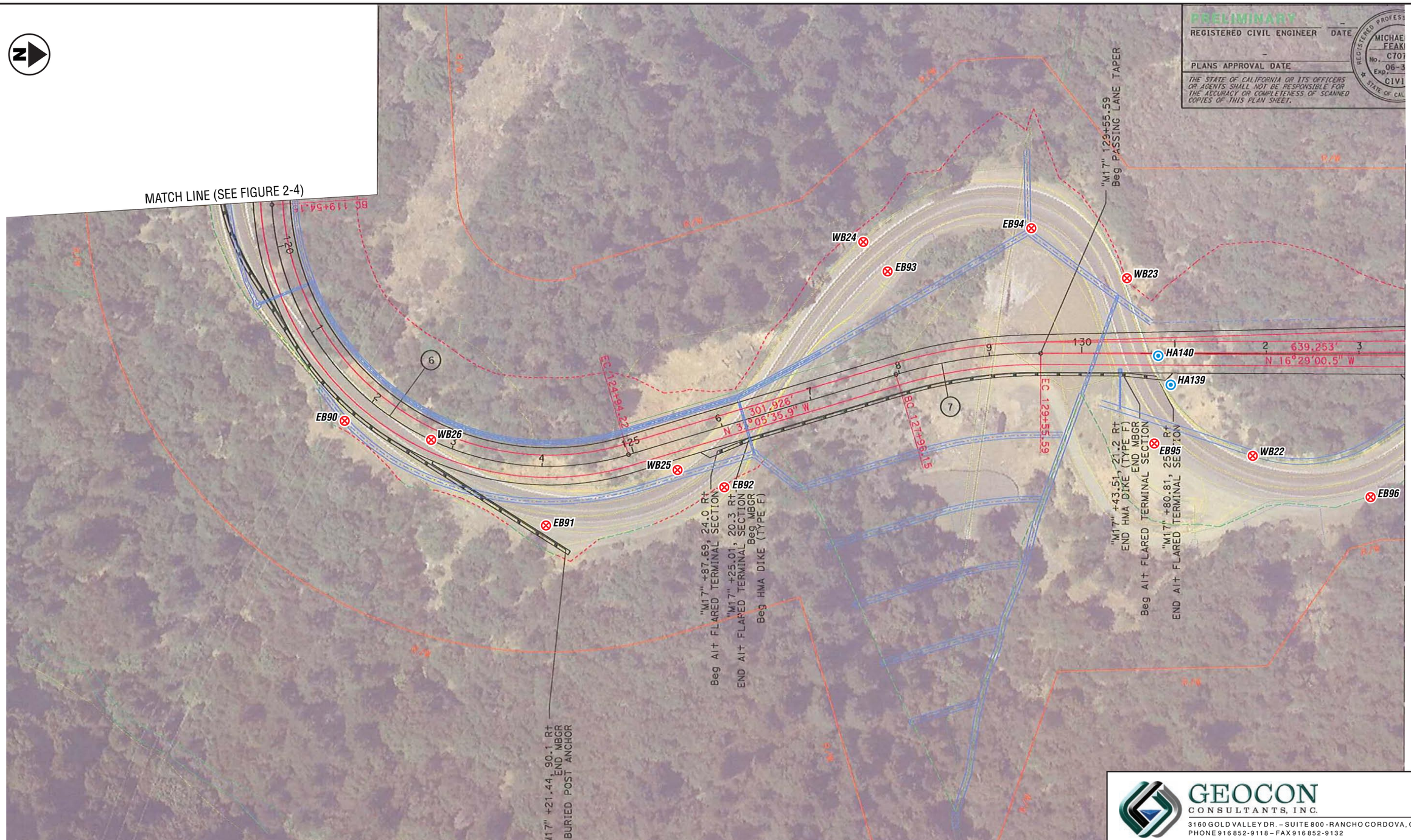
Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-4



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

HA133 ⊙ Approximate Hand-Auger Boring Location

0 100
Scale in Feet

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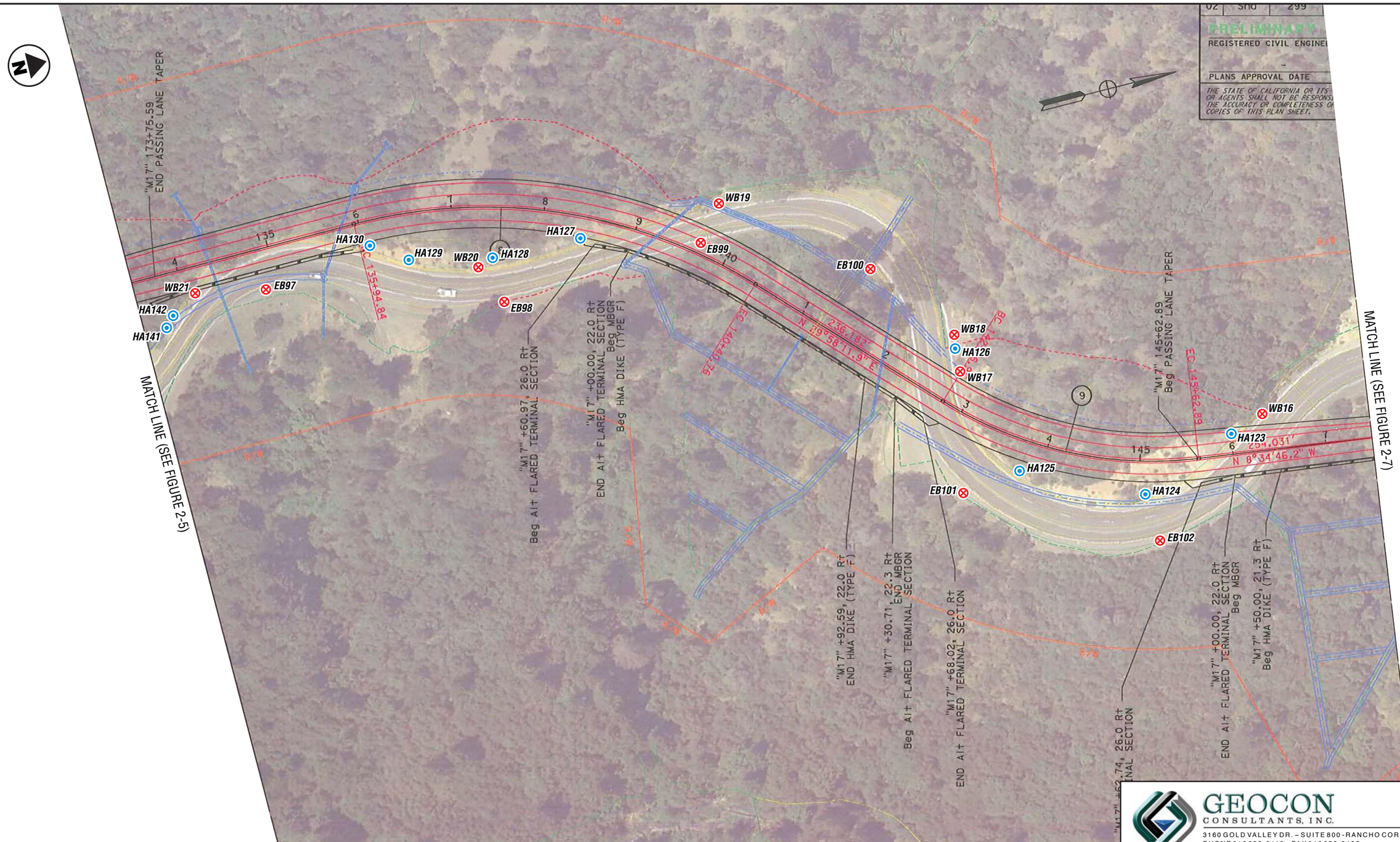
Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-5



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

HA133 ⊙ Approximate Hand-Auger Boring Location

0 100
Scale in Feet

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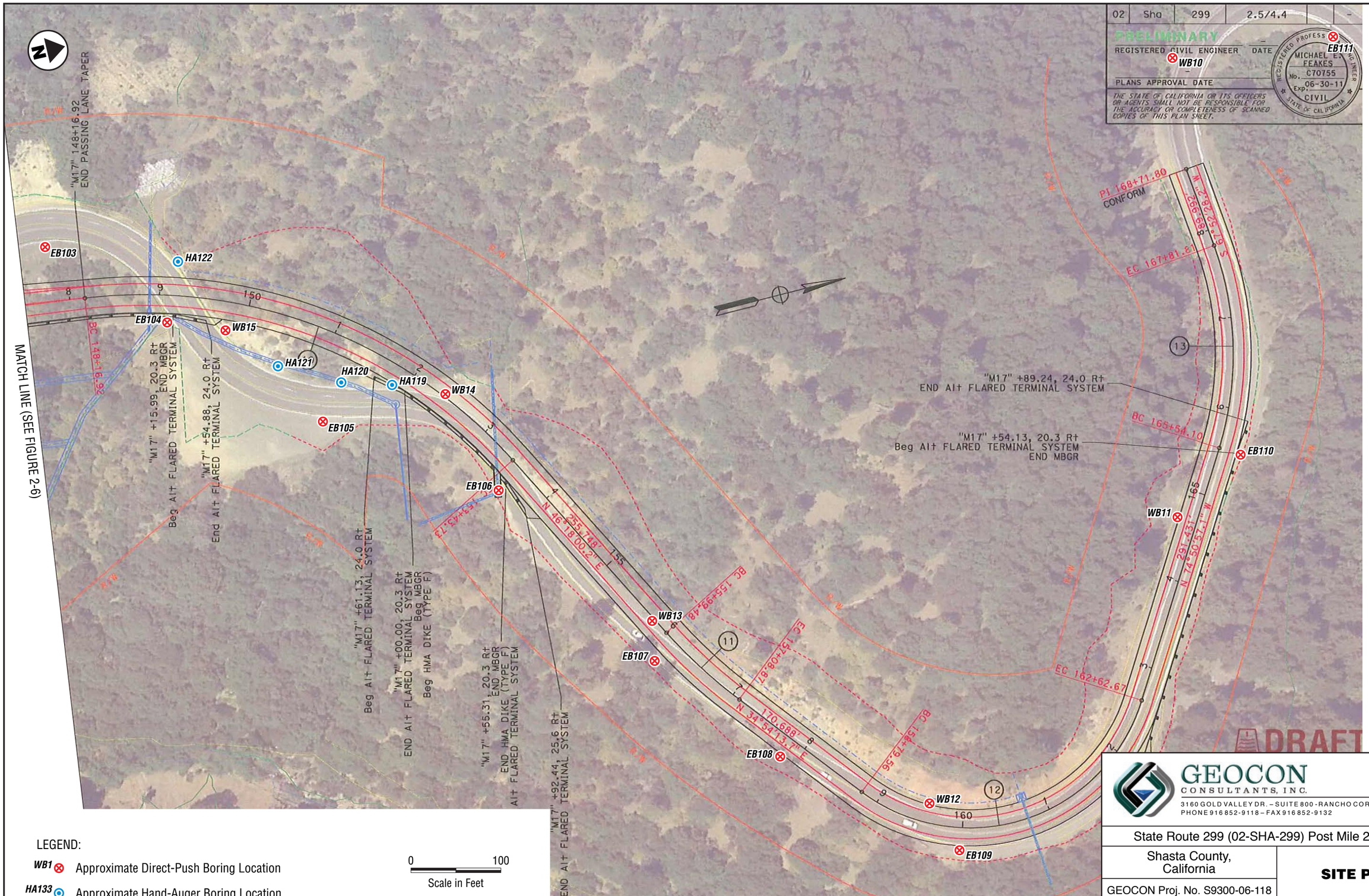
Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-6



LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

HA133 ⊙ Approximate Hand-Auger Boring Location

0 100
Scale in Feet

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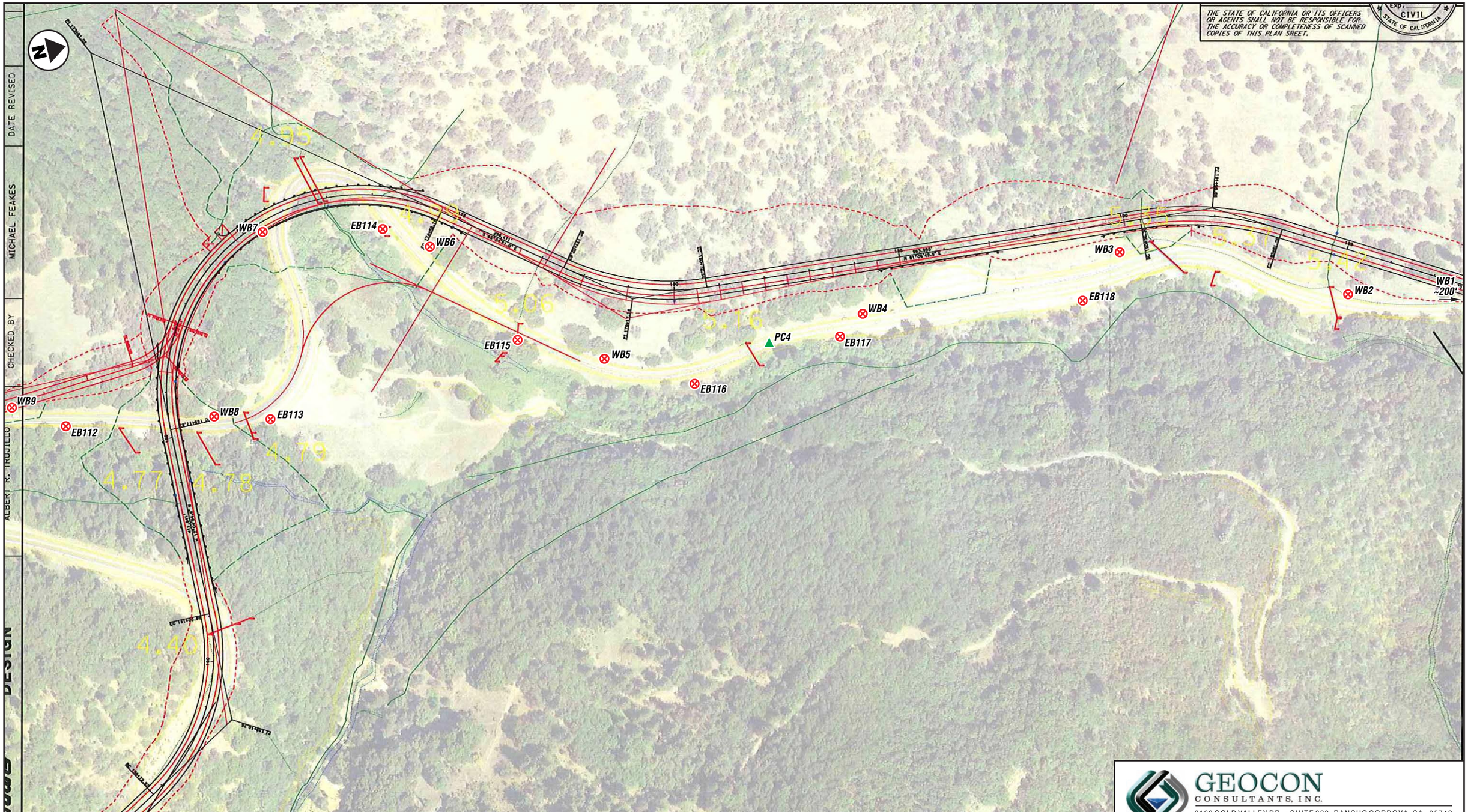
Shasta County, California

SITE PLAN

GEOCON Proj. No. S9300-06-118

Task Order No. 118 | May 2010 | Figure 2-7



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DESIGN | CHECKED BY | MICHAEL FEAKES | ALBERT R. TRUJILLO | DATE REVISED

LEGEND:

WB1 ⊗ Approximate Direct-Push Boring Location

PC1 ▲ Approximate Paint Chip Sample Location

0 200
Scale in Feet

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State Route 299 (02-SHA-299) Post Mile 2.5 to 4.4

Shasta County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-118		
Task Order No. 118	May 2010	Figure 2-8

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
WB1-0	1/27/2010	40.669084702	-122.687409044	7.7
WB1-1	1/27/2010			<5.0
WB1-2	1/27/2010			<5.0
WB2-0	1/27/2010	40.669169164	-122.689222528	15
WB2-1	1/27/2010			26
WB2-2	1/27/2010			20
WB3-0	1/27/2010	40.669435600	-122.690950526	5.0
WB3-1	1/27/2010			8.1
WB4-0	1/27/2010	40.669042887	-122.693046900	72
WB4-1	1/27/2010			8.8
WB4-2	1/27/2010			8.2
WB5-0	1/27/2010	40.668619506	-122.695153974	17
WB5-1	1/27/2010			<5.0
WB5-2	1/27/2010			<5.0
WB6-0	1/27/2010	40.669393780	-122.696484548	25
WB6-1	1/27/2010			21
WB6-2	1/27/2010			8.5
WB7-0	1/27/2010	40.669504761	-122.697651587	48
WB7-1	1/27/2010			14
WB7-2	1/27/2010			10
WB8-0	1/27/2010	40.668360969	-122.698142798	71
WB8-1	1/27/2010			9.9
WB8-2	1/27/2010			<5.0
WB9-0	1/27/2010	40.668357872	-122.700006997	47
WB9-1	1/27/2010			<5.0
WB9-2	1/27/2010			<5.0
WB10-0	1/27/2010	40.667396017	-122.701126619	27
WB10-1	1/27/2010			<5.0
WB10-2	1/27/2010			<5.0
WB11-0	1/27/2010	40.667601559	-122.699351328	13
WB11-1	1/27/2010			13
WB11-2	1/27/2010			11
WB12-0	1/27/2010	40.666853865	-122.698037273	<5.0
WB12-1	1/27/2010			<5.0
WB12-2	1/27/2010			<5.0
WB13-0	1/27/2010	40.665878040	-122.698816784	29
WB13-1	1/27/2010			5.0
WB13-2	1/27/2010			<5.0
WB14-0	1/27/2010	40.665293827	-122.699651368	56
WB14-1	1/27/2010			6.9
WB14-2	1/27/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
WB15-0	1/27/2010	40.664562574	-122.699831194	11
WB15-1	1/27/2010			14
WB16-0	1/27/2010	NA	NA	20
WB16-1	1/27/2010			<5.0
WB16-2	1/27/2010			16
WB17-0	1/27/2010	NA	NA	5.9
WB17-1	1/27/2010			<5.0
WB17-2	1/27/2010			<5.0
WB18-0	1/27/2010	40.662746693	-122.700220843	6.2
WB18-1	1/27/2010			<5.0
WB18-2	1/27/2010			<5.0
WB19-0	1/27/2010	40.662067597	-122.700746921	18
WB19-1	1/27/2010			<5.0
WB19-2	1/27/2010			<5.0
WB20-0	1/27/2010	40.661321572	-122.700446057	<5.0
WB20-1	1/27/2010			<5.0
WB21-0	1/27/2010	40.660514054	-122.700318774	25
WB21-1	1/27/2010			<5.0
WB21-2	1/27/2010			<5.0
WB22-0	1/27/2010	40.660027762	-122.699813948	<5.0
WB22-1	1/27/2010			<5.0
WB22-2	1/27/2010			<5.0
WB23-0	1/27/2010	40.659555227	-122.700224113	<5.0
WB23-1	1/27/2010			<5.0
WB23-2	1/27/2010			<5.0
WB24-0	1/27/2010	40.658641767	-122.700079231	<5.0
WB24-1	1/27/2010			<5.0
WB25-0	1/27/2010	40.658362259	-122.699139647	6.9
WB25-1	1/27/2010			<5.0
WB25-2	1/27/2010			<5.0
WB26-0	1/27/2010	40.657620276	-122.698949196	17
WB26-1	1/27/2010			<5.0
WB26-2	1/27/2010			<5.0
WB27-0	1/27/2010	40.656917600	-122.699611125	<5.0
WB27-1	1/27/2010			<5.0
WB27-2	1/27/2010			<5.0
WB28-0	1/27/2010	40.656900383	-122.700506010	16
WB28-1	1/27/2010			<5.0
WB28-2	1/27/2010			<5.0
WB29-0	1/27/2010	40.656667694	-122.701359358	19
WB29-1	1/27/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
WB29-2	1/27/2010			<5.0
WB30-0	1/27/2010	40.655965044	-122.701128869	<5.0
WB30-1	1/27/2010			<5.0
WB30-2	1/27/2010			<5.0
WB31-0	1/27/2010	40.655414358	-122.701700688	<5.0
WB31-1	1/27/2010			<5.0
WB31-2	1/27/2010			<5.0
WB32-0	1/27/2010	40.655582615	-122.702402699	<5.0
WB32-1	1/27/2010			<5.0
WB32-2	1/27/2010			<5.0
WB33-0	1/27/2010	40.655615706	-122.703340550	14
WB33-1	1/27/2010			7.6
WB33-2	1/27/2010			<5.0
WB34-0	1/27/2010	40.655050492	-122.704051352	12
WB34-1	1/27/2010			5.2
WB34-2	1/27/2010			<5.0
WB35-0	1/27/2010	40.654855991	-122.704771323	29
WB35-1	1/27/2010			5.0
WB35-2	1/27/2010			<5.0
WB36-0	1/27/2010	40.654366386	-122.705256068	18
WB36-1	1/27/2010			<5.0
WB36-2	1/27/2010			<5.0
WB37-0	1/27/2010	40.653890921	-122.705891402	11
WB37-1	1/27/2010			<5.0
WB37-2	1/27/2010			<5.0
WB38-0	1/27/2010	40.654130096	-122.706708640	35
WB38-1	1/27/2010			<5.0
WB38-2	1/27/2010			<5.0
WB39-0	1/27/2010	40.654560466	-122.707204856	14
WB39-1	1/27/2010			<5.0
WB39-2	1/27/2010			<5.0
WB40-0	1/27/2010	40.654369470	-122.708052111	19
WB40-1	1/27/2010			<5.0
WB40-2	1/27/2010			<5.0
WB41-0	1/27/2010	40.653802938	-122.708195363	7.3
WB41-1	1/27/2010			5.8
WB41-2	1/27/2010			<5.0
WB42-0	1/27/2010	40.653238606	-122.707844225	28
WB42-1	1/27/2010			9.2
WB42-2	1/27/2010			<5.0
WB43-0	1/27/2010	40.652805690	-122.707612481	16
WB43-1	1/27/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
WB43-2	1/27/2010			<5.0
WB44-0	1/27/2010	40.652394755	-122.707534484	<5.0
WB44-1	1/27/2010			<5.0
WB45-0	1/27/2010	40.651880653	-122.707664592	6.0
WB45-1	1/27/2010			<5.0
WB45-2	1/27/2010			<5.0
WB46-0	1/27/2010	40.651377361	-122.707878458	11
WB46-1	1/27/2010			<5.0
WB46-2	1/27/2010			<5.0
WB47-0	1/27/2010	40.650835146	-122.707544001	21
WB47-1	1/27/2010			<5.0
WB47-2	1/27/2010			<5.0
WB48-0	1/27/2010	40.650242800	-122.707130943	<5.0
WB48-1	1/27/2010			<5.0
WB48-2	1/27/2010			<5.0
WB49-0	1/27/2010	40.649836971	-122.706743678	8.9
WB49-1	1/27/2010			15
WB49-2	1/27/2010			<5.0
WB50-0	1/28/2010	40.649203451	-122.707502526	10
WB50-1	1/28/2010			<5.0
WB50-2	1/28/2010			<5.0
WB51-0	1/28/2010	40.649348886	-122.709143969	14
WB51-1	1/28/2010			<5.0
WB51-2	1/28/2010			<5.0
WB52-0	1/28/2010	40.649445317	-122.710835845	22
WB52-1	1/28/2010			16
WB52-2	1/28/2010			12
WB53-0	1/28/2010	40.650185014	-122.712225230	13
WB53-1	1/28/2010			<5.0
WB53-2	1/28/2010			<5.0
WB54-0	1/28/2010	40.649475324	-122.713409112	7.7
WB54-1	1/28/2010			<5.0
WB54-2	1/28/2010			<5.0
WB55-0	1/28/2010	40.649154305	-122.714971633	8.8
WB55-1	1/28/2010			<5.0
WB55-2	1/28/2010			<5.0
WB56-0	1/28/2010	40.648219522	-122.714574327	<5.0
WB56-1	1/28/2010			<5.0
WB56-2	1/28/2010			<5.0
WB57-0	1/28/2010	40.647199715	-122.714948316	24
WB57-1	1/28/2010			5.8
WB57-2	1/28/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
WB58-0	1/28/2010	40.646300239	-122.716564460	18
WB58-1	1/28/2010			<5.0
WB58-2	1/28/2010			<5.0
EB59-0	1/28/2010	40.645744207	-122.717066695	15
EB59-1	1/28/2010			<5.0
EB59-2	1/28/2010			<5.0
EB60-0	1/28/2010	40.646547103	-122.715626460	11
EB60-1	1/28/2010			<5.0
EB60-2	1/28/2010			<5.0
EB61-0	1/28/2010	40.647438088	-122.714372894	15
EB61-1	1/28/2010			<5.0
EB61-2	1/28/2010			<5.0
EB62-0	1/28/2010	40.649048749	-122.714959445	13
EB62-1	1/28/2010			<5.0
EB62-2	1/28/2010			<5.0
EB63-0	1/28/2010	40.649484435	-122.713893910	13
EB63-1	1/28/2010			<5.0
EB63-2	1/28/2010			<5.0
EB64-0	1/28/2010	40.649666368	-122.712558541	11
EB64-1	1/28/2010			<5.0
EB64-2	1/28/2010			<5.0
EB65-0	1/28/2010	40.649946878	-122.711737553	20
EB65-1	1/28/2010			<5.0
EB65-2	1/28/2010			<5.0
EB66-0	1/28/2010	40.649365115	-122.710174202	13
EB66-1	1/28/2010			<5.0
EB66-2	1/28/2010			<5.0
EB67-0	1/28/2010	40.648995467	-122.708482080	5.5
EB67-1	1/28/2010			<5.0
EB67-2	1/28/2010			<5.0
EB68-0	1/28/2010	40.649438654	-122.706624694	<5.0
EB68-1	1/28/2010			<5.0
EB68-2	1/28/2010			<5.0
EB69-0	1/28/2010	40.650071197	-122.706698512	<5.0
EB69-1	1/28/2010			<5.0
EB69-2	1/28/2010			<5.0
EB70-0	1/28/2010	40.650579774	-122.707274667	7.8
EB70-1	1/28/2010			22
EB70-2	1/28/2010			<5.0
EB71-0	1/28/2010	40.651131486	-122.707674861	67
EB71-1	1/28/2010			12
EB71-2	1/28/2010			15

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
EB72-0	1/28/2010	40.651610728	-122.707694788	84
EB72-1	1/28/2010			<5.0
EB72-2	1/28/2010			<5.0
EB73-0	1/28/2010	40.652255631	-122.707633933	53
EB73-1	1/28/2010			<5.0
EB73-2	1/28/2010			<5.0
EB74-0	1/28/2010	40.652824073	-122.707510953	12
EB74-1	1/28/2010			5.1
EB74-2	1/28/2010			<5.0
EB75-0	1/28/2010	40.653416662	-122.707842883	13
EB75-1	1/28/2010			<5.0
EB75-2	1/28/2010			<5.0
EB76-0	1/28/2010	40.654046637	-122.708048072	9.0
EB76-1	1/28/2010			<5.0
EB76-2	1/28/2010			<5.0
EB77-0	1/28/2010	40.654405577	-122.707456927	<5.0
EB77-1	1/28/2010			<5.0
EB77-2	1/28/2010			<5.0
EB78-0	1/28/2010	40.654162002	-122.706874454	10
EB78-1	1/28/2010			<5.0
EB78-2	1/28/2010			<5.0
EB79-0	1/28/2010	40.653767533	-122.706125038	9.7
EB79-1	1/28/2010			<5.0
EB79-2	1/28/2010			<5.0
EB80-0	1/28/2010	40.654063351	-122.705405452	18
EB80-1	1/28/2010			<5.0
EB80-2	1/28/2010			<5.0
EB81-0	1/28/2010	40.654607401	-122.704900475	21
EB81-1	1/28/2010			<5.0
EB81-2	1/28/2010			<5.0
EB82-0	1/28/2010	40.654937631	-122.704216995	15
EB82-1	1/28/2010			6.6
EB82-2	1/28/2010			<5.0
EB83-0	1/28/2010	40.655293898	-122.703456540	15
EB83-1	1/28/2010			<5.0
EB83-2	1/28/2010			<5.0
EB84-0	1/28/2010	40.655587692	-122.702901123	16
EB84-1	1/28/2010			<5.0
EB84-2	1/28/2010			<5.0
EB85-0	1/28/2010	40.655400116	-122.702204595	34
EB85-1	1/28/2010			16
EB85-2	1/28/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
EB86-0	1/28/2010	40.655394050	-122.701391773	26
EB86-1	1/28/2010			<5.0
EB86-2	1/28/2010			<5.0
EB87-0	1/28/2010	40.656006110	-122.701013181	27
EB87-1	1/28/2010			<5.0
EB87-2	1/28/2010			<5.0
EB88-0	1/28/2010	40.656581113	-122.701218026	6.8
EB88-1	1/28/2010			5.3
EB88-2	1/28/2010			<5.0
EB89-0	1/28/2010	40.656794319	-122.700609806	<5.0
EB89-1	1/28/2010			<5.0
EB89-2	1/28/2010			<5.0
EB90-0	1/28/2010	40.657417325	-122.698904218	19
EB90-1	1/28/2010			<5.0
EB90-2	1/28/2010			<5.0
EB91-0	1/28/2010	40.658032901	-122.698731734	<5.0
EB91-1	1/28/2010			<5.0
EB91-2	1/28/2010			<5.0
EB92-0	1/28/2010	40.658542194	-122.699167393	<5.0
EB92-1	1/28/2010			<5.0
EB92-2	1/28/2010			<5.0
EB93-0	1/28/2010	40.658779354	-122.699950896	<5.0
EB93-1	1/28/2010			6.6
EB93-2	1/28/2010			<5.0
EB94-0	1/28/2010	40.659204570	-122.700402547	<5.0
EB94-1	1/28/2010			<5.0
EB94-2	1/28/2010			<5.0
EB95-0	1/28/2010	40.659669463	-122.699775733	<5.0
EB95-1	1/28/2010			<5.0
EB95-2	1/28/2010			<5.0
EB96-0	1/28/2010	40.660329153	-122.699802688	13
EB96-1	1/28/2010			<5.0
EB96-2	1/28/2010			<5.0
EB97-0	1/28/2010	40.660776776	-122.700382555	<5.0
EB97-1	1/28/2010			<5.0
EB97-2	1/28/2010			5.4
EB98-0	1/28/2010	40.661397113	-122.700335399	10
EB98-1	1/28/2010			<5.0
EB98-2	1/28/2010			<5.0
EB99-0	1/28/2010	40.662021230	-122.700634630	<5.0
EB99-1	1/28/2010			<5.0
EB99-2	1/28/2010			<5.0

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
EB100-0	1/28/2010	40.662544773	-122.700496915	8.6
EB100-1	1/28/2010			<5.0
EB100-2	1/28/2010			<5.0
EB101-0	1/28/2010	40.662792790	-122.699694188	18
EB101-1	1/28/2010			<5.0
EB101-2	1/28/2010			<5.0
EB102-0	1/28/2010	40.663477199	-122.699579926	56
EB102-1	1/28/2010			8.1
EB102-2	1/28/2010			<5.0
EB103-0	1/28/2010	40.664043010	-122.700232004	21
EB103-1	1/28/2010			9.7
EB103-2	1/28/2010			<5.0
EB104-0	1/28/2010	40.664456573	-122.699879744	28
EB104-1	1/28/2010			<5.0
EB104-2	1/28/2010			<5.0
EB105-0	1/28/2010	40.664893887	-122.699557406	10
EB105-1	1/28/2010			<5.0
EB105-2	1/28/2010			<5.0
EB106-0	1/28/2010	40.665473745	-122.699288155	23
EB106-1	1/28/2010			<5.0
EB106-2	1/28/2010			<5.0
EB107-0	1/28/2010	40.665911175	-122.698711975	24
EB107-1	1/28/2010			28
EB107-2	1/28/2010			<5.0
EB108-0	1/28/2010	40.666310683	-122.698328997	44
EB108-1	1/28/2010			5.8
EB108-2	1/28/2010			5.8
EB109-0	1/28/2010	40.667029743	-122.697943874	22
EB109-1	1/28/2010			<5.0
EB109-2	1/28/2010			<5.0
EB110-0	1/28/2010	40.667717676	-122.699588735	31
EB110-1	1/28/2010			8.9
EB110-2	1/28/2010			8.4
EB111-0	1/28/2010	40.667997554	-122.701190049	6.7
EB111-1	1/28/2010			<5.0
EB111-2	1/28/2010			<5.0
EB112-0	1/28/2010	40.668352799	-122.699710811	47
EB112-1	1/28/2010			9.1
EB112-2	1/28/2010			9.7
EB113-0	1/28/2010	NA	NA	11
EB113-1	1/28/2010			24
EB113-2	1/28/2010			12

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
EB114-0	1/28/2010	40.669509022	-122.696726265	6.0
EB114-1	1/28/2010			9.5
EB114-2	1/28/2010			12
EB115-0	1/28/2010	40.668864528	-122.695657858	25
EB115-1	1/28/2010			7.9
EB115-2	1/28/2010			9.9
EB116-0	1/28/2010	40.668691022	-122.694257846	31
EB116-1	1/28/2010			12
EB116-2	1/28/2010			12
EB117-0	1/28/2010	40.668924068	-122.693195708	12
EB117-1	1/28/2010			7.6
EB117-2	1/28/2010			6.1
EB118-0	1/28/2010	40.669127257	-122.691283748	7.9
EB118-1	1/28/2010			8.4
HA119	1/29/10	40.665138240	-122.699717618	<5.0
HA120	1/29/10	40.664967505	-122.699728679	<5.0
HA121	1/29/10	40.664782898	-122.699757831	10
HA122	1/29/10	40.664459568	-122.700150175	<5.0
HA123	1/29/10	40.663599548	-122.699961266	<5.0
HA124	1/29/10	40.663402466	-122.699735409	<5.0
HA125	1/29/10	40.662979708	-122.699775668	<5.0
HA126	1/29/10	40.662754187	-122.700195951	9.5
HA127	1/29/10	40.661576377	-122.700533353	<5.0
HA128	1/29/10	40.661373286	-122.700476756	<5.0
HA129	1/29/10	40.661082800	-122.700499734	<5.0
HA130	1/29/10	40.660983261	-122.700535919	<5.0
HA131	1/29/10	40.654233763	-122.706684978	10
HA132	1/29/10	40.654226857	-122.706636893	13
HA133	1/29/10	NA	NA	22
HA134	1/29/10	40.654776786	-122.704878621	<5.0
HA135	1/29/10	40.655484284	-122.702050466	12
HA136	1/29/10	40.655460880	-122.702040244	<5.0
HA137	1/29/10	40.656392992	-122.701385599	10

TABLE 1
SUMMARY OF SOIL BORING COORDINATES AND LEAD ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)
HA138	1/29/10	40.656364613	-122.701383894	<5.0
HA139	1/29/10	40.659674115	-122.700001548	<5.0
HA140	1/29/10	40.659655537	-122.700020008	<5.0
HA141	1/29/10	40.660425702	-122.700200725	<5.0
HA142	1/29/10	40.660443387	-122.700241862	<5.0

Notes: WB1-0

Top of sample interval in feet below ground surface
Boring identification

mg/kg = Milligrams per kilogram
< = Less than the laboratory reporting limit
NA = GPS data not available

TABLE 2
SUMMARY OF TRAFFIC PAINT SAMPLE ANALYTICAL RESULTS
STATE ROUTE 299 (02-SHA-299) POST MILE 2.5 TO 4.4
SHASTA COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	PAINT COLOR	TOTAL LEAD (mg/kg)
PC1	1/28/2010	Yellow	440
PC2	1/28/2010	Yellow	920
PC3	1/28/2010	Yellow	79
PC4	1/28/2010	Yellow	4.7

Notes:
mg/kg = Milligrams per kilogram

APPENDIX A

February 08, 2010

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 109897

Rebecca Silva
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

RE: Highway 299 - Site Investigation, S9300-06-118

Attention: Rebecca Silva

Enclosed are the results for sample(s) received on February 01, 2010 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.

CLIENT: Geocon Consultants, Inc.
Project: Highway 299 - Site Investigation, S9300-06-118
Lab Order: 109897

CASE NARRATIVE

Analytical Comments for Method 6010

RPD for Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 109897-002ADUP, 109897-012ADUP, 109897-072ADUP, 109897-182ADUP, 109897-212ADUP, 109897-242ADUP, 109897-302ADUP, 109897-332ADUP, 109897-362ADUP and 109897-372AMSD; 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-001A	WB1-0	7.7	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-002A	WB1-1	ND	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-003A	WB1-2	ND	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-004A	WB2-0	15	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-005A	WB2-1	26	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-006A	WB2-2	20	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-007A	WB3-0	5.0	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-008A	WB3-1	8.1	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-009A	WB4-0	72	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-010A	WB4-1	8.8	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-011A	WB4-2	8.2	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-012A	WB5-0	17	mg/Kg	61519	5.0	1	1/27/2010	2/3/2010
109897-013A	WB5-1	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-014A	WB5-2	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-015A	WB6-0	25	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-016A	WB6-1	21	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-017A	WB6-2	8.5	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-018A	WB7-0	48	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-019A	WB7-1	14	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-020A	WB7-2	10	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-021A	WB8-0	71	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-022A	WB8-1	9.9	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-023A	WB8-2	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-024A	WB9-0	47	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-025A	WB9-1	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-026A	WB9-2	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-027A	WB10-0	27	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-028A	WB10-1	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-029A	WB10-2	ND	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-030A	WB11-0	13	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-031A	WB11-1	13	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-032A	WB11-2	11	mg/Kg	61520	5.0	1	1/27/2010	2/3/2010
109897-033A	WB12-0	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-034A	WB12-1	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-035A	WB12-2	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-036A	WB13-0	29	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-037A	WB13-1	5.0	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-038A	WB13-2	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-039A	WB14-0	56	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-040A	WB14-1	6.9	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-041A	WB14-2	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-042A	WB15-0	11	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-043A	WB15-1	14	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-044A	WB16-0	20	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-045A	WB16-1	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-046A	WB16-2	16	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-047A	WB17-0	5.9	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-048A	WB17-1	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-049A	WB17-2	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-050A	WB18-0	6.2	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-051A	WB18-1	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-052A	WB18-2	ND	mg/Kg	61521	5.0	1	1/27/2010	2/3/2010
109897-053A	WB19-0	18	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-054A	WB19-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-055A	WB19-2	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-056A	WB20-0	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-057A	WB20-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-058A	WB21-0	25	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-059A	WB21-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-060A	WB21-2	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-061A	WB22-0	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-062A	WB22-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/3/2010
109897-063A	WB22-2	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-064A	WB23-0	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-065A	WB23-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-066A	WB23-2	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-067A	WB24-0	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-068A	WB24-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-069A	WB25-0	6.9	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-070A	WB25-1	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-071A	WB25-2	ND	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010
109897-072A	WB26-0	17	mg/Kg	61533	5.0	1	1/27/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-073A	WB26-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-074A	WB26-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-075A	WB27-0	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-076A	WB27-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-077A	WB27-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-078A	WB28-0	16	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-079A	WB28-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-080A	WB28-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-081A	WB29-0	19	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-082A	WB29-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-083A	WB29-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-084A	WB30-0	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-085A	WB30-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-086A	WB30-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-087A	WB31-0	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-088A	WB31-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-089A	WB31-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-090A	WB32-0	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-091A	WB32-1	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-092A	WB32-2	ND	mg/Kg	61534	5.0	1	1/27/2010	2/4/2010
109897-093A	WB33-0	14	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-094A	WB33-1	7.6	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-095A	WB33-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-096A	WB34-0	12	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-097A	WB34-1	5.2	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-098A	WB34-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-099A	WB35-0	29	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-100A	WB35-1	5.0	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-101A	WB35-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-102A	WB36-0	18	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-103A	WB36-1	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-104A	WB36-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-105A	WB37-0	11	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-106A	WB37-1	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-107A	WB37-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-108A	WB38-0	35	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-109A	WB38-1	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-110A	WB38-2	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-111A	WB39-0	14	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-112A	WB39-1	ND	mg/Kg	61535	5.0	1	1/27/2010	2/4/2010
109897-113A	WB39-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-114A	WB40-0	19	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-115A	WB40-1	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-116A	WB40-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-117A	WB41-0	7.3	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-118A	WB41-1	5.8	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-119A	WB41-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-120A	WB42-0	28	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-121A	WB42-1	9.2	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-122A	WB42-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-123A	WB43-0	16	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-124A	WB43-1	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-125A	WB43-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-126A	WB44-0	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-127A	WB44-1	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-128A	WB45-0	6.0	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-129A	WB45-1	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-130A	WB45-2	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-131A	WB46-0	11	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-132A	WB46-1	ND	mg/Kg	61536	5.0	1	1/27/2010	2/4/2010
109897-133A	WB46-2	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-134A	WB47-0	21	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-135A	WB47-1	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-136A	WB47-2	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-137A	WB48-0	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-138A	WB48-1	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-139A	WB48-2	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-140A	WB49-0	8.9	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-141A	WB49-1	15	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-142A	WB49-2	ND	mg/Kg	61537	5.0	1	1/27/2010	2/4/2010
109897-143A	WB50-0	10	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-144A	WB50-1	ND	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-145A	WB50-2	ND	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-146A	WB51-0	14	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-147A	WB51-1	ND	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-148A	WB51-2	ND	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-149A	WB52-0	22	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-150A	WB52-1	16	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-151A	WB52-2	12	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-152A	WB53-0	13	mg/Kg	61628	5.0	1	1/28/2010	2/5/2010
109897-153A	WB53-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-154A	WB53-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-155A	WB54-0	7.7	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-156A	WB54-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-157A	WB54-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-158A	WB55-0	8.8	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-159A	WB55-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-160A	WB55-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-161A	WB56-0	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-162A	WB56-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-163A	WB56-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-164A	WB57-0	24	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-165A	WB57-1	5.8	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-166A	WB57-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-167A	WB58-0	18	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-168A	WB58-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-169A	WB58-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-170A	EB59-0	15	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-171A	EB59-1	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-172A	EB59-2	ND	mg/Kg	61538	5.0	1	1/28/2010	2/4/2010
109897-173A	EB60-0	11	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-174A	EB60-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-175A	EB60-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-176A	EB61-0	15	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-177A	EB61-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-178A	EB61-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-179A	EB62-0	13	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-180A	EB62-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-181A	EB62-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-182A	EB63-0	13	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-183A	EB63-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-184A	EB63-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-185A	EB64-0	11	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-186A	EB64-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-187A	EB64-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-188A	EB65-0	20	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-189A	EB65-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-190A	EB65-2	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-191A	EB66-0	13	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-192A	EB66-1	ND	mg/Kg	61540	5.0	1	1/28/2010	2/4/2010
109897-193A	EB66-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-194A	EB67-0	5.5	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-195A	EB67-1	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-196A	EB67-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-197A	EB68-0	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-198A	EB68-1	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-199A	EB68-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-200A	EB69-0	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-201A	EB69-1	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-202A	EB69-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-203A	EB70-0	7.8	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-204A	EB70-1	22	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-205A	EB70-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-206A	EB71-0	67	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-207A	EB71-1	12	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-208A	EB71-2	15	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-209A	EB72-0	84	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-210A	EB72-1	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-211A	EB72-2	ND	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-212A	EB73-0	53	mg/Kg	61541	5.0	1	1/28/2010	2/4/2010
109897-213A	EB73-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-214A	EB73-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-215A	EB74-0	12	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-216A	EB74-1	5.1	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
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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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-217A	EB74-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-218A	EB75-0	13	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-219A	EB75-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-220A	EB75-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-221A	EB76-0	9.0	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-222A	EB76-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-223A	EB76-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-224A	EB77-0	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-225A	EB77-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-226A	EB77-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-227A	EB78-0	10	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-228A	EB78-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-229A	EB78-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-230A	EB79-0	9.7	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-231A	EB79-1	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-232A	EB79-2	ND	mg/Kg	61569	5.0	1	1/28/2010	2/4/2010
109897-233A	EB80-0	18	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-234A	EB80-1	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-235A	EB80-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-236A	EB81-0	21	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-237A	EB81-1	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-238A	EB81-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-239A	EB82-0	15	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-240A	EB82-1	6.6	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-241A	EB82-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-242A	EB83-0	15	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-243A	EB83-1	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-244A	EB83-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-245A	EB84-0	16	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-246A	EB84-1	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-247A	EB84-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-248A	EB85-0	34	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-249A	EB85-1	16	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-250A	EB85-2	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-251A	EB86-0	26	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010
109897-252A	EB86-1	ND	mg/Kg	61570	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-253A	EB86-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-254A	EB87-0	27	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-255A	EB87-1	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-256A	EB87-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-257A	EB88-0	6.8	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-258A	EB88-1	5.3	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-259A	EB88-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-260A	EB89-0	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-261A	EB89-1	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-262A	EB89-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-263A	EB90-0	19	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-264A	EB90-1	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-265A	EB90-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-266A	EB91-0	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-267A	EB91-1	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-268A	EB91-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-269A	EB92-0	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-270A	EB92-1	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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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Date: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-271A	EB92-2	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-272A	EB93-0	ND	mg/Kg	61571	5.0	1	1/28/2010	2/5/2010
109897-273A	EB93-1	6.6	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-274A	EB93-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-275A	EB94-0	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-276A	EB94-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-277A	EB94-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-278A	EB95-0	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-279A	EB95-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-280A	EB95-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-281A	EB96-0	13	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-282A	EB96-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-283A	EB96-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-284A	EB97-0	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-285A	EB97-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-286A	EB97-2	5.4	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-287A	EB98-0	10	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-288A	EB98-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-289A	EB98-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-290A	EB99-0	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-291A	EB99-1	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-292A	EB99-2	ND	mg/Kg	61572	5.0	1	1/28/2010	2/5/2010
109897-293A	EB100-0	8.6	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-294A	EB100-1	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-295A	EB100-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-296A	EB101-0	18	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-297A	EB101-1	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-298A	EB101-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-299A	EB102-0	56	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-300A	EB102-1	8.1	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-301A	EB102-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-302A	EB103-0	21	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-303A	EB103-1	9.7	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-304A	EB103-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-305A	EB104-0	28	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-306A	EB104-1	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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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Date: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-307A	EB104-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-308A	EB105-0	10	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-309A	EB105-1	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-310A	EB105-2	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-311A	EB106-0	23	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-312A	EB106-1	ND	mg/Kg	61573	5.0	1	1/28/2010	2/5/2010
109897-313A	EB106-2	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-314A	EB107-0	24	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-315A	EB107-1	28	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-316A	EB107-2	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-317A	EB108-0	44	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-318A	EB108-1	5.8	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-319A	EB108-2	5.8	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-320A	EB109-0	22	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-321A	EB109-1	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-322A	EB109-2	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-323A	EB110-0	31	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-324A	EB110-1	8.9	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-325A	EB110-2	8.4	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-326A	EB111-0	6.7	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-327A	EB111-1	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-328A	EB111-2	ND	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-329A	EB112-0	47	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-330A	EB112-1	9.1	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-331A	EB112-2	9.7	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-332A	EB113-0	11	mg/Kg	61574	5.0	1	1/28/2010	2/5/2010
109897-333A	EB113-1	24	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-334A	EB113-2	12	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-335A	EB114-0	6.0	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-336A	EB114-1	9.5	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-337A	EB114-2	12	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-338A	EB115-0	25	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-339A	EB115-1	7.9	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-340A	EB115-2	9.9	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-341A	EB116-0	31	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-342A	EB116-1	12	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-343A	EB116-2	12	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-344A	EB117-0	12	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-345A	EB117-1	7.6	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-346A	EB117-2	6.1	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-347A	EB118-0	7.9	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-348A	EB118-1	8.4	mg/Kg	61575	5.0	1	1/28/2010	2/5/2010
109897-349A	HA119	ND	mg/Kg	61575	5.0	1	1/29/2010	2/5/2010
109897-350A	HA120	ND	mg/Kg	61575	5.0	1	1/29/2010	2/5/2010
109897-351A	HA121	10	mg/Kg	61575	5.0	1	1/29/2010	2/5/2010
109897-352A	HA122	ND	mg/Kg	61575	5.0	1	1/29/2010	2/5/2010
109897-353A	HA123	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-354A	HA124	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-355A	HA125	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-356A	HA126	9.5	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-357A	HA127	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-358A	HA128	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-359A	HA129	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-360A	HA130	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010

Qualifiers:

B	Analyte detected in 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: 2/8/2010

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	109897
Project:	Highway 299 - Site Investigation, S9300-06-118	**Date Received**	2/1/2010 9:25:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	CL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
109897-361A	HA131	10	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-362A	HA132	13	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-363A	HA133	22	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-364A	HA134	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-365A	HA135	12	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-366A	HA136	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-367A	HA137	10	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-368A	HA138	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-369A	HA139	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-370A	HA140	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-371A	HA141	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010
109897-372A	HA142	ND	mg/Kg	61576	5.0	1	1/29/2010	2/5/2010

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
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S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

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CLIENT: Geocon Consultants, Inc. **Lab Order:** 109897
Project: Highway 299 - Site Investigation, S9300-06-118

Lab ID: 109897-373 **Collection Date:** 1/28/2010
Client Sample ID: PC1 **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_100205E	QC Batch: 61605			PrepDate:	2/5/2010	Analyst: **CL**
Lead	440	2.0		mg/Kg	1	2/5/2010 06:25 PM

Lab ID: 109897-374 **Collection Date:** 1/28/2010
Client Sample ID: PC2 **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_100205E	QC Batch: 61605			PrepDate:	2/5/2010	Analyst: **CL**
Lead	920	2.0		mg/Kg	1	2/5/2010 06:30 PM

Lab ID: 109897-375 **Collection Date:** 1/28/2010
Client Sample ID: PC3 **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_100205E	QC Batch: 61605			PrepDate:	2/5/2010	Analyst: **CL**
Lead	79	2.0		mg/Kg	1	2/5/2010 06:35 PM

Lab ID: 109897-376 **Collection Date:** 1/28/2010
Client Sample ID: PC4 **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_100205E	QC Batch: 61605			PrepDate:	2/5/2010	Analyst: **CL**
Lead	4.7	2.0		mg/Kg	1	2/5/2010 04:15 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		

CLIENT: Geocon Consultants, Inc.
Work Order: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-61605** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117709**
Client ID: **PBS** Batch ID: **61605** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **2/5/2010** SeqNo: **1870615**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.239	1.0									

Sample ID: **LCS-61605** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117709**
Client ID: **LCSS** Batch ID: **61605** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **2/5/2010** SeqNo: **1870616**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	47.337	1.0	50.00	0.2392	94.2	80	120				

Sample ID: **109753-001AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117709**
Client ID: **ZZZZZZ** Batch ID: **61605** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **2/5/2010** SeqNo: **1870623**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	129.652	1.0	125.0	21.82	86.3	34	126				

Sample ID: **109753-001AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117709**
Client ID: **ZZZZZZ** Batch ID: **61605** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **2/5/2010** SeqNo: **1870624**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	129.050	1.0	125.0	21.82	85.8	34	126	129.7	0.465	20	

Sample ID: **109897-376ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117709**
Client ID: **PC4** Batch ID: **61605** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **2/5/2010** SeqNo: **1870673**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.736	2.0						4.651	1.82	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61519A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **PBS** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868441**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.424	5.0									

Sample ID: **LCS-61519** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **LCSS** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868442**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	279.894	5.0	250.0	0.4240	112	80	120				

Sample ID: **109897-002ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **WB1-1** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.297	5.0						4.004	27.8	20	R

Sample ID: **109897-002AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **WB1-1** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868454**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	215.895	5.0	250.0	4.004	84.8	34	126				

Sample ID: **MB-61519B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **PBS** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868455**

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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-012ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **WB5-0** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868466**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	11.023	5.0						16.92	42.2	20	R

Sample ID: **109897-012AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **WB5-0** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868467**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	244.037	5.0	250.0	16.92	90.8	34	126				

Sample ID: **109897-012A** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117624**
Client ID: **WB5-0** Batch ID: **61519** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868468**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	243.691	5.0	250.0	16.92	90.7	34	126	244.0	0.142	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61520A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **PBS** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868504**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61520** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **LCSS** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868505**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	279.575	5.0	250.0	0	112	80	120				

Sample ID: **109897-022ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **WB8-1** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868516**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	10.930	5.0						9.855	10.3	20	

Sample ID: **109897-022AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **WB8-1** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868517**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	224.113	5.0	250.0	9.855	85.7	34	126				

Sample ID: **MB-61520B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **PBS** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868518**

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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-032ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **WB11-2** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868529**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	9.102	5.0						11.03	19.2	20	

Sample ID: **109897-032AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **WB11-2** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868530**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	228.408	5.0	250.0	11.03	86.9	34	126				

Sample ID: **109897-032AMSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117627**
Client ID: **WB11-2** Batch ID: **61520** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868531**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	223.908	5.0	250.0	11.03	85.1	34	126	228.4	1.99	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-61521A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **PBS** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868532**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61521** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **LCSS** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868533**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	280.650	5.0	250.0	0	112	80	120				

Sample ID: **109897-042ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **WB15-0** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868544**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	9.763	5.0						10.52	7.47	20	

Sample ID: **109897-042AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **WB15-0** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868545**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	144.606	5.0	250.0	10.52	53.6	34	126				

Sample ID: **MB-61521B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **PBS** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868546**

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: **109897-052ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **WB18-2** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868557**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.479	5.0						2.306	0	20	

Sample ID: **109897-052AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **WB18-2** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868558**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	208.567	5.0	250.0	2.306	82.5	34	126				

Sample ID: **109897-052AMSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117628**
Client ID: **WB18-2** Batch ID: **61521** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868559**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	215.522	5.0	250.0	2.306	85.3	34	126	208.6	3.28	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61533A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117629**
Client ID: **PBS** Batch ID: **61533** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868588**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61533** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117629**
Client ID: **LCSS** Batch ID: **61533** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868589**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	224.506	5.0	250.0	0	89.8	80	120				

Sample ID: **109897-062ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117629**
Client ID: **WB22-1** Batch ID: **61533** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868600**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.773	5.0						0.4011	0	20	

Sample ID: **109897-062AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117629**
Client ID: **WB22-1** Batch ID: **61533** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/3/2010** SeqNo: **1868601**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	199.912	5.0	250.0	0.4011	79.8	34	126				

Sample ID: **MB-61533B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117661**
Client ID: **PBS** Batch ID: **61533** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869499**

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: **109897-072A**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117661**
Client ID: **WB26-0**	Batch ID: **61533**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869510**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	28.464	5.0						16.74	51.9	20	R

Sample ID: **109897-072A**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117661**
Client ID: **WB26-0**	Batch ID: **61533**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869511**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	244.571	5.0	250.0	16.74	91.1	34	126				

Sample ID: **109897-072A**	SampType: **MSD**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117661**
Client ID: **WB26-0**	Batch ID: **61533**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869512**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	265.930	5.0	250.0	16.74	99.7	34	126	244.6	8.37	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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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61534A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **PBS** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869160**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61534** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **LCSS** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	281.645	5.0	250.0	0	113	80	120				

Sample ID: **109897-082A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/2/2010** RunNo: **117658**
Client ID: **WB29-1** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869172**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.984	5.0						1.139	0	20	

Sample ID: **109897-082A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/2/2010** RunNo: **117658**
Client ID: **WB29-1** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869173**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	228.602	5.0	250.0	1.139	91.0	34	126				

Sample ID: **MB-61534B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **PBS** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869174**

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: **109897-092A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **WB32-2** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869185**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.329	5.0						2.974	0	20	

Sample ID: **109897-092A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **WB32-2** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869186**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	236.063	5.0	250.0	2.974	93.2	34	126				

Sample ID: **109897-092A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117658**
Client ID: **WB32-2** Batch ID: **61534** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869187**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	228.460	5.0	250.0	2.974	90.2	34	126	236.1	3.27	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		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61535A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **PBS** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869188**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61535** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **LCSS** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869189**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	281.429	5.0	250.0	0	113	80	120				

Sample ID: **109897-102A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **WB36-0** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	15.679	5.0						17.59	11.5	20	

Sample ID: **109897-102A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **WB36-0** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869201**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	273.441	5.0	250.0	17.59	102	34	126				

Sample ID: **MB-61535B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **PBS** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869202**

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
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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-112A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **WB39-1** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869213**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.450	5.0						2.895	0	20	

Sample ID: **109897-112A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **WB39-1** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	226.123	5.0	250.0	2.895	89.3	34	126				

Sample ID: **109897-112A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117660**
Client ID: **WB39-1** Batch ID: **61535** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869215**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	193.407	5.0	250.0	2.895	76.2	34	126	226.1	15.6	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-61536A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **PBS** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869540**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61536** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **LCSS** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869541**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	289.420	5.0	250.0	0	116	80	120				

Sample ID: **109897-122A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **WB42-2** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869552**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.351	5.0						0.8719	0	20	

Sample ID: **109897-122A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **WB42-2** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869553**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	238.843	5.0	250.0	0.8719	95.2	34	126				

Sample ID: **MB-61536B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **PBS** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869554**

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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-132A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **WB46-1** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.432	5.0						4.950	0	20	

Sample ID: **109897-132A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **WB46-1** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	236.211	5.0	250.0	4.950	92.5	34	126				

Sample ID: **109897-132A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117663**
Client ID: **WB46-1** Batch ID: **61536** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	232.988	5.0	250.0	4.950	91.2	34	126	236.2	1.37	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-61537A**	SampType: **MBLK**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117664**
Client ID: **PBS**	Batch ID: **61537**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61537**	SampType: **LCS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/2/2010**	RunNo: **117664**
Client ID: **LCSS**	Batch ID: **61537**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	293.976	5.0	250.0	0	118	80	120				

Sample ID: **109897-142A-DUP**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117664**
Client ID: **WB49-2**	Batch ID: **61537**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869608**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.211	5.0						1.848	0	20	

Sample ID: **109897-142A-MS**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/3/2010**	RunNo: **117664**
Client ID: **WB49-2**	Batch ID: **61537**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	216.870	5.0	250.0	1.848	86.0	34	126				

Qualifiers:

B	Analyte detected in 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-61538A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117667**
Client ID: **PBS** Batch ID: **61538** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869649**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61538** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117667**
Client ID: **LCSS** Batch ID: **61538** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	288.602	5.0	250.0	0	115	80	120				

Sample ID: **109897-162A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117667**
Client ID: **WB56-1** Batch ID: **61538** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869661**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.906	5.0						1.573	0	20	

Sample ID: **109897-162A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117667**
Client ID: **WB56-1** Batch ID: **61538** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869662**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	234.467	5.0	250.0	1.573	93.2	34	126				

Sample ID: **MB-61538B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117667**
Client ID: **PBS** Batch ID: **61538** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869663**

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: **109897-172A-DUP**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/4/2010**	RunNo: **117667**
Client ID: **EB59-2**	Batch ID: **61538**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869674**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.740	5.0						0.6882	0	20	

Sample ID: **109897-172A-MS**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/4/2010**	RunNo: **117667**
Client ID: **EB59-2**	Batch ID: **61538**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869675**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	242.941	5.0	250.0	0.6882	96.9	34	126				

Sample ID: **109897-172A-MSD**	SampType: **MSD**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/4/2010**	RunNo: **117667**
Client ID: **EB59-2**	Batch ID: **61538**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/4/2010**	SeqNo: **1869676**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	240.469	5.0	250.0	0.6882	95.9	34	126	242.9	1.02	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-61540A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **PBS** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869513**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.607	5.0									

Sample ID: **LCS-61540** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **LCSS** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869514**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	288.276	5.0	250.0	0.6071	115	80	120				

Sample ID: **109897-182A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **EB63-0** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869525**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	17.199	5.0						12.79	29.4	20	R

Sample ID: **MB-61540B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **PBS** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869526**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.195	5.0									

Sample ID: **109897-192A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **EB66-1** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869537**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.221	5.0						1.040	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: 6010_SPB

Sample ID: **109897-192A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **EB66-1** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869538**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	232.734	5.0	250.0	1.040	92.7	34	126				

Sample ID: **109897-192A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **EB66-1** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869539**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	228.256	5.0	250.0	1.040	90.9	34	126	232.7	1.94	20	

Sample ID: **109897-182A** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117662**
Client ID: **EB63-0** Batch ID: **61540** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869945**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	237.119	5.0	250.0	12.79	89.7	34	126				

Qualifiers:

B	Analyte detected in 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-61541A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **PBS** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61541** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **LCSS** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869678**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	274.667	5.0	250.0	0	110	80	120				

Sample ID: **109897-202A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **EB69-2** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869689**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.009	5.0						2.283	0	20	

Sample ID: **109897-202A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **EB69-2** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869690**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	227.097	5.0	250.0	2.283	89.9	34	126				

Sample ID: **MB-61541B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **PBS** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869691**

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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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-212A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **EB73-0** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	29.249	5.0						52.75	57.3	20	R

Sample ID: **109897-212A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **EB73-0** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869703**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	273.259	5.0	250.0	52.75	88.2	34	126				

Sample ID: **109897-212A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117668**
Client ID: **EB73-0** Batch ID: **61541** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869704**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	267.100	5.0	250.0	52.75	85.7	34	126	273.3	2.28	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		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61569A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117673**
Client ID: **PBS** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869755**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.172	5.0									

Sample ID: **LCS-61569** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117673**
Client ID: **LCSS** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869756**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	284.655	5.0	250.0	0.1720	114	80	120				

Sample ID: **109897-222A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117673**
Client ID: **EB76-1** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869767**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.660	5.0						1.511	0	20	

Sample ID: **109897-222A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117673**
Client ID: **EB76-1** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869768**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	242.725	5.0	250.0	1.511	96.5	34	126				

Sample ID: **MB-61569B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/3/2010** RunNo: **117673**
Client ID: **PBS** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869769**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.162	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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Work Order: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-232A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117673**
Client ID: **EB79-2** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869780**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.204	5.0						4.305	0	20	

Sample ID: **109897-232A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117673**
Client ID: **EB79-2** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869781**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	212.363	5.0	250.0	4.305	83.2	34	126				

Sample ID: **109897-232A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/4/2010** RunNo: **117673**
Client ID: **EB79-2** Batch ID: **61569** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/4/2010** SeqNo: **1869782**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	207.453	5.0	250.0	4.305	81.3	34	126	212.4	2.34	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: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61570A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **PBS** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870471**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.167	5.0									

Sample ID: **LCS-61570** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **LCSS** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870472**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	279.738	5.0	250.0	0.1665	112	80	120				

Sample ID: **109897-242A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **EB83-0** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870483**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	29.960	5.0						14.73	68.1	20	R

Sample ID: **109897-242A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **EB83-0** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870484**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	184.443	5.0	250.0	14.73	67.9	34	126				

Sample ID: **MB-61570B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **PBS** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870485**

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: **109897-252A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **EB86-1** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870496**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.221	5.0						2.284	0	20	

Sample ID: **109897-252A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **EB86-1** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870497**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	231.440	5.0	250.0	2.284	91.7	34	126				

Sample ID: **109897-252A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117704**
Client ID: **EB86-1** Batch ID: **61570** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	215.524	5.0	250.0	2.284	85.3	34	126	231.4	7.12	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		

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61571A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117706**
Client ID: **PBS** Batch ID: **61571** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870507**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61571** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117706**
Client ID: **LCSS** Batch ID: **61571** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870508**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	285.521	5.0	250.0	0	114	80	120				

Sample ID: **109897-262ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117706**
Client ID: **EB89-2** Batch ID: **61571** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.394	5.0						0.5196	0	20	

Sample ID: **109897-262AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117706**
Client ID: **EB89-2** Batch ID: **61571** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	219.840	5.0	250.0	0.5196	87.7	34	126				

Sample ID: **MB-61571B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117706**
Client ID: **PBS** Batch ID: **61571** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870521**

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: **109897-272ADUP**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117706**
Client ID: **EB93-0**	Batch ID: **61571**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870532**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.892	5.0						2.492	0	20	

Sample ID: **109897-272AMS**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117706**
Client ID: **EB93-0**	Batch ID: **61571**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870533**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	235.932	5.0	250.0	2.492	93.4	34	126				

Sample ID: **109897-272AMSD**	SampType: **MSD**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117706**
Client ID: **EB93-0**	Batch ID: **61571**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870534**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	230.356	5.0	250.0	2.492	91.1	34	126	235.9	2.39	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-61572A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **PBS** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61572** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **LCSS** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870678**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	275.414	5.0	250.0	0	110	80	120				

Sample ID: **109897-282ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **EB96-1** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870689**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.814	5.0						1.859	0	20	

Sample ID: **109897-282AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **EB96-1** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870690**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	247.886	5.0	250.0	1.859	98.4	34	126				

Sample ID: **MB-61572B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **PBS** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870691**

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: **109897-292ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **EB99-2** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.002	5.0						1.260	0	20	

Sample ID: **109897-292AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **EB99-2** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870703**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	219.055	5.0	250.0	1.260	87.1	34	126				

Sample ID: **109897-292AMSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117711**
Client ID: **EB99-2** Batch ID: **61572** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870704**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	215.269	5.0	250.0	1.260	85.6	34	126	219.1	1.74	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: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61573A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **PBS** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870723**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61573** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **LCSS** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	279.116	5.0	250.0	0	112	80	120				

Sample ID: **109897-302ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **EB103-0** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870735**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	9.829	5.0						21.11	72.9	20	R

Sample ID: **109897-302AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **EB103-0** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870736**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	229.737	5.0	250.0	21.11	83.4	34	126				

Sample ID: **MB-61573B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **PBS** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870737**

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: **109897-312ADUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **EB106-1** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870748**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.746	5.0						1.410	0	20	

Sample ID: **109897-312AMS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **EB106-1** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870749**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	204.830	5.0	250.0	1.410	81.4	34	126				

Sample ID: **109897-312AMSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117714**
Client ID: **EB106-1** Batch ID: **61573** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870750**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	212.907	5.0	250.0	1.410	84.6	34	126	204.8	3.87	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61574A**	SampType: **MBLK**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117715**
Client ID: **PBS**	Batch ID: **61574**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870771**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61574**	SampType: **LCS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117715**
Client ID: **LCSS**	Batch ID: **61574**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870772**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	277.969	5.0	250.0	0	111	80	120				

Sample ID: **109897-322A-DUP**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117715**
Client ID: **EB109-2**	Batch ID: **61574**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870783**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.765	5.0						1.356	0	20	

Sample ID: **109897-322A-MS**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117715**
Client ID: **EB109-2**	Batch ID: **61574**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870784**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	219.909	5.0	250.0	1.356	87.4	34	126				

Sample ID: **MB-61574B**	SampType: **MBLK**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117715**
Client ID: **PBS**	Batch ID: **61574**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870785**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.117	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-332A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117715**
Client ID: **EB113-0** Batch ID: **61574** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870796**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	16.672	5.0						10.91	41.8	20	R

Sample ID: **109897-332A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117715**
Client ID: **EB113-0** Batch ID: **61574** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870797**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	232.207	5.0	250.0	10.91	88.5	34	126				

Sample ID: **109897-332A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117715**
Client ID: **EB113-0** Batch ID: **61574** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870798**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	216.899	5.0	250.0	10.91	82.4	34	126	232.2	6.82	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61575A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **PBS** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870820**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61575** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **LCSS** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870821**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	270.512	5.0	250.0	0	108	80	120				

Sample ID: **109897-342A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **EB116-1** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870832**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	12.297	5.0						11.82	3.98	20	

Sample ID: **109897-342A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **EB116-1** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870833**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	221.021	5.0	250.0	11.82	83.7	34	126				

Sample ID: **MB-61575B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **PBS** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870834**

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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-352A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **HA122** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870845**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.481	5.0						1.415	0	20	

Sample ID: **109897-352A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **HA122** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870846**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	212.321	5.0	250.0	1.415	84.4	34	126				

Sample ID: **109897-352A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117718**
Client ID: **HA122** Batch ID: **61575** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870847**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	213.592	5.0	250.0	1.415	84.9	34	126	212.3	0.597	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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61576A**	SampType: **MBLK**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117719**
Client ID: **PBS**	Batch ID: **61576**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.148	5.0									

Sample ID: **LCS-61576**	SampType: **LCS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117719**
Client ID: **LCSS**	Batch ID: **61576**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	260.148	5.0	250.0	0.1482	104	80	120				

Sample ID: **109897-362A-DUP**	SampType: **DUP**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117719**
Client ID: **HA132**	Batch ID: **61576**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870905**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	19.955	5.0						12.80	43.7	20	R

Sample ID: **109897-362A-MS**	SampType: **MS**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117719**
Client ID: **HA132**	Batch ID: **61576**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870906**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	197.347	5.0	250.0	12.80	73.8	34	126				

Sample ID: **MB-61576B**	SampType: **MBLK**	TestCode: **6010_SPB**	Units: **mg/Kg**	Prep Date: **2/5/2010**	RunNo: **117719**
Client ID: **PBS**	Batch ID: **61576**	TestNo: **EPA 6010B**	**EPA 3050M**	Analysis Date: **2/5/2010**	SeqNo: **1870907**

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: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **109897-372A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117719**
Client ID: **HA142** Batch ID: **61576** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.097	5.0						1.658	0	20	

Sample ID: **109897-372A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117719**
Client ID: **HA142** Batch ID: **61576** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	214.055	5.0	250.0	1.658	85.0	34	126				

Sample ID: **109897-372A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117719**
Client ID: **HA142** Batch ID: **61576** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	168.036	5.0	250.0	1.658	66.6	34	126	214.1	24.1	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		

Advanced Technology Laboratories
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CLIENT: Geocon Consultants, Inc.
Work Order: 109897
Project: Highway 299 - Site Investigation, S9300-06-118

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-61628A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117721**
Client ID: **PBS** Batch ID: **61628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870927**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID: **LCS-61628** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117721**
Client ID: **LCSS** Batch ID: **61628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870928**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	269.566	5.0	250.0	0	108	80	120				

Sample ID: **109897-152A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117721**
Client ID: **WB53-0** Batch ID: **61628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	11.413	5.0						12.68	10.5	20	

Sample ID: **109897-152A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117721**
Client ID: **WB53-0** Batch ID: **61628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870940**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	223.087	5.0	250.0	12.68	84.2	34	126				

Sample ID: **109897-152A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **2/5/2010** RunNo: **117721**
Client ID: **WB53-0** Batch ID: **61628** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **2/5/2010** SeqNo: **1870941**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	223.395	5.0	250.0	12.68	84.3	34	126	223.1	0.138	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

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: 2/1/10

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: GSO

Sample Condition Upon Receipt: 13.6, 14.6
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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Mary	2/1/10	9:25

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments:
CalTrans Contract 0341368
T0118
send report & EDF to cook@geocon.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), 6010B (Total Lead)

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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109897-001	WB1-0	1/27/10	948										X		X				Std	1	2.0	
	2	WB1-1		949																			
	3	WB1-2		950																			
	4	WB2-0		1000																			
	5	WB2-1		1001																			
	6	WB2-2		1002																			
	7	WB3-0		1005																			
	8	WB3-1		1006																			
	9	WB4-0		1015																			
	10	WB4-1		1016																			

■ 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Mary	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See page 1

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), 6010B (Total Lead)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

Q A / Q C: 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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109897-11	WB4-2	1/27/10	1017										X		X			Std	1	2.5p		
	12	WB5-0		1020																			
	13	WB5-1		1021																			
	14	WB5-2		1022																			
	15	WB6-0		1025																			
	16	WB6-1		1026																			
	17	WB6-2		1027																			
	18	WB7-0		1030																			
	19	WB7-1		1031																			
	20	WB7-2		1032																			

- 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
				2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

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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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109877-21	WB8-0	1/27/10	1040										X		X			Std	1	2.5		
	22	WB8-1		1041																			
	23	WB8-2		1042																			
	24	WB9-0		1050																			
	25	WB9-1		1051																			
	26	WB9-2		1052																			
	27	WB10-0		1055																			
	28	WB10-1		1056																			
	29	WB10-2		1057																			
	30	WB11-0		1115																			

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

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3275 Walnut Avenue
Signal Hill, CA 90755
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FOR LABORATORY USE ONLY

P.O. #: _____
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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Consultants, Inc.
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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:
	1/29/10	1630	650	1/29/10	1630
				2/1/10	925

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SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

Q A / Q C: 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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	159847-31	WB11-1	1/27/10	1116									X		X				Std	1	2ip		
	32	WB11-2	↓	1117									↓		↓				↓	↓	↓		
	33	WB12-0		1120																			
	34	WB12-1		1121																			
	35	WB12-2		1122																			
	36	WB13-0		1130																			
	37	WB13-1		1131																			
	38	WB13-2		1132																			
	39	WB14-0		1135																			
	40	WB14-1	↓	1136									↓		↓				↓	↓	↓		

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Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

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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 ☐ 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Marge	2/1/10	925

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Project Mgr /Submitter:
Print Name Date
Signature

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-41	WB14-2	1/27/10	1137									X		X				Std	1	2oz		
	42	WB15-0		1140																			
	43	WB15-1		1141																			
	44	WB15-D		1143																			
	45	WB16-1		1146																			
	46	WB16-2		1147																			
	47	WB17-0		1155																			
	48	WB17-1		1156																			
	49	WB17-2		1157																			
	50	WB18-0		1205																			

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Signal Hill, CA 90755
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FOR LABORATORY USE ONLY

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Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GTO	1/29/10	1630
			Marg	2/1/10	925

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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 (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109857-51	WB18-1	1/27/10	1206									X		X				Std	1	2.p		
	52	WB18-2		1207																			
	53	WB19-0		1215																			
	54	WB19-1		1216																			
	55	WB19-2		1217																			
	56	WB20-0		1220																			
	57	WB20-1		1221																			
		~~WB20-2~~		~~1222~~																			
	58	WB21-0	1/27/10	1225									X		X				Std	1	2.p		
	59	WB21-1		1226									X		X					1	2.p		

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	1/29/10	1630	650	1/29/10	1630
				2/1/10	925

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	1099897-60	WB21-2	1/27/10	1227									X		X				std	1	2 jar		
	61	WB22-0		1235																			
	62	WB22-1		1236																			
	63	WB22-2		1237																			
	64	WB23-0		1300																			
	65	WB23-1		1301																			
	66	WB23-2		1302																			
	67	WB24-0		1310																			
	68	WB24-1		1311																			
		~~WB24-2~~		1312																			

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	1/29/10	1630	650	1/29/10	1630
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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	8015B	8021	TITLE 22	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109897-69	WB25-0	1/27/10	1320									X		X				Std	1	2p		
	70	WB25-1		1321																			
	71	WB25-2		1322																			
	72	WB26-0		1325																			
	73	WB26-1		1326																			
	74	WB26-2		1327																			
	75	WB27-0		1335																			
	76	WB27-1		1336																			
	77	WB27-2		1337																			
	78	WB28-0		1340									X		X					X			

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3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Geocon Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Mary	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: see page 1

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), 6010B (Total Lead)

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	8082	8260B	8270C	6010B	8015B (GRO) / 8020	8015B (DRO)	8021	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-79	WB28-1	1/27/10	1341										X	Y				std	1	2oz		
	80	WB28-2		1342																			
	81	WB29-0		1350																			
	82	WB29-1		1351																			
	83	WB29-2		1352																			
	84	WB30-0		1355																			
	85	WB30-1		1356																			
	86	WB30-2		1357																			
	87	WB31-0		1400																			
	88	WB31-1		1401																			

- 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 ☐
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6. PRESERVED Y ☐ N ☐

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Project Name: Highway 299 – Site Investigation
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				2/1/10	925

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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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	169877-89	WB31-2	1/27/10	1402									X		X				Std	1	2.p		
	90	WB32-0		1410																			
	91	WB32-1		1411																			
	92	WB32-2		1412																			
	93	WB33-0		1415																			
	94	WB33-1		1416																			
	95	WB33-2		1417																			
	96	WB34-0		1430																			
	97	WB34-1		1431																			
	98	WB34-2		1432									X		X					X			

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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

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 ☐

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Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Mike	2/1/10	925

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Print Name Date
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Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See page 1

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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-99	WB35-0	1/27/10	1435									X		X				Std	1	2P		
	100	WB35-1		1436																			
	101	WB35-2		1437																			
	102	WB36-0		1440																			
	103	WB36-1		1441																			
	104	WB36-2		1442																			
	105	WB37-0		1445																			
	106	WB37-1		1446																			
	107	WB37-2		1447																			
	108	WB38-0		1450																			

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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

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 Consultants, Inc.
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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marc	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: see page 1

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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: 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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109987-109	WB38-1	1/27/10	1451									X		X				Std	1	2P		
	110	WB38-2		1452																			
	111	WB39-0		1500																			
	112	WB39-1		1501																			
	113	WB39-2		1502																			
	114	WB40-0		1505																			
	115	WB40-1		1506																			
	116	WB40-2		1507																			
	117	WB41-0		1510																			
	118	WB41-1		1511																			

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Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

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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 Consultants, Inc.
Attention: Rebecca Silva
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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
	1/29/10	1630	650	1/29/10	1630
			Mary	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
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Send Report To: Attn: Co: Addr: City: State: Zip:

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Special Instructions/Comments: See page 1

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109857-119	WB41-2	1/27/10	1512									X		X				std	1	2 p		
	120	WB42-0	↓	1515									↓		↓				↓	↓	↓		
	121	WB42-1		1516																			
	122	WB42-2		1517																			
	123	WB43-0		1525																			
	124	WB43-1		1526																			
	125	WB43-2		1527																			
	126	WB44-0		1530																			
	127	WB44-1	↓	1531									↓		↓				↓	↓	↓		
		~~WB44-2~~		~~1532~~																			

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CHAIN OF CUSTODY RECORD

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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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5. # OF SPLS MATCH COC Y ☐ N ☐
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	1/29/10	1630	650	1/29/10	1630
			Marg	2/1/10	925

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Print Name Date
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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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109577-128	WB45-0	1/27/10	1540										X		X			std	1	2.P		
	129	WB45-1		1541																			
	130	WB45-2		1542																			
	131	WB46-0		1550																			
	132	WB46-1		1551																			
	133	WB46-2		1552																			
	134	WB47-0		1600																			
	135	WB47-1		1601																			
	136	WB47-2		1602																			
	137	WB48-0		1605																			

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			Margo	2/1/10	925

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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	TITLE 22 / CAM 17	6010B			SOIL	WATER	GROUND WATER	WASTEWATER		TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109597-138	WB48-1	1/27/10	1606									X				X					std	1	2 P		
	139	WB48-2	↓	1607									↓				↓					↓	↓	↓		
	140	WB49-0		1610																						
	141	WB49-1		1611																						
	142	WB49-2	↓	1612																						
	143	WB50-0	1/28/10	855																						
	144	WB50-1	↓	856																						
	145	WB50-2		857																						
	146	WB51-0		900																						
	147	WB51-1	↓	901									↓				↓					↓	↓	↓		

- 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

Page 16/39 of

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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	050	1/29/10	1630
				2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

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), 6010B (Total Lead)

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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109897-148	WB51-2	1/28/10	902										X		X			STD	1	Zip		
	149	WB52-0		905																			
	150	WB52-1		906																			
	151	WB52-2		907																			
	152	WB53-0		910																			
	153	WB53-1		912																			
	154	WB53-2		913																			
	155	WB54-0		920																			
	156	WB54-1		921																			
	157	WB54-2		922																			

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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 ☐ 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 Consultants, Inc.
Attention: Rebecca Silva
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City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marge	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109897-158	WB55-D	1/28/10	930									X		X				Std	1	2P		
	159	WB55-1		931																			
	160	WB55-2		932																			
	161	WB56-0		935																			
	162	WB56-1		936																			
	163	WB56-2		937																			
	164	WB57-0		945																			
	165	WB57-1		946																			
	166	WB57-2		947																			
	167	WB58-0		955																			

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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 ☐
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 Consultants, Inc.
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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marco	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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Sample/Records - Archival & Disposal
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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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109357-165	WB58-1	1/28/10	956									X		X				Std	1	2 P		
	169	WB58-2		957																			
	170	EB59-0		1015																			
	171	EB59-1		1016																			
	172	EB59-2		1017																			
	173	EB60-0		1020																			
	174	EB60-1		1021																			
	175	EB60-2		1022																			
	176	EB61-0		1025																			
	177	EB61-1		1026																			

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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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
				2/1/10	725

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

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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: 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), 6010B (Total Lead)

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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	1098172-178	EB61-2	1/28/10	1027									X		X				std	1	2P		
	179	EB62-0		1035																			
	180	EB62-1		1036																			
	181	EB62-2		1037																			
	182	EB63-0		1040																			
	183	EB63-1		1041																			
	184	EB63-2		1042																			
	185	EB64-0		1055																			
	186	EB64-1		1056																			
	187	EB64-2		1057																			

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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 ☐

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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
				2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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	6010B (Total Lead)	SOIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-188	EB65-0	1/28/10	1100	X	X	std	1	2P		
	189	EB65-1		1101							
	190	EB65-2		1102							
	191	EB66-0		1110							
	192	EB66-1		1111							
	193	EB66-2		1112							
	194	EB67-0		1115							
	195	EB67-1		1116							
	196	EB67-2		1117							
	197	EB68-0		1120							

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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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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 ☐

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	1/29/10	1630	650	1/29/10	1630
			Marg	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

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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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109877-198	EB68-1	1/28/10	1121									X		X				std	1	2p		
	199	EB68-2		1122																			
	200	EB69-0		1135																			
	201	EB69-1		1136																			
	202	EB69-2		1137																			
	203	EB70-0		1140																			
	204	EB70-1		1141																			
	205	EB70-2		1142																			
	206	EB71-0		1150																			
	207	EB71-1		1151																			

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CHAIN OF CUSTODY RECORD

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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 ☐

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	1/29/10	1630	650	1/29/10	1630
			Mark	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To:
Attn:
Co:
Addr:
City: State: Zip:

Bill To:
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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	19857-208	EB71-2	1/28/10	1152									X		X				Std	1	2P		
	209	EB72-0		1155																			
	210	EB72-1		1156																			
	211	EB72-2		1157																			
	212	EB73-0		~~1110~~ 1205																			
	213	EB73-1		1206																			
	214	EB73-2		1207																			
	215	EB74-0		1215																			
	216	EB74-1		1216																			
	217	EB74-2		1217																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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marg	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

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), 6010B (Total Lead)

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	6010B (Total Lead)	SOIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	105857-218	EB75-0	1/28/10	1220	X	X	Std	1	2 P		
	219	EB75-1		1221							
	220	EB75-2		1222							
	221	EB76-0		1225							
	222	EB76-1		1226							
	223	EB76-2		1227							
	224	EB77-0		1230							
	225	EB77-1		1231							
	226	EB77-2		1232							
	227	EB78-0		1240							

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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 ☐
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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Margo	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See page 1

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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), 6010B (Total Lead)

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	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
1	197897-228	EB78-1	1/28/10	1241									X		X				Std	1	2 P		
	229	EB78-2		1242																			
	230	EB79-0		1245																			
	231	EB79-1		1246																			
	232	EB79-2		1247																			
	233	EB80-0		1250																			
	234	EB80-1		1251																			
	235	EB80-2		1252																			
	236	EB81-0		1255																			
	237	EB81-1		1256																			

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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 ☐
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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Mary	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

Sample/Records - Archival & Disposal
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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: 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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	199857-236	EB81-2	1/28/10	1257									X		X				std	1	2.p		
	237	EB82-0		1300																			
	240	EB82-1		1301																			
	241	EB82-2		1302																			
	242	EB83-0		1305																			
	243	EB83-1		1306																			
	244	EB83-2		1307																			
	245	EB84-0		1315																			
	246	EB84-1		1316																			
	247	EB84-2		1317																			

■ 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Mary	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: see page 1

Sample/Records - Archival & Disposal
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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: 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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	107897-248	EB85-0	1/28/10	1325									X		X				STD	1	2P		
	249	EB85-1		1326																			
	250	EB85-2		1327																			
	251	EB86-0		1330																			
	252	EB86-1		1331																			
	253	EB86-2		1332																			
	254	EB87-0		1335																			
	255	EB87-1		1336																			
	256	EB87-2		1337																			
	257	EB88-0		1340																			

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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 ☐ 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marge	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See page 1

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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), 6010B (Total Lead)

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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109817-258	EB88-1	1/28/10	1341									X			X			Std	1	ZP		
	259	EB88-2		1342																			
	260	EB89-0		1350																			
	261	EB89-1		1351																			
	262	EB89-2		1352																			
	263	EB90-0		1355																			
	264	EB90-1		1356																			
	265	EB90-2		1357																			
	266	EB91-0		1400																			
	267	EB91-1		1401																			

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CHAIN OF CUSTODY RECORD

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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 ☐ 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 ☐

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Project Name: Highway 299 – Site Investigation
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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:
	1/29/10	1630	650	1/29/10	1630
			Margi	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1994972-266	EB91-2	1/28/10	1402									X		X				STM	1	2.5		
	269	EB92-0		1405																			
	270	EB92-1		1406																			
	271	EB92-2		1407																			
	272	EB93-0		1410																			
	273	EB93-1		1411																			
	274	EB93-2		1412																			
	275	EB94-0		1415																			
	276	EB94-1		1416																			
	277	EB94-2		1417																			

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CHAIN OF CUSTODY RECORD

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Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Margo	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

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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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	1098877-278	EB95-0	1/28/10	1420									X		X				Std	1	2P		
	279	EB95-1		1421																			
	280	EB95-2		1422																			
	281	EB96-0		1440																			
	282	EB96-1		1441																			
	283	EB96-2		1442																			
	284	EB97-0		1445																			
	285	EB97-1		1446																			
	286	EB97-2		1447																			
	287	EB98-0		1450																			

- 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 Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
				2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: see page 1

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), 6010B (Total Lead)

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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109597-288	EB398-1	1/28/10	1451										X		X				std	1	2ip	
	289	EB398-2		1452																			
	290	EB99-0		1455																			
	291	EB99-1		1456																			
	292	EB99-2		1457																			
	293	EB100-0		1500																			
	294	EB100-1		1501																			
	295	EB100-2		1502																			
	296	EB101-0		1510																			
	297	EB101-1		1511																			

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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

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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:
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6. PRESERVED Y ☐ N ☐

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Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	G50	1/29/10	1630
			Marco	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments: See Page 1

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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), 6010B (Total Lead)

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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-298	EB101-2	1/29/10	1512									X		X				std	1	2.5		
	299	EB102-0		1515																			
	300	EB102-1		1516																			
	301	EB102-2		1517																			
	302	EB103-0		1525																			
	303	EB103-1		1526																			
	304	EB103-2		1527																			
	305	EB104-0		1530																			
	306	EB104-1		1531																			
	307	EB104-2		1532																			

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Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

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Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

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6. PRESERVED Y ☐ N ☐

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Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	GSO	1/29/10	1630
			Marge	2/1/10	925

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Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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Circle or Add Analysis(es) Requested; SPECIFY APPROPRIATE MATRIX

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)	6010B (Total Lead)			SOIL	WATER	GROUND WATER	WASTEWATER			TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	15887-308	EB105-0	1/28/10	1535									X				X						std	1	2.P		
	309	EB105-1		1536																							
	310	EB105-2		1537																							
	311	EB106-0		1540																							
	312	EB106-1		1541																							
	313	EB106-2		1542																							
	314	EB107-0		1545																							
	315	EB107-1		1546																							
	316	EB107-2		1547																							
	317	EB108-0		1555																							

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=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
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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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6. PRESERVED Y ☐ N ☐

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Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
[signature]	1/29/10	1630	650	1/29/10	1630
			Marge [signature]	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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 (Total Metal)	8015B (GRO) / 8020	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109572-318	EB108-1	1/28/10	1556									X		X				STD	1	2 jp		
	319	EB108-2	↓	1557									↓		↓				↓	↓			
	320	EB109-0		1600																			
	321	EB109-1		1601																			
	322	EB109-2		1602																			
	323	EB110-0		1610																			
	324	EB110-1		1611																			
	325	EB110-2		1612																			
	326	EB111-0		1620																			
	327	EB111-1	↓	1621									↓		↓				↓	↓			

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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:
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4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

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Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
	1/29/10	1630	650	1/29/10	1630
			Marge	2/1/10	915

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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	TITLE 22 / CAM 17	6010B	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	109857-328	EB111-2	1/28/10	1622									X		X				Std	1	2P		
	329	EB112-0		1625																			
	330	EB112-1		1626																			
	331	EB112-2		1627																			
	332	EB113-0		1630																			
	333	EB113-1		1631																			
	334	EB113-2		1632																			
	335	EB114-0		1635																			
	336	EB114-1		1636																			
	337	EB114-2		1637																			

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CHAIN OF CUSTODY RECORD

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Project #: S9300-06-118
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	1/29/10	1630	650	1/29/10	1630
			Margo	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To:
Attn:
Co:
Addr:
City: State: Zip:

Bill To:
Attn:
Co:
Addr:
City: State: Zip:

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SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

Q A / Q C: 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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	159897-338	EB115-0	1/28/10	1640									X		X				std	1	2		
	339	EB115-1		1641																			
	340	EB115-2		1642																			
	341	EB116-0		1645																			
	342	EB116-1		1646																			
	343	EB116-2		1647																			
	344	EB117-0		1655																			
	345	EB117-1		1656																			
	346	EB117-2		1657																			
	347	EB118-0		1700																			

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CHAIN OF CUSTODY RECORD

Page 36 of 39

Advanced Technology Laboratories

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Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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), 6010B (Total Lead)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE ☐ CT X; 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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109857-348	EB118-1	1/28/10	1701									X		X				std	1	2		
		~~EB118-2~~		~~1702~~																			
	349	HA119	1/29/10	837									X		X				std	1	2		
	350	HA120		840																			
	351	HA121		843																			
	352	HA122		846																			
	353	HA123		900																			
	354	HA124		903																			
	355	HA125		906																			
	356	HA126		909																			

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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

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3275 Walnut Avenue
Signal Hill, CA 90755
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Client: Geocon Consultants, Inc.
Attention: Rebecca Silva
Address: 3160 Gold Valley Drive, Suite 800
City: Rancho Cordova State: Ca Zip Code: 95742
Tel: (916) 852-9118
Fax: (916) 852-9132

Project Name: Highway 299 – Site Investigation
Project #: S9300-06-118
Sampler: Mike O'Brien (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
[signature]	1/29/10	1630	650	1/29/10	1630
			Marg [signature]	2/1/10	925

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
	1098772-357	HA127	1/29/10	925									X		X				std	1	2p	
	358	HA128		928																		
	359	HA129		931																		
	360	HA130		934																		
	361	HA131		952																		
	362	HA132		955																		
	363	HA133		958																		
	364	HA134		1001																		
	365	HA135		1009																		
	366	HA136		1012																		

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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=$Na_2S_2O_3$

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Signal Hill, CA 90755
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Sample Condition Upon Receipt:
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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 Consultants, Inc.
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			Marge	2/1/10	925

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Circle or Add Analysis(es) Requested

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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)	6010B (Total Lead)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	109897-367	HA137	1/29/10	1015									X		X				Std 2wk	1	2		
	368	HA138	↓	1018									↓		↓				↓	↓	↓		
	369	HA139		1023																			
	370	HA140		1030																			
	371	HA141		1034																			
	372	HA142	↓	1042									↓		↓				↓	↓	↓		

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3. CONTAINER INTACT Y ☐ N ☐
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			Mary [signature]	2/1/10	925

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	1097897-373	PC 1	1/28/10	1044									X						X	Std 2 wk	1	Zip		
	374	PC 2	↓	1159									X						↓	↓	↓	↓		
	375	PC 3	↓	1344									X						↓	↓	↓	↓		
	376	PC 4	↓	1651									X						↓	↓	↓	↓		

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Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

APPENDIX B

DESCRIPTION OF DATA SET

Project Name:	State Route 299 (02-SHA-299) Post Mile 2.5 to 4.4
Project No.:	S9300-06-118
Sample Interval:	0.0 to 1.0 ft

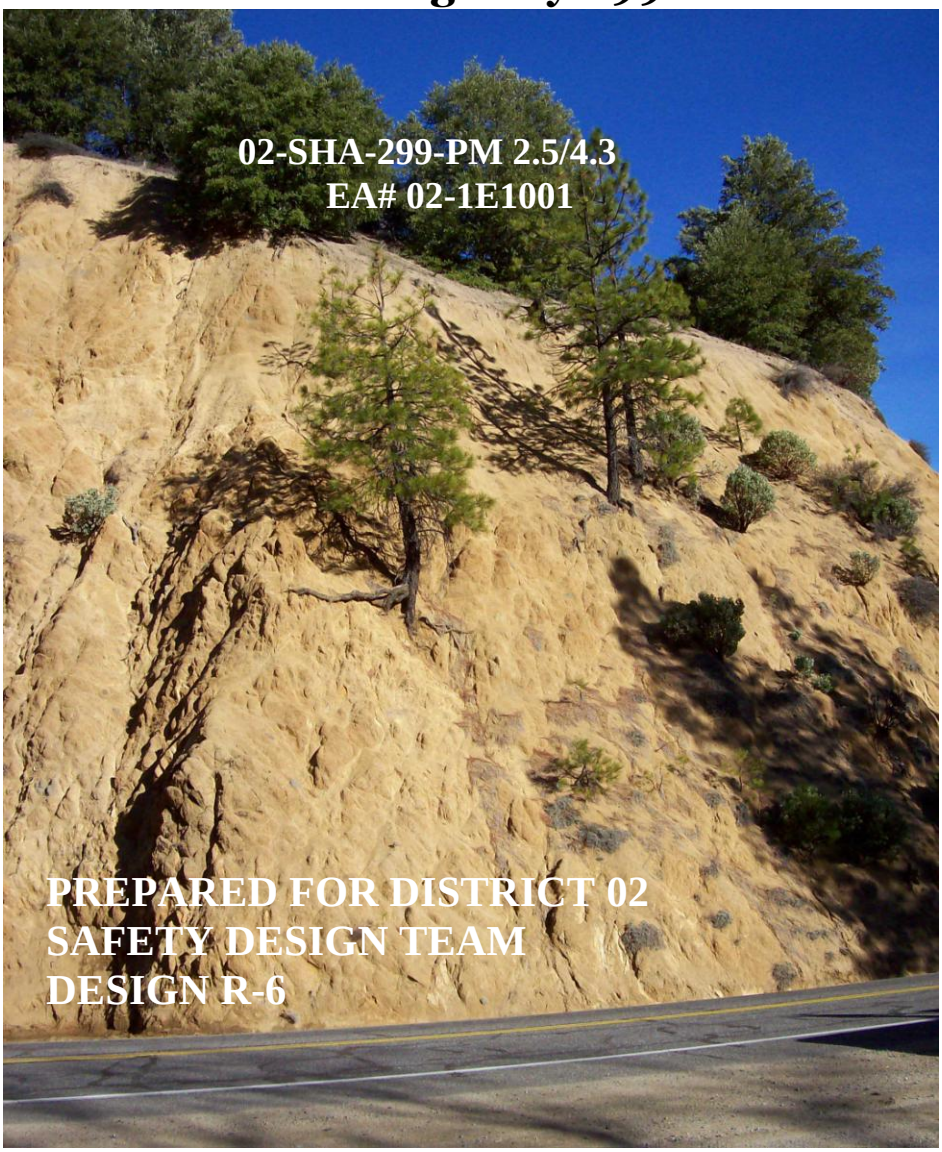
DATA SET STATISTICS

Number of Valid Samples	118
Number of Distinct Samples	50
Minimum	2.5
Maximum	84
Mean	17.27033898
Median	13
Standard Deviation	16.10186223
Variance	259.2699674
Coefficient of Variation	0.932341991
Skewness	1.936258415
Mean of log data	2.444363286
Standard Deviation of log data	0.952274266
90% Non-parametric UCLs	
Standard Bootstrap UCL	19.12622423
95% Non-parametric UCLs	
Standard Bootstrap UCL	19.74808652

GEOTECHNICAL DESIGN REPORT

Middle of Buckhorn Roadway Realignment Safety Project

State Highway 299



By:

J. Scott Lewis
Certified Engineering Geologist-2257
Registered Geophysicist-1032

DIVISION of ENGINEERING SERVICES-GEOTECHNICAL SERVICES
OFFICE of GEOTECHNICAL DESIGN-NORTH
January 20, 2011

State of California
Department of Transportation

Business, Transportation and Housing Agency

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Be energy efficient!

To: **MR. AL TRUJILLO**
District 2 Safety Team Senior Engineer

Attn: Mr. Mike Feakes
Transportation Engineer

Date: January 20, 2011

File: 02-SHA-299-PM 2.5/4.3
0200000088
EA 02-1E1001
Middle of Buckhorn Curve
Improvement Safety
Project

From: **DEPARTMENT OF TRANSPORTATION**
Division of Engineering Services
Geotechnical Services

Subject: Geotechnical Design Report for Middle of Buckhorn Curve Improvement Safety Project

Per your request, we are providing a Geotechnical Design Report for the Middle of Buckhorn Curve Improvement Safety Project on State Highway 299 from PM 2.5 to PM 4.3 in Shasta County, California. This report defines the geotechnical conditions as evaluated from field and laboratory test data and used in the development of the geotechnical design. It provides recommendations and specifications for project design and construction.

Specific geotechnical aspects of this project that are addressed in this report include cut slopes, fill embankments, zoning of fills, select material, a geogrid reinforced soil slope, and rockfall mitigation. This project involves no structures.

If you have any questions or comments, please call me at (530) 225-3516.

J. SCOTT LEWIS, P.G., C.E.G., R.G.P.
Associate Engineering Geologist
Office of Geotechnical Design - North

REGISTERED GEOLOGIST
JOHN SCOTT LEWIS
NO. 2257
EXP. 6/30/12
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

REGISTERED GEOPHYSICIST
J. S. LEWIS
No. 1032
Exp. 6/30/12
STATE OF CALIFORNIA

ec: Al Trujillo
Chris Harvey (Project Manager)
Douglas Brittsan
Roy Bibbens-OGDN File
Mark Willian (Geotech Corporate)
R.E. Pending File (Mike Feakes- Project Engineer)
District 2 O.E. (Bruce Lutz)

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1. Introduction

This Geotechnical Design Report is for the Middle of Buckhorn Curve Improvement Safety Project on State Highway 299 from PM 2.5 to PM 4.3 in Shasta County, California.

Specific geotechnical aspects of this project that are addressed in this report include cut slopes, fill embankments, zoning of fills, select material, a geogrid reinforced soil slope, and rockfall mitigation. This project involves no structures.

Plate 1 presents a vicinity map showing the location of the project. Plate 2 presents an aerial view of the project site with the general locations of cut slopes and fills.

2. Project Proposed Improvements and Existing Facilities

At the time of our investigation Highway 299 in the project area consisted of a 2-lane roadway with a few pullouts, little to no shoulders, and two short passing lanes. Existing cut slope ratios are predominantly at 0.75:1, with a few having been rounded by sloughing and erosion to flatter ratios of about 1:1 in their upper reaches after construction. Existing cut slopes have a maximum height of over 100 feet (ft). Most fill slopes stand at approximately 1.5:1 and have a maximum height of about 90 ft.

The proposed improvements generally utilize the route of the existing roadway location. Curves are smoothed by moving the proposed alignment atop large (up to 270 ft high) new fills and deeper into the existing cut slopes with cuts up to 130 ft high. These new fills and cuts are also used to create space for wider shoulders and a longer and straighter passing lane. The improved curve radii of the new alignment raises the design speed range from the present 15 to 25 miles per hour (mph) up to a 30 to 40 mph range for this nearly two-mile stretch of highway.

For the purpose of discussion the cuts proposed for this project have been numbered 1 thru 10 by increasing station. The approximate locations of these cuts are indicated by number on the aerial photo shown in Plate 2 and the topographic map shown in Plate 3. Though most of these cuts comprise distinct cuts on a single face with a beginning and end, several of these involve two separate faces that comprise a thru-cut or a portion of a thru cut, but they have been lumped together here for simplicity in discussion, as well as by the fact that they are basically in similar material. Cuts 1 through 4 are entirely in DG, cuts 7 through 10 are entirely in metasedimentary and metavolcanic rocks, cut 5 is located in the primary transition between the DG and metamorphic rocks, and cut 6, while primarily in metamorphic rocks, contains a few slivers of DG. All proposed cuts (except part of cut 5) have maximum slope ratios of 0.75:1. The northern end of cut 5 undergoes a transition from 0.75:1 to 1.5:1.

Proposed Cut 1 is primarily an expansion, modification, and widening of an existing thru-cut extending from about station 85+25 to about 90+50. The existing cuts here reach a maximum height of over 100 ft and have slope ratios ranging from about 1.1:1 (top of westbound slope) to 0.75:1. Proposed cut faces have a maximum height of about 80 ft.

Proposed Cut 2 is a thru-cut that departs completely from the existing alignment. It extends from about station 97+00 to 102+25 and has a maximum height of about 135 ft (westbound side) and 87 ft (eastbound side). A 20-foot wide bench is located on the westbound side of this thru-cut. The existing cut slope (to be abandoned) in this stretch has a maximum height of about 65 ft and a 0.75:1 slope ratio on most of its face.

Proposed Cut 3 is a westbound cut into an existing westbound cut slope from about station 104+00 to 106+10, which then quickly undergoes a transition to an eastbound cut into an existing eastbound cut slope from about station 106+10 to 107+05. Cut 3 primarily widens the roadway and has a maximum height of about 75 ft. The existing cuts here have a maximum height of about 80 ft. and have retained their original 0.75:1 cut slope ratio.

Proposed Cut 4 is a westbound cut into an existing westbound cut slope. It extends from about station 110+60 to 114+20 and has a maximum height of about 100 ft. The existing cut here has a maximum height of about 60 ft and has mostly retained its original 0.75:1 cut slope ratio.

Proposed Cut 5 is a westbound cut into an existing westbound cut slope that occurs in the primary transition between the DG down-station and the metamorphic rock up-station. The proposed cut extends from about station 118+10 to 126+50. It has a maximum height of about 120 ft with a mid-slope bench that traverses the entire cut slope (for dual ingress and egress by maintenance forces). The existing cut has a maximum height of about 90 ft. Although the majority of the existing cut has an approximate slope ratio of 0.75:1, parts of the slope vary in ratio between 0.5 and 1.5:1 (northern end of the slope) due primarily to the geologically mixed nature of this transition cut.

Proposed Cut 6 is a westbound cut into an existing westbound cut slope from about station 130+60 to 135+80. The proposed cut has a maximum height of about 115 ft. The existing cut slope stands well at 0.75:1 with a maximum height of about 60 ft.

Proposed Cut 7 is a westbound cut into an existing westbound cut-slope from about station 134+80 to 139+25. The proposed cut slope has a maximum height of about 80 ft. The existing cut slope stands at 0.75:1 with a maximum height of about 40 ft.

Proposed Cut 8 is a westbound cut into an existing westbound cut-slope from about station 142+60 to 146+30. The proposed cut slope has a maximum height of about 90 ft. The existing cut slope has a maximum height of about 60 ft. and a slope ratio that changes from 0.75:1 (down-station) to 1:1 (up-station).

Proposed Cut 9 is a westbound cut into an existing westbound cut-slope from about station 149+25 to 152+25. The proposed cut slope has a maximum height of about 110 ft. The existing cut slope stands mostly at 0.75:1, though some parts are as steep as 0.6:1 and others flatten to about 0.85:1. The existing cut has a maximum height of about 70 ft.

Proposed Cut 10 consists of a westbound cut into two existing, closely spaced, westbound cut-slopes from about station 152+80 to 161+75. These existing cuts stand at 0.75:1 at a maximum height of about 60 ft up to about station 160+50. Up-station, where the existing roadway turns

strongly left (to the west), the existing cut slope flattens to about 1:1 and stands at a maximum height of about 100 ft. The portion of the proposed cut (155+20 to 156+50) situated between the two existing cuts currently lies uncut at 2:1.

The 7 fills proposed for this project range in height from 110 ft to 270 ft. They have been numbered 1 thru 7 by increasing station. Their approximate locations are indicated by number on the aerial photo shown in Plate 2 and the topographic map shown in Plate 3. All proposed fills have slope ratios of 1.5:1. Fill 6 is designed as a geogrid reinforced soil slope (RSS) to be constructed with less-suitable material designated as select material C. All fills have an outer shell of select material (select material B) for protection against erosion, surficial sloughing, and shallow global instability.

In addition to these major fills, there are smaller fills throughout the project, generally horizontal in nature, that are planned to raise the present grade of the road (and/or the neighboring shoulders, catchments, and turnouts), or to facilitate the merging of a fill with a cut. These shall be armored by select material A where erosion protection is deemed necessary.

Select materials (A, B, and C) are obtained from specified locations within the material excavated in this project.

3. Pertinent Reports and Investigations

This report includes a review of Caltrans, state, federal, and private publications. A search on the Caltrans Bridge Inspection Records Information System (BIRIS) Site yielded no information considered pertinent to the project investigation or report. A search on the Caltrans Intranet Document Retrieval System (DRS) site yielded As-Builts and Plans that were reviewed for information pertinent to this report. Though several of the entries are located outside of the postmile limits of the present project, they are still considered to be of value due to their location in geologic material similar to that which is found within the present project limits. Each entry typically comprises several pieces.

Caltrans work and research done since the 1960's in an effort to improve the entire Buckhorn Grade was perused, yielding considerable information and data of value. This includes previous work done by Prysock (1968, 1979), Duffy (1990; 2010), SHN (2002), James (1990-1996), and Graves (2010), and a collection of unpublished files in the District 2 Materials Lab. Such work has generally fallen under the umbrella of similar names such as the Buckhorn Grade Realignment Project, the Buckhorn Grade Improvement Project (02-270310), and others.

Caltrans literature, tools, and websites reviewed and/or utilized pertaining to seismic issues include the *Caltrans Seismic Design Criteria website, Appendix B* (http://www.dot.ca.gov/hq/esc/techpubs/manual/othermanual/other-engin-manual/seismic-design-criteria/page/Appendixb.pdf), the USGS website showing the faults that are numbered in the database (http://earthquake.usgs.gov/regional/qfaults/ca/index.php), the *Caltrans Fault Database* (Merriam, 2009), and the internal Caltrans website for calculating acceleration response spectra (ARS) curves at http://10.160.173.178/shake2/shake_index2.php.

Geologic literature reviewed include the *Geologic Map of California, Redding Sheet* (Strand, 1962), the *Fault Activity Map of California and Adjacent Areas* (Jennings, 1994), *Geology of the French Gulch Quadrangle Shasta and Trinity Counties California* (Albers, 1964), *Geology of Northern California* (Bailey, 1966), *Tectonic Accretion of the Klamath Mountains* (Irwin, 1981), and the French Gulch Quadrangle, California, 15-Minute Series (Topographic) (United States Geologic Survey, 1944).

Soil information was obtained from the Natural Resources Conservation Service (NRCS) Web Soil Survey Website (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) and the Soil Survey of Shasta County Area, California (1974).

Geological and geotechnical engineering literature and reports directly pertinent to the project area reviewed include *Trinity River Diversion Features of the Central Valley Project: Technical Record of Design and Construction, vol. I & II* (USBR, 1965), *Decomposed Granite* (Wagner, 1991), *Decomposed Granite in California* (Wagner, 1992), *Decomposed Granite as an Embankment Fill Material: Physical and Mechanical Properties- A Review* (Yapa, Mitchell, and Sitar, 1992a), *An Investigation on the Use of Decomposed Granite as an Earthfill Material* (Yapa, Mitchell, and Sitar, 1992b), *Performance of Geosynthetically Reinforced Soil Slopes at Failure: A Centrifuge Study* (Zornberg, Sitar, and Mitchell, 1995a), and *Design of Geosynthetically Reinforced Embankments Using Decomposed Granite as Backfill Material* (Zornberg, Sitar, and Mitchell, 1995b).

4. Physical Setting

The physical setting of the project and the surrounding area was reviewed to provide information that might aid Design and Construction on climate, topography, drainage, and man-made and natural features. The project is located on the eastern side of Buckhorn Summit on State Highway 299 at an elevation ranging from about 1925 feet (ft) to 2500 ft above mean sea level.

The following is a discussion of the above review:

4.1. Climate

Climate information was obtained from the Western Regional Climate Data Center (http://www.wrcc.dri.edu/) weather station located at Whiskeytown Reservoir for the period of record from 1960 to 2009. The Whiskeytown Reservoir Station is located about 7 miles east of the project area at about 1295 feet above sea level, which is about 1000 feet lower than the average elevation of the project area. The average annual precipitation at the Whiskeytown Reservoir Weather Station is about 62 inches, with over 95% in the form of rain (as opposed to minor snow). The majority of this precipitation falls between October and March. The average annual maximum and minimum air temperatures at the Whiskeytown Reservoir Weather Station are 73.0 °F and 48.7 °F, respectively. The average monthly extremes are 36.1°F in January and 95.8°F in July.

4.2. Topography and Drainage

The present highway climbs gradually but steadily through the project from about 1925 ft above sea level at the project's eastern end to about 2556 ft at its western end. The roadway, which generally trends southwest-northeast and north-south within the project area, is notched into the slopes above and northwest of Willow Creek, with drainages between slopes being bridged by small to intermediate sized fills. Both above and below the road the slopes are consistently steep throughout the entire length of the project.

Throughout the project, surface water flows from north to south (where the highway runs generally east-west) or west to east (where the highway runs generally north-south), from the slopes above the road down to Willow Creek between 200 to 270 ft below the road. Drainages within the project limits are ephemeral, with surface flow occurring only during and shortly after storm events.

4.3. Man-made and Natural Features of Engineering and Construction Significance

Man-made features that may potentially have an impact on the project, or be impacted by the project, include drainage inlets and culverts, access to a BLM dirt road at about station 108+00, and overhead high-voltage transmission lines. The Clear Creek Water Diversion Tunnel, which carries water from Lewiston Lake to Whiskeytown Lake, passes beneath the project at considerable depth and should neither be impacted by, nor have an impact upon, the project.

Willow Creek runs parallel to sub-parallel with the present and proposed highway alignment just a few hundred feet downslope of the project area before flowing into Whiskeytown Lake, the centerpiece for the National Park Service's Whiskeytown National Recreation Area, a few miles to the east.

4.4. Regional Geology and Seismicity

The project lies within the Eastern Klamath Belt in the southeastern portion of the Klamath Mountains Geologic Province (Irwin, 1966). Within the project region the Eastern Klamath Belt is composed of the Ordovician (about 440 to 500 million years ago) Trinity Ultramafic Sheet beneath Devonian (about 345 to 400 million years ago) to Middle Jurassic (about 165 to 190 million years ago) metavolcanic, sedimentary and metasedimentary rocks, which collectively dip together to the east as a result of tectonic accretion (Irwin, 1981). The late Jurassic (about 135 million years ago) Shasta Bally Batholith, the largest granitic pluton (a large rising body of magma that cools and crystallizes below the surface) in the Eastern Klamath Belt, is found along the western edge of the eastern Klamath Belt in the project region. It is composed primarily of quartz diorite to granodiorite, with three facies- a coarse biotite facies, a fine biotite facies, and a biotite-hornblende facies. Structural and mineralogical evidence indicate that the pluton was forcibly intruded into the older metavolcanic, sedimentary, and metasedimentary rocks. The Devonian Copley Greenstone, which unconformably overlies the Trinity Ultramafic sheet, is composed of keratophyre, spilite, and meta-andesite with a few localized lenses of tuff and shale. The

Balaklala Rhyolite intertongues with, and unconformably overlies, the Copley Greenstone, and is composed of porphyritic and non-porphyritic quartz keratophyre with some minor tuff, tuffaceous shale, and breccia. The Balaklala is unconformably overlain by the Bragdon Formation, which is composed of conglomerate and sandstone interbedded with siltstone and shale, as well as subordinate tuff and mudstone. Some elongate portions of the Bragdon Formation parallel to, and in close proximity to, the northeastern edge of the Shasta Bally Batholith have been metamorphosed into phyllite, while other pieces of the Bragdon, together with some portions of the Copley and Balaklala Formations, have been metamorphosed into gneiss and amphibolite, all in response to the intrusion of the batholith.

Faults are present in the rocks north and east of the Shasta Bally batholith (Albers, 1964), an area that includes the project area. These consist of the irregular low-angle faults of the Spring Creek Thrust system and the high-angle normal faults, which includes the Hoadley fault that runs through the middle of the project (at about station 125+00 to 128+00). These faults are not considered active.

The nearest active faults are the Keswick Fault (east-northeast of the project area), the Battle Creek Fault (southeast of project area), and the Bartlett Springs Fault system (southwest of project area). The Keswick Fault, a fairly recent discovery (USBR, 2004), is located at depth on the subducting oceanic plate that dips into the earth beneath the project area and the area to the east of the project.

The project area is located in an area less seismically active than most other parts of California, though active faults to the west are capable of producing earthquakes with maximum moment magnitudes (MMax) up to 7.9.

4.5 Soil Survey Mapping

Two series of soils, as classified by the USDA Soil Conservation Service(SCS; Klaseen & Ellison, 1974), comprising three soil types are mapped in the Project area: (CbF) Chaix sandy loam with 50 to 70 percent slopes (2:1 to 1.43:1), (CaF3) Chaix coarse sandy loam with 50 to 70 percent slopes- severely eroded (2:1 to 1.43:1), and (NDG) Neuns very stony loam with 50 to 80 percent slopes (2:1 to 1.25:1).

4.6 Naturally Occurring Asbestos (NOA)

Geologic units mapped (Albers, 1964) in the project area are granodiorite, quartz diorite, metasedimentary rock, and metavolcanic rock, none of which are typically known to harbor naturally occurring asbestos (NOA) deposits. According to the map contained within the report referenced by the State of California Air Resources Board (California Dept of Conservation, 2000), the project site is not mapped as an area likely to contain NOA. No native serpentine exists within the project area. No non-native serpentine (dumped or imported as fill material) was observed at the site.

5. Exploration

5.1 Drilling and Sampling

Based on resource constraints the Project Development Team (PDT) made the decision to utilize only existing borings for this project. Integral to this decision was the assessment by the Office of Geotechnical Design North (OGDN) that this decision entailed a risk, albeit moderately low. Four borings were completed by SHN consultants (2002) within the project limits as part of the subsurface investigation for the broader Buckhorn Grade Improvement Project, a project that has been intermittently ongoing for several decades. Also included in this improvement project were four additional borings on the Buckhorn Grade (but outside of the project limits) in material similar to that within the Middle of Buckhorn Project. Earlier Caltrans work by Prysock (1968, 1979) involved drilling in material near the project boundaries that is similar to material within the project area. Several other investigators also drilled and sampled the Buckhorn Grade. Their work is discussed in later sections.

Soils were sampled during field surveys performed specifically for this project using a small shovel and pick ax, and evaluated with field methods.

5.2. Geologic Mapping

A portion of a geologic map produced by Albers (1974) that includes the project area and neighboring terrain is shown in Plate 4.

Analysis of aerial photos of the project area and nearby surroundings was performed prior to, during, and after field work.

Geologic reconnaissance was conducted along the road, and in select locations on slopes above and below the highway within the project area, as well as some geologically representative locations west and east of the project area. Reconnaissance was partially limited by the extensive brush that exists in some locations within the project area. Linear swaths of brush were cleared by Cal Fire for Caltrans where seismic refraction work was planned by OGDN. These swaths, which were about 4 ft wide and up to 300 ft in length, permitted additional surficial evaluation of the geology. Some information obtained from these efforts, together with information garnered through a literature search, was plotted on an aerial photograph taken from the Caltrans Digital Highway Inventory Photography Program (DHIPP) and presented on Plate 5.

5.3. Geophysical Studies

Fourteen seismic refraction lines were shot (lines 1 through 16, with line 13 merged with line 14 into one line (line 14) during office processing, and line 15 omitted in the field) in areas of potential slope cuts. The locations of these lines are shown on Plate 6. Travel-time curves, velocity models, and depth sections for these lines are shown in Appendix B.

6. Geotechnical Testing

No geotechnical testing was performed specifically for this report beyond visual hand sample identification, because sufficient laboratory testing had already been done by several previous investigators. Several samples collected previously as part of the larger Buckhorn Grade project had been analyzed for gradation, Atterberg Limits, corrosivity (resistance, pH, and chlorite/sulfate values), φ angle, and cohesion (C) by SHN (2002). Their test results are given in Appendix D. Additional sampling and lab testing done by Caltrans and other investigators in the past in the project area or nearby in similar material was available and utilized in the analyses and design presented in this report. These include gradation analyses, Atterberg limits determinations, corrosion tests (pH, resistivity), and shallow boring field notes culled from the archives of the District 2 Materials Lab, as well as work done by USBR (1960), Prysock (1968), Prysock (1979), Solbos (1990), Duffy (1992; 2010), and Yapa et al (1993).

The literature search provided information on the material properties of DG from the Buckhorn Grade area as well as other DG regions around the world.

7. Geotechnical Conditions

7.1 Site Geology

7.1.1 Lithology

The project is located in an area of metamorphic and granitic rocks. Granitics comprise roughly half of the project area, from the western end of the project (station 75+50) to about station 120+00. The metamorphic rocks are located in the northeastern half of the project from about station 120+00 to the project terminus at station 161+75 at about postmile 4.3. A transition area exists in the middle of the project between these two rock types where varying amounts, slivers, and chunks of metamorphic and granitic rocks are closely juxtaposed. The bulk of this transition zone is located approximately between station 120+00 and station 132+00.

Metamorphic Rocks

The metamorphic rocks consist of metavolcanic and metasedimentary gneiss, and metavolcanic schist. All the rocks are fairly siliceous. The metasedimentary gneiss was derived from the sandstone-shale interbeds of the Bragdon Formation. The metavolcanic gneiss was derived from the Balaklala rhyolite, and possibly a slight amount from the Copley Greenstone. Near the eastern end of the project the gneiss appears to grade into the more schistose, slightly less metamorphosed (into keratophyre) Balaklala Formation, which is primarily composed of metamorphosed rhyolite.

The metasedimentary and metavolcanic gneiss contains distinct relict bedding structures or compositional layering. The slightly metavolcanic Balaklala rhyolite possesses distinctive schistose foliation oriented roughly similarly to the relict bedding and compositional layering of the gneiss. Because the metavolcanic and metasedimentary rocks within the

project area are fairly similar in pertinent engineering properties (structural orientation and strength), these rocks will be referred to collectively in this report as metamorphics for ease of discussion. Although Albers (1964) shows (see Plate 4) these metamorphics as beginning at about station 112+00, field mapping by OGDN finds that these rocks actually begin at about station 120+00 and continue up-station beyond the eastern end of the project. Metamorphics are mixed with slivers of granitics near the contact between the Shasta Bally Batholith and the metamorphic rocks, from about station 120+00 to about 131+50.

Granitic Rocks (DG)

The granitic rocks consist primarily of biotite hornblende granodiorite, quartz diorite, and coarse biotite granodiorite, all part of the northeastern edge of the Shasta Bally Batholith. Albers (1964) map (Plate 4) shows an indefinite contact between the biotite hornblende granodiorite to the west and the coarse biotite granodiorite to the east, with the contact drawn at about station 85+00. Field observations of texture, grain size, corestones, and apparent mineralogy found that this contact appears to be broadly transitional and gradational.

The top 250 ft of the granitics that comprise the northern portion of the Shasta Bally Batholith along State Route 299 from the middle of this project west to about 4 miles west of Buckhorn Summit are in various stages of decomposition ranging from slightly weathered to residual soil. This rock, and similar variously decomposed granitic rock around the world, is collectively referred to in the literature and by most engineering geologists as decomposed granite. This descriptor will be similarly applied in this report, despite its conflict with the Caltrans' Logging Manual, to facilitate consistency with the numerous investigations reported in the literature on decomposed granite that will be drawn upon in this report. For the sake of ease of discussion, decomposed granite will be referred to as 'DG'. Descriptors are applied to the term 'DG' to further specify the degree of weathering and decomposition. These include slightly weathered, moderately weathered, intensely weathered, decomposed, and residual soil. DG weathering descriptions are based on field observations, using a rock hammer and hand lens, in conjunction with seismic refraction results.

DG material within the project area varies from moderately weathered DG to DG residual soil, with the possibility of some slightly weathered DG existing deep inside the bottom of a couple of proposed cuts (based on hints from the seismic refraction results). The bulk of the material to be excavated in the proposed DG cuts is considered to be moderately weathered DG with lesser varying quantities of intensely weathered and decomposed DG, and with residual DG soil typically above it. Corestones (spheroid-shaped cobbles and boulders within the DG matrix that are slightly to moderately weathered) are evident in a few cut slopes and will likely compose less than 1 % of the material proposed for excavation. Plate 7 shows photos of several different DG cuts, some with corestones.

7.1.2 Structure

Although there are some broad large scale structural features (flow banding) within the granitic Shasta Bally Batholith, these are not evident at the outcrop or cut slope scale and have no impact on the geological engineering properties of the material as it pertains to this project. Being an intrusive rock, there are also no foliation or bedding structures. Jointing has been almost totally obscured by weathering.

The batholith does display numerous aplite (quartz and alkali feldspar) dike structures, typically in clusters or swarms. These dikes are typically a few inches thick within the project area, though thicker ones greater than 2 feet wide can be found elsewhere in the batholith. Having been injected into cross joint structures within the batholiths, these dikes are at various orientations at high angle to the local surface of the batholith. Observations of these dikes in present cut slopes indicate that they generally do not pose stability issues for cut slopes, although that possibility cannot be wholly discounted for the proposed cuts. A swarm of these dikes can be seen in the photo in Plate 8, which was taken on the north side of cut 5 at about station 126+50 (postmile 3.65).

The large majority of the metamorphic rocks possess gneissic compositional layering, which is essentially relict bedding. These bedding structures or layering are significant from a geological engineering perspective, as they have a direct impact upon slope (cut or otherwise) stability. This layering generally dips about 45˚ at an azimuth between 45˚ and 60˚ east of north through most of the metamorphic rocks within the project area, from station 121+00 to about station 146+00. From about station 149+00 to about station 152+00 the layering dips about 60˚ at an azimuth of about 15˚ east of north. Spacing in this layering typically varies from about 1 inch to 12 inches, while a few areas are massive and non-layered. The vast majority of the layering is devoid of infilling. Layer surfaces are smooth to slightly rough with larger scale undulations varying from being negligible up to about ¼ inch from trough to crest over a distance of about 12 inches.

Further east to, and beyond, the end of the project, where the metamorphic rocks are composed of the mildly metamorphosed Balaklala Rhyolite foliation schistosity becomes the prominent structural controlling feature, as it also creates potential failure surfaces (like the compositional layering). Foliation dips between about 50˚ to 55˚ at an azimuth between about 15˚ and 20˚ east of north.

The Hoadley Fault, a normal fault that dips generally towards the northeast, runs through the middle of the project from the southeast to the northwest, crossing the project in the vicinity of about postmile 3.5 (station 125+00). The geomorphic expression of the fault can clearly be seen in various locations northeast and southeast of the project. A topographic low seen to the southeast (on opposite side of the Willow Creek drainage) from the roadway is such an example. The projection of the fault trace cuts through the project at about station 125+00 at the same location and orientation as a small block slide that occurred sometime after the roadway was constructed. It is uncertain if the fault is in the precise location as the slide slip plane, and thereby, at least partially culpable for the slide, or if the fault's very close proximity to the slide is coincidental. The existence of two

small DG outliers (see map on plate 5) juxtaposed to the east side of the projected slide plane in the vicinity of the roadway support the case for the fault's existence in this exact location and its being at least contributory to the slide. The Log of Test Boring (LOTB) from boring B02-6 by SHN (2002; Appendix C), which was drilled in the turnout of the present road at about postmile 3.53 (about station 125+00) shows DG over shale over DG over shale, a sequence repetition of rocks from opposite sides of the fault that corroborates the suggestion that the fault is here, or very close by.

7.1.3 Natural Slope Stability

Natural slopes within the project area are considered stable in their current morphology based on field observations.

Stable native slopes in the DG terrain presently found on the Buckhorn Grade vary in slope ratio from about 0.9:1 to nearly flat on the ridge crests. The bulk of the steeper portions of the native DG slopes within the project limits and right-of-way tends to cluster at about 1.25:1.

Slope stability in the vast majority of the metamorphic rocks in the project is structurally controlled or limited by the compositional layering. The slope stability of the metamorphic rocks (Balaklala Rhyolite) at the up-station end of the project is structurally controlled by the foliation schistosity. From a geological engineering or kinematic analysis perspective, however, these two controlling factors act quite similarly, due to their fairly similar orientations, making the lumping of these rocks into the metamorphic description umbrella justified for engineering purposes. As was explained previously in section 7.1.2 on geologic structure, the layering and foliation dip between about 45˚ to 60˚ at between about 10˚ and 50˚ east of north. Native slopes dipping within about 20˚ to 25˚of the same general azimuth as the layering or foliation are limited on their steepness by the dip of the local structure, and often weather to flatter slope ratios than the bedrock structure. The slope above the roadway between stations 132+00 and 134+00 is an example of this, as the azimuth of the slope dip is oriented at about 35˚ east of north, the azimuth of the geologic structure dip is also about 35˚ east of north, and the slope ratio is about 2:1 (27˚). In contrast, natural slopes that dip basically in the opposite direction (generally between about 195˚ and 230˚ east of north) are typically capable of stably supporting the steepest native slopes (a few are as steep as 1:1) in the project area.

Structural control combined with the presence of the Hoadley Fault is likely responsible for the landslide that occurred sometime after the existing roadway was completed in the vicinity of station 125+50 to 126+50. Strong physical evidence of this slide remains, including the remains of a portion of the toe, which now forms a pseudo-bench below the steep intact headwall of the slide. The close similarity in orientation and location between the slide slip plane and the projected slip plane(s) of the Hoadley Fault strongly suggest that the two are linked.

7.2 Soils

Field reconnaissance and field evaluation of soils in the project area, together with laboratory tests performed by previous investigators, produced soil descriptions based on engineering properties and strongly linked to the geological sources. This resulted in soil, bedrock, and boundary descriptions considerably different than those of the Soil Conservation Service (section 4.5), descriptions more applicable to this project. Soil boundaries follow the lithology boundaries (section 7.1.1) quite closely, with those soils weathered from DG being almost exclusively composed of silty sands (soil symbol SM), with some minor sandy silt (soil symbol ML) and even less prevalent clayey sand (soil symbol SC). These soils are generally well- to excessively-drained, non-plastic with no apparent shrink-swell potential, and low in corrosivity. The remainder of the project soils, which are found in the eastern half of the project area (roughly up-station of station 120+00), consist primarily of moderate to well-drained sandy silts (soil symbol ML) that are underlain by metasedimentary and metavolcanic rock. A relatively small portion of these soils are gravelly. Lesser amounts of sandy clay (soil symbol CL) and sandy clay with gravel (soil symbol CL) are also present. The bulk of these soils (the ML soils) have low plasticity (PI generally below 7), very low shrink-swell potential, and moderately low corrosivity.

7.3 Surface Water and Groundwater

No year-round streams are present within the project area. Over a dozen drainages run generally perpendicular to the length of the project and the roadway, some of which see ephemeral flows during storm events. The vast majority of the time, however, these drainages act as funneling pathways for groundwater to travel down to Willow Creek. Groundwater elevations vary widely throughout the project area and with the seasons. During the winter wet season surface water is groundwater is typically closer to the ground surface. Storm-fed groundwater likely travels through the residual DG soil throughout the project, both above and below the roadway. Some of this groundwater does intercept the DG cuts, increasing erosion. Similarly, storm-fed groundwater also travels through the metamorphic residual soils, but at slower rates. Surface water on the metamorphic residual soils, however, may, during significant storms, overcome the percolation capacity of these soils and create mild sheet flow conditions.

No problematic seeps were observed in areas proposed for cutting, which leads our Office to believe that groundwater is unlikely to create problems for the proposed cuts, either during construction or after. It is possible that the proposed cuts might seep should they intercept a significant groundwater flow path that is hidden at present. It is also possible that the groundwater table might be intercepted during the cutting process. This could create some short-term difficulties for construction, but would likely not create any long-term problems, since the groundwater table typically re-equilibrates to the new cut faces and ceases to seep within a few weeks or months after being revealed.

A few minor seeps were observed in areas where some of the fills are planned, all of them in the DG. These are shown on Plate 5 in blue.

7.4 Erosion

Metamorphic Rocks and Soils

Erosion in the metamorphic rocks is insignificant. Erosion in soils derived from metamorphic rocks can be moderately high when surfaces are left unprotected by vegetation, and even more especially when positioned in the paths of sheet flow or concentrated surface water. Present metamorphic residual soils within the project area appear to be sufficiently protected and unsusceptible to these situations.

DG and Residual DG Soils

DG soils are known to be considerably erosive (Keller, 1992). DG soils were found by Andre and Anderson (1961) to be the most erodible of eight different parent type materials tested at 168 different sites in California. DG rock (slightly weathered to intensely weathered DG) is also likely the most erodible of the most prevalent geologic parent materials in the state. Accelerated erosion is considered to be a given whenever DG soils are disturbed (Megahan, 1992).

Native DG slopes within the project area have developed a relatively thin veneer of topsoil in most locations that is generally protected by duff and established vegetation, making these slopes fairly immune to the significant erosion that can otherwise be caused by surface sheet flow of rainfall runoff and rainfall impact (splash erosion). This protection is not, however, generally sufficient to protect the native DG slopes from natural or man-made concentrated surface flow.

7.5 Project Site Seismicity

Based on Caltrans Seismic Design Criteria, Appendix B (2006) soil conditions within the project area are classified as soil profile types C and D. Calculations performed on the Caltrans ARS (Acceleration Response Spectra) online tool, using these soil profile types, yield a probabilistic PBA (peak bedrock acceleration) of 0.211 g and a probabilistic PGA (peak ground acceleration) of 0.250 g for the project area. The primary contributing fault determined by the ARS tool is the Keswick Fault, with the secondary contributing fault being the San Andreas Fault System towards the coast. The Keswick Fault, a reverse fault believed to be a part of the subducting oceanic plate descending into the mantle, has a maximum moment magnitude (MMax) of 6.0. It is located about 8 miles northeast of the project at a minimum depth of 3 miles and dips approximately 65˚ to the southeast. The San Andreas Fault System, a right-lateral strike-slip fault system with a maximum moment magnitude (MMax) of 7.9, is located about 83 miles to the west-southwest of the project.

8. Geotechnical Analysis and Design

8.1. Cuts and Excavations

8.1.1 Cut Slopes

DG Cut Slopes

The existing weathered DG cut slopes provide empirical evidence regarding stability. They are considered here as the best source of geotechnical information available for determining stability and behavior of the future proposed cuts, because they are to be cut in essentially the same material and at the same slope ratio (0.75:1) as the existing ones. Analyzing the slightly higher proposed cuts in the DG for global stability is limited by assumptions that must be made due to the variable weathering of the DG, the fact that most of the DG is not a soil (approximately 10 to 15 % of the DG material proposed for excavation is likely residual DG soil), and the fact that the weathered DG is not readily amenable to the most typical analytic approach (kinematic analysis) employed on rock masses because of the lack of discontinuities. Though weathered, the large majority of the DG masses are still not soils, so the weathered DG is also not amenable to accurate analysis by limit equilibrium methods typically employed for soils that involve C and φ parameters. Assigning C and φ values to this DG requires making significantly large assumptions that diminish greatly, if not completely negate, the worth or certainty of the result of any such analysis. Wyllie and Mah (2004) and Hoek and Bray (1977) state that slope failure in highly weathered rock masses is likely to occur as a circular failure and is most typically analyzed as closely fractured rock with randomly oriented discontinuities. Pertinent discontinuity data (structural kinematic data), however, is not available in the DG, so this approach is considered untenable without again incurring large assumptions. An additional approach involving strength moduli could be employed, but this would suffer equally from the burden of assumptions. As a consequence of these analytic shortcomings and the substantial empirical evidence available in the existing DG cut slopes, the proposed DG cut slopes have been analyzed and designed based primarily on field observations, seismic refraction results, and information available in the literature.

Existing DG cut slopes have slope ratios mostly around 0.75:1, with a few areas having slope ratios around 1:1, the flatter ratios being the result of erosion and sloughing subsequent to their construction, processes that are discussed more in a later section (8.1.5) on erosion in cuts. Existing cut slopes range in height from about 60 to 100 ft in the project area. Cut slopes in DG elsewhere on the Buckhorn Grade also run as high as 100 ft. A majority of these cuts are over 70 years old, with some having been constructed over 80 years ago, according to as-built drawings and DRS records. Having stood such a test of time, these existing cuts offer good empirical evidence of general global stability for these DG slopes up to about 100 ft, which encompasses the heights of 3 of the 4 cuts proposed in the DG (proposed Cut 1, Cut 3, and Cut 4).

Proposed Cut 2 (in DG) reaches a height of about 135 ft on its westbound side, which is considerably greater than the highest existing cut (100 ft) cited above for empirical

evidence of stability. Field observations and seismic refraction results generally indicate a gradual decrease in weathering and an increase in rock strength with depth in the DG cuts on the Buckhorn Grade, although the degree of such change varies from cut to cut and is merely qualitative. The existing cut that is to be abandoned for the proposed Cut 2 exposes moderately weathered DG at road level. This suggests that the proposed Cut 2, which is located deeper both horizontally and vertically into the same local DG mass, will possess sufficient strength in its lower reaches to support the higher cut slope proposed. Additional options of either flattening the cut slope or adding a mid-slope bench were also investigated. Laying the slope back at a flatter slope ratio significantly increases excavation quantities, expands right-of-way limits, increases the area of disturbance, and exposes the slope to a slightly more direct rainfall impact angle- all considered negative impacts. The bench option increases the stability of the overall slope by increasing the mass at the bottom of the slope relative to the top (acting somewhat like slope flattening without the negative effects cited above). The bench also provides an additional benefit in that it splits the direct falling distance between the top of the slope and the roadway below, thereby reducing by at least half the kinetic energy of any potential sloughs, which greatly reduces risk of the material impacting the travelled way. Furthermore, the possibility that this mid-slope bench might eventually serve as a launching point for rockfall, as benches can often do when not properly maintained, is considered moot because the DG material does not contain solid rock capable of producing rockfall (see section 8.1.4). Sloughed material does not demonstrate run out at the toe of a slope like rocks do, but instead breaks apart mostly into individual grains and small clumps. Therefore, both sides of the thru-cut proposed for Cut 2 should be cut at 0.75:1, with the 135-foot westbound side containing a mid-slope bench along its entire length.

Transition (Between DG and Metamorphics) Cut Slope 5

Proposed Cut 5 occurs within the primary transition between the DG and metamorphic material, a transition that adds complexity to the geologic structure and material strength properties of this cut slope, and creates a moderate risk of surficial raveling and sloughing. Weathered DG is exposed on the present cut faces from the beginning of the cut at about 118+10, where it continues until about station 120+50. 50 to 300 ft further up the slope above this stretch of DG cut slope faces, the DG undergoes a transition to metamorphics. From about station 120+50 to the end of the cut at about 126+50 the existing cut faces reveal mostly metamorphic rocks intermixed with a few small slivers of DG. The slopes above these (120+50 to 126+50) faces of mixed material appear to consist solely of metamorphic rocks and soil derived from metamorphic rock.

The predominant geologic structure of the metamorphics in this cut appears to dip about 45˚ at an azimuth of about 40˚ east of north, while the cut slope dips at an azimuth roughly 60˚ to 70˚ further east of that. Kinematic analysis of this data clearly indicates that the metamorphic portions of the cut slope should be considered stable. The only caveat to this, however, would be the possibility of unseen contacts between ‘slivers’ of metamorphics and/or DG acting as slip planes that could be unfavorably oriented so as to create instability. The empirical evidence of the past 70-plus years seems to deny this possibility,

though, because global failure would most likely have occurred if such unfavorable slip planes existed. Consequently, the kinematic analysis is considered valid and the proposed cut slope globally stable.

Seismic refraction indicates that the quality of the rock increases substantially 40 to 70 ft inward (into the soil and rock) from the existing cut slope face, which indicates that global failure of the proposed cut slope is probably even less likely than for the existing slope. Based on the history and present appearance of the existing cut slope face, localized sloughing of soil from the top of the cut and raveling of rocks from parts of its face may still occur with the proposed cut slope.

The presence of the Hoadley Fault and the landslide (see section 7.2) at the northern end of this cut indicate that steep cuts (0.75:1) should not be considered in this location (up-station of approximately station 124+75). Kinematic analysis of this location also indicates that this location will not allow stable slopes of 1:1 or steeper, as the cut face dip azimuth and the azimuth of the dipping structure appear to be within about 20˚ of each other.

The height increase of the proposed Cut 5 from 100 ft (existing) to 130 ft (proposed) at the same slope ratio (0.75:1) as existing is not considered to pose a problem for the global stability of this cut, except at its northern end, based on the globally stable performance of this cut slope for over 70 years and the increase in rock quality expected with depth. The moderate likelihood of sloughing and raveling from this cut slope indicates a need for either greater catchment at the toe of the slope, or a mid-slope bench to interrupt the falling distance of such material. Due to economic constraints the PDT has decided to implement the bench, because of its significantly less excavation costs relative to those of the catchment.

Based on the two preceding paragraphs, the proposed Cut 5 shall have a 20-foot wide mid-slope bench that traverses the entire cut slope (for dual ingress and egress by maintenance forces). The slope ratio for the cuts below and above the bench should be 0.75:1 from the beginning of the cut at about 118+10 to about 124+75. Beginning at station 124+75 the slope ratio should begin flattening to reach a 1.5:1 slope ratio by station 125+25.

Metamorphic Cut Slopes

Present metamorphic cut slopes have slope ratios generally around 0.75:1. A majority of these cuts are over 70 years old, with some having been constructed over 80 years ago, according to as-built drawings and DRS records. The present condition and appearance of the metamorphic cut slopes are thought to be fairly similar to the original cut faces, with the exception of some small localized planar failures that likely occurred fairly soon after their construction, as well as the long-term raveling of localized periodic rockfall. All of this suggests that the slopes are globally stable in their existing slope ratio.

All of the existing and proposed cut faces dip steeper than the geologic structure they are cut into, as the 0.75:1 cut faces dip at 53˚ while the vast majority of the structure dips

between 45˚ and 50˚. This generally results in daylighting structure. Such daylighting is generally thought, according to the general principles guiding stereonet and kinematic analysis, to begin the risk of plane failure (failure by slippage along the predominant structural planes) when the azimuth of the cut slope comes within about 20˚ to 25˚ of the azimuth of the dip of the geologic structure. The degree of risk also depends upon how steeply the structure is dipping, how much of a difference there is between the dip of the cut face and the structure, how steeply the structure is dipping, the type of structural surfaces present (joints, fractures, foliation, layering, etc.), and how resistant these surfaces are to movement. As was described previously (section 7.1.2) the surfaces between compositional layering are generally devoid of infilling, and, though fairly smooth, do have undulations and periodic diversion from the overall structural dip, giving them some resistance to movement.

The existing cut slope at about station 137+50 (in the vicinity of the proposed Cut 7) exposes the metamorphic layering at a dip of about 45˚ and at an azimuth within about 15˚ of the of the azimuth of the dip of the existing cut slope face. The face of this slope, which is about 30 ft high, appears to be close to its balancing point between stability and failure-in engineering terms, at a factor of safety only slightly above 1.0. This is based on the presence of 5- to 10-foot exposed surfaces of compositional layering (the predominant structure), where the material above it has failed and slid on that exposed surface sometime since slope cutting. This exposure is used as an indicator of the resistance against movement that exists on the surfaces of the structural layering. It also indicates that 15˚ appears to be the approximate window between the dip azimuths for the structure and the cut face where failure becomes imminent. Keeping that window at 20˚ or higher in the design of the metamorphic cut slopes should then provide at least some degree of conservatism against failure. For significantly higher slopes that window should probably be widened to about 25˚. Based on the dips and azimuths noted in the structural geology section (7.1.2), proposed cuts 7, 8, and 9 avoid falling inside this 20˚ to 25˚ azimuth window, and are, therefore, considered to be stable cuts.

Proposed Cut 6 is aligned so that the up-station portion of its face is oriented at about 20˚ azimuth to the local prevailing structure. This cut has a considerable maximum height of 115 ft (versus the existing 65 ft). This means the proposed cut slope may possibly demonstrate some localized failures within the first year after cutting, and may also have some long-term rockfall problems. Seismic refraction results indicate that good quality rock is likely to be found on the lower to mid portions of the proposed cut face, suggesting that the risk posed by the proximal structural alignment is moderate, and it exists primarily for the top 20 to 30 ft of the planned cut slope.

The up-station end of proposed Cut 10 is oriented slightly unfavorably based on the dip and dip azimuth of the structure (foliation) it possesses. This portion of the cut face dips at an azimuth that varies rapidly from within about 30˚ of the azimuth of the dip of the geologic structure (foliation) at station 160+50 to within about 10˚ of the geologic structure at the end of the project at station 161+75. The dip of this foliation appears to vary between 50˚ and 55˚. The proposed cut faces in this more northerly-facing slope have a maximum height of about 32 ft. and a slope ratio of 0.75:1 (53˚). The narrowing window

here between the azimuth of the cut face and that of the geologic structure, together with the possibility that the structure may dip less than or equal to the 53˚ cut face, suggests the possibility of some localized shallow failure along foliation planes during and after construction. These possible shallow failures will likely appear as rockfall and shallow rockslide incidents that should be contained within the 8-foot unpaved shoulder catchment and/or the 20 foot bench.

Overwintering of Cut Slopes

Discussions with the PDT from the onset of this project have assumed an early decision to make the project at least a two year project, with slope cuts being allowed to winter over through at least one interim wet season, while the contractor is present to deal with instabilities and storm water issues. This project is opting for fairly steep (0.75:1) and high (up to 135 feet in height) cut slopes that are not without some mild stability risk. Overwintering is considered necessary because it will allow the newly cut slopes to undergo their first post-cutting season- when they are most likely to undergo the major portion of any sloughing, sliding, mass eroding, or rockfall they might be inclined to do-with the traveled way at a considerable distance from the toe of these slopes. Overwintering will also allow observation of the new cut slopes to better identify any additional work that may need to be done to them before considering them complete and signing off on construction.

8.1.2 Rippability

Rippability assessments are made based on seismic velocity (P waves), rock type, and rock fracture and joint characteristics. Seismic velocity correlations are based on two different scales, each with differing rippability assessments depending upon ripping equipment and rock type. Caltrans has its own non-rock-type specific internal correlation scale between seismic velocity and rippability based on a Caterpillar D9 Series bulldozer with a single-toothed ripper:

Velocity (ft/s)	(Caltrans)	Rippability
< 3445		Easily Ripped
3446 – 4921		Moderately Difficult
4922 – 6562		Difficult
> 6563		Not Rippable

A rock-type specific seismic velocity scale based on a larger bulldozer (Caterpillar D10 with a single shank ripper) taken from a handbook published by Caterpillar (1982) is also presented here to provide the contractor with a wider range of rippability information. For granitic rocks (and a D10 with a single shank ripper) the following scale applies:

Velocity (ft/s)	(DG)	Rippability
≤ 7800		Rippable
7800 – 9000		Marginally Rippable
> 9000		Non-Rippable

For metamorphic schist (and a D10 with a single shank ripper), which of all the rock descriptions in the handbook best collectively fit the metamorphic rocks in this project, the following scale applies.

Velocity (ft/s)	**(Metamorphics)**	**Rippability**
≤ 8000		Rippable
8000 – 10,000		Marginally Rippable
> 10,000		Non-Rippable

All DG cuts (Cuts 1 thru 4) are considered easily rippable based on both the Caltrans and Caterpillar seismic velocity rippability scales, and field observations of pertinent geological characteristics.

Most of the rock in the metamorphic cuts (Cut 5 thru 10) is considered rippable by the Caterpillar scale. Cut 5 has material deemed marginally rippable by Caterpillar standards that lies near the horizontal (into cut) and vertical limits of the proposed excavation and probably makes up no more than a few percent of the total excavation. The remainder of the metamorphic material proposed for excavation in the project area is deemed rippable by Caterpillar standards.

Based on the Caltrans' rippability scale, the metamorphic cuts (Cut 5 thru 10) range from rippable to unrippable. All metamorphic rock at the surface and tops of all cuts is considered rippable. A majority of the material in Cut 5 is considered moderately difficult to rip. About 10 to 15 percent of the Cut 5 material is deemed difficult to rip, and it will likely be encountered deep (horizontal and vertical) in the excavation. Two to three percent of the innermost material in Cut 5 may be unrippable. Material deemed moderately difficult to rip will likely be encountered about 25 ft horizontally into Cut 6 at depths greater than 20 to 35 vertical ft below the present ground surface. Material deemed moderately difficult to rip will likely be encountered about 20 to 40 ft horizontally (variable by station) into Cut 7 at depths greater than 40 vertical ft below the present ground surface. Material deemed moderately difficult to rip will likely be encountered about 5 to 10 ft horizontally into Cut 8 at depths greater varying between 5 and 20 vertical ft below the present ground surface. Based on surface geological observations and comparisons to neighboring cuts (no seismic refraction survey performed here), cut 9 has material deemed moderately difficult to rip by Caltrans standards that will likely be encountered about 2 to 10 ft into the cut at depths varying between 5 and 20 vertical ft below the present ground surface. Cut 10 has material deemed moderately difficult to rip that will likely be encountered about 2 to 10 horizontal ft into the cut (this varies by station) at a depth of about 20 vertical ft below the present ground surface.

Based on the rippability descriptions discussed above, blasting is not considered necessary.

8.1.3 Grading factor

Grading factor for DG material is expected to be about 0.92. This factor is based on

discussions with construction inspectors and personnel working in the field on the Top of Buckhorn Project, which involved the construction of two fills. This factor is also based on an assumed relative compaction of 93% (see section 8.2).

Grading factor for the metamorphic rocks and overburden soil collectively is expected to be about 1.0. The grading factor for the metamorphic rocks and overburden soil separately is expected to be about 1.07 and 0.95, respectively. These factors are based on discussions with construction inspectors and personnel working in the field on the Bottom of Buckhorn Project, which involved the excavation of metasedimentary rocks and metasedimentary overburden soils somewhat similar to those of this project, as well as the construction of a fill involving the excavated material.

8.1.4 Rockfall

DG Slopes (cuts 1 through 4)

Rockfall is not expected to be a problem in the DG cuts.

Metamorphic Slopes (Cuts 5 through 10)

Rockfall presently occurs from some localized parts of the metamorphic cut slopes. Almost all existing catchment ditches slope away from the roadway at 4:1 and vary between 2 and 8 feet in width, with 2 to 4 ft being by far the most common width. These catchment ditches are fairly effective in containing rock run out from reaching the travelled way. It is believed that rockfall was probably significantly more prevalent during the first few years following the cuts on the present metamorphic cut slopes, only to asymptotically approach the present lower rate and volume within a few years. The same type of response is expected from the metamorphic cuts proposed for this project, as the new faces ‘adjust’ to their new condition. If, however, a cut slope is destabilized (as in, for example, when the cut face and geological structure both dip within about 20˚ azimuth of each other), then rockfall frequency will likely to remain until the slope stabilizes (uncertain time frame), or is stabilized by additional work. New cuts are significantly higher than the present ones in most locations, which means that 1) there will be a greater amount of slope surface area from which rockfall can originate, 2) the fall heights (and therefore the inertias and kinetic energies) will be substantially greater, and 3) the resultant run out distances of the rocks and the catchment widths required to sufficiently contain these rocks will be greater.

Rockfall mitigation analysis and design was performed based on field observations of present catchments and performance, field observations and data on present geological conditions, catchment tables created from over 10,000 rockfall simulations by Pierson, et al (2001), and the Colorado Rockfall Simulation Program software (CRSP; Jones, et al, 2000). Numerous CRSP simulation runs were performed to stochastically estimate catchment widths under different design conditions.

Catchment has been defined previously in this report as the unpaved shoulder laying flat or sloping away from the pavement. That definition is expanded here to include the paved

shoulder space outside of the edge of traveled way (ETW) for the purpose of analysis. Unpaved catchment functions far better than paved catchment for stopping and retaining falling and rolling rocks, but all shoulder space (paved and unpaved) was considered during modeling runs in CRSP (the properties of the catchment surface can be varied in the software and pavement can be modeled fairly well). Unpaved catchments with back slopes of 6:1 were used in all modeling runs. During CRSP analysis the paved portions of these catchments (the paved shoulders) were varied in slope from a 6:1 back slope to an 8:1 forward slope, with widths of 4 and 8 ft. The primary variable that was manipulated during modeling runs in CRSP, once the parameters for the surface of the cut slope and the falling rocks were tuned as well as possible, was the width of the unpaved catchment and the slope height.

Tuning the parameters to the existing conditions (existing slope heights, relatively narrow catchments, existing rock shapes and sizes, assumed percentage of rocks reaching the road,…) was not entirely successful – catchment widths produced by the models were larger than those observed in the field. These models were based on the standard that 90% of rocks should be retained within the catchment, yet the average result achieved during tuning was about 60% retention. The amount of rockfall coming from the existing slopes is not voluminous, and it may be quite possible that estimations of retention percentages for the present catchments were inaccurate. These estimations were based on discussions with maintenance personnel, first hand observations of rockfall volume contained in catchments, and a few actual rockfall simulations from existing slopes.

An averaging of some CRSP analyses and the Pierson et al (2001) catchment tables resulted in unpaved catchment widths ranging up to 18 ft in width for the higher cut slopes planned for this project if the 90% retention criteria was used. The 60% retention criteria resulted in catchment widths ranging up to about 14 ft.

In response to the implementation by the PDT of a standardized 8-foot wide, 5 to 8% catchment at the base of every cut slope, the option of dressing the tops of certain slopes with rockfall mitigating drapery systems was introduced. The philosophy behind this approach is that the catchment need only be sufficient for the height of the undraped slope, since rockfall would essentially not begin a true gravity accelerated fall until the bottom of the drapery was reached. Where catchment need was in excess of the 8 ft allocated by the proposed design, drapery could be added to the top of the slope until catchment need equaled the 8-foot standard.

Drapery coverage based on 90% retention was fairly extensive, which resulted in costs that were unacceptable to the PDT, while drapery coverage based on models with about 70% retention was more economically feasible to the PDT. This lesser coverage represented a compromise to account for the 60% retention that occurred during parameter tuning. This drapery coverage may carry with it some risk that more rockfall will reach the travelled way than the 10% that is typically designed for. This risk will be greatest during the few years following the completion of the cuts and in areas where some instability might arise. Implicit in this risk is the possibility that additional drapery may need to be installed later.

Drapery systems shall be installed on the tops of 3 cut slopes (cut 6, cut 8, and cut 9) to further assist in the mitigation of rockfall. The station intervals for these installations are 131+25 to 132+75, 143+50 to 145+00, and 150+00 to 151+25. The bottom of these drapery systems should extend down to within at least 70 ft of grade at the bottom of the slope. The tops of these draperies shall wrap over the hinge points at the top of the cut slope a minimum of 5 ft. The drapery coverage for cuts 6, 8, and 9 is estimated to be approximately 8200 ft^2, 4500 ft^2, and 6225 ft^2, respectively, of drapery. Table 3 (Section 10.1) provides additional information regarding these drapery installations.

The drapery systems shall consist of double twisted wire mesh panels secured at the top of the slope with anchor assemblies, as specified in the non-Standard Special Provisions (nSSP's) and as shown on the plans.

8.1.5 Post-Construction Sloughing and Erosion-Potential and Control

Because issues regarding erosion have always been a very important consideration in the development of this project for both the PDT and those involved in storm water runoff and sediment transport, this section attempts to discuss in some detail the various aspects of the erosion issues as they pertain to the final geotechnical design.

Metamorphic Cuts

Proposed cut slopes in the metamorphic Rocks (most of cut 5 and cuts 6 thru 10) are not expected to present any significant erosion problems due to the predominantly rocky nature expected of the new faces, although the tops of these cuts may expose surfaces with a significant amount of silt and smaller amounts of sand and clay. A hydroseed mulch or other similar erosion prevention product should be applied to these cut slopes.

DG Cuts

Background erosion rates in DG cuts on the Buckhorn Grade are clearly higher than background erosion rates from cuts in other geologic environments in the Klamath Mountains along the SHA 299-TRI 299 corridor. Erosion debris aprons accumulate continually at the bottom of all DG cut slopes, regardless of age. Plate 9 shows photos of different Shasta Bally Batholith DG cut slopes and their erosion aprons.

The post-cutting evolution (sculpting) of DG cut faces that will occur following the cutting of the proposed DG slopes in this project (Cuts 1, 2, 3, and 4) begins with both sloughing and erosional processes at a maximum for that slope. Generally, the sloughing process (a form of surficial or shallow global instability) asymptotically approaches zero typically within 2 to 3 wet seasons, with sloughing becoming very infrequent within 5 years. Erosion follows the same general asymptote, with the general background erosion level for DG cuts reached within 5 years or less. This 3 to 5 year asymptotic decline model of post-construction cut face evolution for DG is based on ten years of observations of the Buckhorn Grade, earlier observations of DG slopes elsewhere, conversations with maintenance personnel, and background research on DG decomposition. Some believe the

evolution is faster. According to Megahan and Kidd (1972), surface erosion from DG cuts decreases rapidly during the first and second year after cutting, so that by the end of the second year after disturbance erosion rates remain fairly constant, though still fairly high (higher than undisturbed DG slopes).

The faces of a couple of cut slopes on the Buckhorn Grade have clearly undergone more weathering and failure since being cut than the post-construction evolution model presented above would suggest. The greater sloughing and/or erosion of these slopes is considered to be the result of various combinations of the presence of localized relatively incompetent material (decomposed), localized groundwater flow, large groundwater pore-water pressure, and the erosive effects of greater than normal surface water flow. As in most slopes, instability in DG cut slopes is usually created when excessive water is present, whether it is additional surface water or ground water seeps on the cut face. Such water can also typically induce accelerated erosion, which then can undercut and undermine local areas on a slope, creating conditions for additional sloughing, which then create additional fresh areas of erosion that then perpetuate the cycle. The slide at the top of the Buckhorn Grade that created considerable construction difficulties for a recent project there (SHA 299 PM 0.0/0.5) is a good example of water-created global instability (for that cut), though such instability does not always take the form of a steady, slow moving slide, as this one did. Fortunately, there do not appear to be any locations within the project area where such problematic hydraulic conditions exist, at least on the present surface, based on geological reconnaissance and field work performed, nor are there any examples of heightened sloughing and erosion induced by any other causes within the project area, all of which bodes well for the planned cuts.

Erosion control begins with design in the choosing of cut slope ratio, which may influence the amount of erosion to be expected. In studies on DG from the Idaho Batholith, Megahan (1993) found that steeper road cuts in DG erode faster, which he states is contradictory to what some road builders advocate. Megahan (1993) states, “DG road cuts will eventually end up at the natural angle of repose; it depends whether you want it now or later.” This generalized statement is somewhat in contradiction, however, to the evidence available on the present Buckhorn Grade, where a significant majority of the over 60 DG road cut faces remain predominantly at, or fairly close to, the original slope ratio of 0.75:1 that they were cut at over 70 years ago. In deference to Megahan’s work, however, it should be stated that the tops of some of these cut faces have been laid back flatter by erosion (or sloughing) and that some of the main cut faces have been flattened slightly to, for example, 0.8:1 or a few even to 1:1. The question is partly a matter of what time framework is relevant, since eventually all slopes will be eroded down to sea level, given enough time. Further contradicting Megahan’s work is the observation that the tops of many Buckhorn Grade DG slopes, having been protected by a duff layer or vegetation, have shown no sign of being laid back and the cut faces beneath these tops remain at about 0.75:1. The process of splash erosion, which is the erosive force induced by raindrops impacting upon the individual DG grains and dislodging them, should be lessened by steeper slopes due to the reduction in the amount of raindrops striking a certain amount of exposed surface area per rain event, as well as a reduction in the dislodging force of the raindrop applied in the normal direction (to the slope). This reduction in the normal component of the raindrop

force would only reduce erosion, however, when the remnant rock strength provided by the remnant grain-to-grain connections was strong enough to resist the dislodging force imparted by the tangential component of the raindrop force. Observations of the DG cut faces on the Buckhorn Grade seem to indicate that the large majority of them do retain sufficient strength on most of their surfaces. Some material is still dislodged, but it does not appear to be any more than that which occurs where a few cut faces are moderately flatter. Splash erosion likely occurs more at steeper slope ratios when the DG is completely weathered to a residual soil state, but is likely insignificant when the DG retains at least a small amount of secondary or primary crystalline bonds between grains.

Water flow, both on the surface and in the subsurface, has the most significant role in the erosion of DG. After a road is cut into a DG slope a portion of the subsurface flow is now intercepted by the road cut. The flatter the cut the less amount of flow is intercepted, but it is still intercepted, so this difference, though present, is not considered significant. Subsurface flow, if even slightly above the general background level for this area, however, will have a very significant effect upon both steep and flat cut slopes. Indeed, it is just such subsurface flow that is believed to have caused some, if not all, of the relatively few badly eroded cut slopes present on the Buckhorn Grade (all outside of this present project area). The most severely eroded and slough-sculpted cut slope on the Buckhorn Grade exists in the vicinity of a spring dubbed 'Old Faithful' around Postmile 0.65 (SHA 299). Surface water runoff, if significant enough to build up or become concentrated, will have a strong erosional impact on the DG cut slopes, flat or steep, but steeper slopes will be affected more due to higher flow velocities. Design must be very careful not to create, purposely or inadvertently, situations that will subject the DG cut slopes to such surface flow.

Various kinds of post-construction erosion control measures have been studied and implemented on DG material (Megahan et al, 1992; Megahan et al, 1993; Bethlahmy and Kidd, 1966; Ohlander, 1964; Haynes, 1992) including numerous studies and experiments on the Grass Valley Creek Watershed (on the Shasta Bally Batholith) and the Buckhorn Grade, some of which involved Caltrans personnel and projects. A list of methods that have been considered for application on DG cuts includes, but is not limited to 1) erosion control blankets with materials ranging from various grasses and legumes to small trees, fiber, mulches, emulsions, synthetic jutes, straw wattles; 2) gabion baskets or half baskets filled with rock; 3) various benching approaches and steps cut into the cut faces with plantings typically composed of small trees; 4) side cast angular rock (for cuts of 1:1 or flatter); and 5) basic seed-fertilizer-stabilizer mulch mixes that are sprayed on the faces. While all these methods have demonstrated some effectiveness in some locations and situations on DG cuts, they all have limitations with respect to the Buckhorn project. Blankets, mulches and other similar methods are quite likely to be rendered ineffective by the shallow sloughing that is expected to occur over a significant percentage of the cut faces during the first wet season. Straw wattles staggered periodically on the faces might be mildly effective, as some wattles would likely escape removal by sloughing, but this success would probably only be localized (except at the bottom of the cut slope where they have the best chance of success). Side cast rock will not work on the steep 0.75:1 slopes. Besides being costly, gabion and half-basket methods would likely suffer considerable failure due to larger sloughs and the likelihood that erosion would still occur beneath some

baskets, eventually resulting in failure from undermining. Benching methods would probably have the best success rate of the methods presented above, but would not be without problems, most notably their potential to destabilize the shallow surface layers of the DG by allowing excessive water quantities to percolate into the DG. Benching with small conifer tree plantings was performed on a DG cut on the Buckhorn Grade in 2002 at about postmile 1.0 (SHA 299) with mixed results. The upper portion of the slope failed completely, partly due to the presence of DG residual soil typically found at the apices of such cuts, and partly due to the water percolation promoted by the benches. Most of the lower portion of this slope remains intact with plantings at the time of this writing. However, there are still aprons of DG debris observed at the bottom of these benched slopes, comparable to aprons observed at the bottom of other unprotected cut faces. In addition, such benching and planting is labor and equipment intensive, and therefore, considerably costly, particularly considering the surface area of DG cut faces planned for this project.

The primary and most important objective of erosion control is the protection of the water quality of the watershed, primarily Willow Creek and Whiskeytown Lake. The use of sediment traps, sediment detention basins, and widely used BMP's (Best Management Practices, such as wattles and silt fences) between the cut slopes and the entry ways into the watershed represent an approach to erosion control that doesn't reduce the amount of material coming off the cut slopes, but instead acts to prevent the material from reaching the waterways. These methods can have a high success rate in preventing most sediment, particularly the sands that makes up the bulk of the DG erosion, from entering the waterways. Combined with the relatively less disturbed area of the steeper 0.75:1 cuts, these methods are considered to be the most effective.

0.75:1 cut slope ratios were chosen over flatter slope ratios for the DG slopes because they reduce the amount of disturbed area and the amount of area made susceptible to erosion, because they have demonstrated a fairly good resistance to erosion in most cases for (for DG cuts), because they have demonstrated long-term slope stability, and because they are economically feasible. Temporary (during construction) and permanent BMP's (post-construction), and permanent sediment and sand traps (post-construction) should be used to capture in-situ sediment.

8.2 Embankments

A 1.5:1 slope ratio was chosen for the fills in this project, based on multiple factors and parameters, including properties of the material to be used in the proposed fills, height of the fills, constraints limiting the spatial footprint of the fills (environmental issues, proximity to Willow Creek), costs, and risks. Because of their magnitude, any flattening of the fill slope ratios would greatly increase right-of-way needs, earthwork volumes and costs, and environmental costs, and would quickly push the toes of some fills into Willow Creek, which would then require either a sizeable retaining or culvert structure. Building the fills at a steeper slope ratio than 1.5:1 to further reduce the footprint would require

significant slope reinforcement and was not considered economically feasible in respect to the minimal reduction in footprint gained.

Examination of Caltrans records (DRS), including As-Builts, plans, and other construction information, indicate that most of the present fills within the DG portion of the Buckhorn Grade east of Buckhorn Summit were constructed between 1920 and 1935. Records indicate, and field observations corroborate, that these fills were constructed at 1.5:1. Repairs done to these fills over the ensuing years appear to be in response to damage primarily incurred by excessive concentrated surface water, not by slope instability. Field reconnaissance of these fills revealed no signs of apparent stability issues such as circular slumps or bulges from such circular failures. This evidence supports building the proposed fills at 1.5:1, although the significantly larger size of the proposed fills (compared to the present fills) is not well addressed by this empirical evidence.

The material properties of the rock and soil to be used in constructing the fills were investigated in great detail to assure that the appropriate values were chosen for φ (angle of internal friction), C (cohesion), and γ (unit weight) for all materials to be used in fill construction. This is discussed below in the section (8.2.1) on embankment material.

These parameters were iteratively utilized in analytic modeling runs employing limit equilibrium methods to determine if these materials could be used to construct 1.5:1 fills with a minimum factor of safety (FOS) of 1.3. This is discussed below in the section (8.2.2) on stability analysis.

Rocky material excavated from a designated location within cut 7 shall be used to armor smaller fill areas where surface water runoff could potentially cause rilling and erosion. This material, designated as Select Material A (SM-A), is discussed below in the section (8.2.3) on embankment select material.

Rocky material excavated from locations designated within 3 cuts (cuts 8, 9, and 10) shall be used to armor the fill slopes with an external 9.2 foot (horizontally) encapsulation of rocky material primarily intended to provide extra global stability, prevent shallow circular failures, and protect against erosion. This material, designated as Select Material B (SM-B), is also discussed below in section 8.2.3.

Approximately 50,000 yards^3 of material excavated from the metamorphic cuts is considered to be of insufficient quality (low φ angle) to be utilized in the construction of a non-reinforced fill at a slope ratio of 1.5:1 due to inadequate material strength properties, as discussed below in section 8.2.2. This material, designated as Select Material C (SM-C), is also discussed below in section 8.2.3.

Section 8.2.4 presents analysis and discussion of a geogrid reinforced fill constructed with SM-C.

8.2.1 Embankment Material

The fills are to be built from material excavated from the DG and metamorphic rocks and the soil overburden atop these rocks. The material properties of these excavated materials, as they pertain to fill construction, are discussed here.

Metamorphic Rocks and Soils.

The excavated metamorphic rock should possess considerable stability at slope ratios as steep as 1:1 (45˚), based on its angularity. Excavation is almost certain to produce predominantly subangular to angular, blocky to slightly elongate or slightly tabular shapes, based on field observations of the intact rock on the slopes and rock shed from the slopes found in the catchment ditches. Even though the cohesion of the metamorphic rock is essentially zero, these shapes indicate that the excavated metamorphic rock will possess a high φ angle and impart significant stability upon the material at slope ratios up to about 1:1. Observations at the disposal site fill(1.5:1) at station 126+00 to 130+00, which is constructed of slightly less angular metavolcanic rocky material (mostly Copley Greenstone) excavated from another project a couple miles east of this project on the Buckhorn Grade completed a few years prior to this report, indicate that this material is very stable at 1.5:1 (33.7˚). This material has an assumed φ angle of 45˚ and a C of 0.

The soil atop the metamorphic rocks (residual soil) has a φ angle ranging from as low as 15˚ to possibly 23˚ to 25˚. Samples of this soil taken from within the project boundaries were tested for shear strength (triaxial CD) by Prysock (1968; 1979) and by SHN (2002), with the three tests yielding φ angles of 15˚, 15˚, and 22˚. SHN (2002) tested samples of this material obtained from their borings and got φ angles of 15˚, and 19˚, and C values averaging about 800 pounds per square foot (psf). Both investigators found γ values around 108 pounds per cubic foot (pcf). Field reconnaissance of the metamorphic slopes (slope measurements, soil sampling and hand classification) showed a range of material that seemed to indicate that the low φ angles (15˚) were probably purposely sampled in some of the poorer soils and, as such, are likely in the lower range of expected values for the material as a whole, while the average φ angle is assumed to be about 22˚.

DG Rocks and Soils.

Information regarding the material properties and behavior of DG, particularly as they pertain to fill construction, has been obtained from numerous sources including 1) Caltrans records (DRS, Materials Lab, logs of test borings), 2) research and investigations done by Caltrans and consultants for the Buckhorn Grade Realignment Project (Prysock, 1968; Prysock, 1979; Duffy, 1990; SHN, 2002; Graves, 2010), 3) research and investigations done specifically on the Shasta Bally Batholith DG, or involving the Shasta Bally Batholith, by other investigators (Solbos, 1990;Yapa et al, 1992a; Yapa et al, 1993; Zornberg et al, 1995; Zornberg et al, 1995b), 4) research and investigations performed on DG at multiple locations around the world, 5) and observations of present fills on the Buckhorn Grade.

The great majority of DG samples in all of the studies were classified (based on gradation and sieve analysis) as silty sands (SM) with a few of them being clayey sands (SC) or sandy silt (ML). The same is true for the Shasta Bally Batholith samples. Unit weights varied from about 107 pounds per cubic foot (pcf) to 125 pcf for Shasta Bally samples. An average of these values of 116 pcf is assumed for the analyses discussed in section 8.2.2.

The φ angle of the DG is the most important parameter when considering DG as fill material, especially since cohesion is typically very low. Studies on weathered and decomposed DG from other locations around the world have yielded φ angles ranging from 26˚ to 51˚ (Li and Mejia, 1967; Peda, 1967; Gwilford and Chan, 1969; Ucheda and Others, 1968; Onitsuka and Others, 1985; Matsuo and Others, 1970; Furukawa and Fujita, 1990; Onitsuka and Yashitake, 1990; Nishida and Kagawa, 1972; Lee, 1991; and MacFarland, 1990), with the average of these values being somewhere between 35˚ to 36˚. Keller (1992) presents a table of material properties for DG that includes φ angles for the Shasta Bally Batholith (33˚ to 35˚) and other locations in California, including the Sierra Nevada, that range from 26˚ to 44˚. Shear test data by SHN (2002) on Shasta Bally Batholith material taken from different depths from borings produced φ angles ranging from 31˚ to 38˚, with the mean value being about 35˚. Samples taken from about 2 miles west of the present project by Yapa et al (1993) were subjected to over a dozen triaxial and direct shear tests at different confining pressures and different compaction levels (90% and 95%), and yielded an average φ angle between 36.5˚ and 37˚. Triaxial CD tests performed by Solbos (1990) on DG from the Buckhorn Grade resulted in a φ angle of 37.3˚. Triaxial tests performed on clay-silt DG (CL-ML and ML-SM) material from the Grass Valley Creek area (on the west side of Buckhorn summit) produced φ angles of 29˚ (USBR, 1960) and 28˚ (ML-SM; Solbos, 1990). Triaxial (CD) tests by Caltrans (Prysock,1968; Prysock,1979) on DG found east of the present project, apparently near the Greenhorn Mine, yielded φ values from 26.5˚ to 32˚, while later work by Caltrans (Duffy, 1990) on Buckhorn DG west of the present project yielded a φ angle of 42.6˚, one of the higher values cited.

An important issue discussed in the literature that may have significance to the larger fills proposed for the present project is the processes that weathered DG undergoes during the construction, compaction, and long-term internal evolution of a fill that can reduce its φ angle. The primary processes that occur to potentially cause this reduction are particle breakage and separation of aggregated particles. The literature indicates that this φ angle reduction occurs under moderate to heavy loading, which becomes more likely as the size of a fill increases. Breakage can be both compaction-induced and load-induced, and can also be affected by soaking and saturation.

In a dozen triaxial tests on Shasta Bally Batholith DG at 95% relative compaction Yapa et al (1993) found that the peak angle of shear resistance (φ) decreased with increasing confining pressure from 50˚ (at 2088 psf) to 46˚ (at 4175 psf) to 43˚ (at 6265 psf) to 42˚ (at 8355 psf) to 39˚ (at 12,531 psf) to 38.5˚ (at 19,000 psf) to 38˚ (at 31,000 psf). Differences in relative compaction affect the φ angle of the DG, with higher compaction resulting in higher φ angles. In the same study cited above, Yapa et al (1993) found that Shasta Bally Batholith DG compacted at 95% has φ values 2˚ to 5˚ higher than the same DG compacted at 90%. With 90% relative compaction the φ angle decreased to about 36˚ at a confining

pressure of 31,000 psf. Although the highest fill proposed for the present project is about 270 ft, the highest vertical column of compacted soil in any of these fills is about 80 ft, which, at 125 pcf, adds up to about 10,000 psf at the bottom of the column. The present project then, with a maximum vertical load of about 10,000 psf, corresponds to a maximum decrease in the φ angle to about 40˚ for material compacted at 95% and about 38˚ for 90% compaction. Other studies on DG elsewhere have found somewhat similar decreases with overburden pressure, although the range of φ values varied depending upon the locale.

Saturation level during compaction can also have an effect upon the final φ angle of DG, although what that final effect may be is not altogether clear, based on the somewhat conflicting results cited in the literature. Miura and others (1983) conducted tests with varying levels of wetting and drying and found that wetting reduced the strength, which then induced greater particle breakage. Miura and others (1983) also found, however, that significant particle breakage and densification in specimens that were wetted and redried seems to have actually made them stronger, as indicated by higher φ angles. This study and that of Onitsuka et al (1985) seem to indicate that the maximum long term shear strength will be achieved for the DG fills when water content is kept at or slightly above optimum. Several investigators (Lee, 1991; Prysock, 1968, 1979; Yapa, Mitchell, and Sitar, 1992;…) tested the results of compacting DG at 90%, 93%, and/or 95% of maximum dry density with varying amounts of water (less than optimum, optimum, and over-optimum or saturation). The different compaction efforts and water contents had differing effects upon particle breakage, final density, and the φ angle of the DG. Their findings seemed to indicate that moisture content should be held at 2% to 3% below optimum. The apparent conflicts between these studies may stem from a difference in focus or concern between particle breakage and final long-term shear strength.

Based on the above discussion, the representative φ angle for the DG that is to be used as fill material on this project (excavated from cuts 1 through 4) has a value of 35˚. Also based on the above discussion, together with discussions with construction personnel familiar with DG compaction, the District Office Engineer, and the PDT, DG should be compacted to 93% at 2 to 3% below optimum water content to obtain the best long-term φ angle.

Values for C in DG were presented in many of the investigations mentioned above. These varied from about 20 psf to about 4000 psf. The very high C values were rare and were associated with DG material classified as a clay (CL), which is not typical DG material. Moderately high C values (500 to 1000 psf) were typically associated with DG classified as clayey sands (SC) or sandy silts (ML). The lower and certainly most common C values (100 to 500 psf) were typically associated with DG classified as silty sands (SM). Based on C values published in investigations on Shasta Bally Batholith and field observations of the proposed DG cuts, C values between 100 and 500 psf should be considered reasonable for use in stability analyses, with 400 psf being considered as the representative value.

8.2.2 Embankment Stability Analysis

Slope stability analysis was performed based on the C, φ, and γ values discussed in section 8.2.1 to evaluate the use, in a 1.5:1 fill, of 1) the metamorphic residual soil, 2) the metamorphic rock and soil mix, 3) the metamorphic rock, and 4) the DG. Limit equilibrium methods available in Slope/W (2004) and the Reinforced Soil Slope Analysis (ReSSA; FHWA, 2002) software program that utilize only force equations (Janbu simplified), and both force and moment equations together (Bishop's simplified, Bishop's Comprehensive, Spencer, GLE) were employed in the analyses.

C and φ values were varied in the stability analysis of the metamorphic residual soil to develop an understanding of how sensitive the FOS was to variation in these parameter values. Values of 800 and 1000 psf were used for C. Values for φ varied from 15˚ to 25˚. A γ value of 108 pcf was used in all runs.

Table 1 shows some of the main results of the stability analysis for the metamorphic residual soil. FOS values from the analyses ranged from 0.84 to 1.3. A C of 1000 psf and a φ of 25˚ produced the highest FOS of 1.3, while a C value of 800 psf and a φ of 15˚ produced a FOS value of 0.84. A C equaling 800 psf and φ equaling 22 are deemed most representative of the metamorphic residual soil material.

Although the minimum required FOS of 1.3 was obtained for a C of 1000 psf and a φ of 25˚, it is considered unlikely that these parameter values are representative of the material that is expected to be encountered during excavation. Consequently, this material is considered inadequate for 1.5:1 fill, unless the fill has reinforcement. This reinforcement is discussed in section 8.2.4 below.

Table 1. Stability analysis results for a 1.5:1 fill constructed with metamorphic residual soil.

RUN	φ	C (psf)	γ (pcf)	FOS		RUN	φ	C (psf)	γ (pcf)	FOS
1	25	800	108	1.22		8	25	1000	108	1.3
2	24	800	108	1.18		9	24	1000	108	1.26
3	23	800	108	1.14		10	23	1000	108	1.22
4	22	800	108	1.1		11	22	1000	108	1.18
5	21	800	108	1.06		12	21	1000	108	1.14
6	20	800	108	1.03		13	20	1000	108	1.1
7	15	800	108	0.84		14	15	1000	108	0.92

Slope stability analysis was similarly performed on the metamorphic rock and soil mix using the same Limit equilibrium methods. This mix is intended to represent any

metamorphic material excavated between stations 120+00 to 134+00. Metamorphic material up-station of this point will be separated into different select materials (8.2.3). It is estimated that the metamorphic rock composes approximately 70% of the excavation material between these station limits (120+00 to 134+00), while the metamorphic residual soil composes the remaining 30%. C, φ, and γ values were then determined by combining the parameter values of the metamorphic rock and metamorphic residual soil along a 70/30 proportioning. This resulted in a C value of 240 psf, a φ value of 38˚, and a γ value of 113.6 pcf. Analysis based on these parameter values resulted in a FOS of 1.48.

Slope stability analysis was similarly performed on the material designated as Select Material B (section 8.2.3), which is explained and discussed in the next section (8.2.3) and is essentially the metamorphic rock mixed with about 5% of the metamorphic residual soil. Based on this 95/5 ratio, the parameter values are calculated in the same fashion as they were for the metamorphic rock and soil mix above. This resulted in a C value of 40 psf, a φ value of about 44˚, and a γ value of about 116 pcf. Analysis based on these parameter values resulted in a FOS of 1.55.

Slope stability analysis was performed for the DG material. C, φ, and γ values were varied in these analyses to understand parameter sensitivity. C values ranged from 0 to 500 psf, φ from 34˚ to 36˚, and γ from 108 to 123 pcf.

Table 2. Stability analysis results for a 1.5:1 fill constructed with DG.

RUN	φ	C (psf)	γ (pcf)	FOS
1	35	0	116	1.05
2	35	200	116	1.28
3	35	300	116	1.35
4	35	400	116	1.41
5	35	500	116	1.47
6	36	200	116	1.3
7	34	0	116	1.02
8	34	500	116	1.34
9	35	400	123	1.35
10	35	400	108	1.34

Table 2 shows some of the main results of the stability analysis for the DG. Resultant FOS values ranged from 1.02 to 1.47, with a C of 0 and a φ of 34˚ producing the lowest FOS of 1.02, while a C of 500 psf and a φ of 35˚ produced the highest FOS of 1.47. Cohesion demonstrated a somewhat misleadingly significant effect on the FOS, more than the φ

angle did so long as the φ angle was above the angle of the slope (33.7˚ = 1.5:1). The low FOS values resulting from runs with no cohesion were all due to very localized surficial circular failures, not deeper global circular failures. This primarily demonstrates the importance of cohesion in preventing surficial sloughs on the fill faces. Otherwise, the effect of cohesion, though important, was less than that of the φ angle in achieving higher FOS values related to actual deep-seated global stability. When C was set at 0, γ had a small but noticeable effect (0.05 difference) upon the FOS, but otherwise its effect was essentially negligible. The highlighted row for Run 4 in Table 2 contains the parameter values and the FOS (1.41) considered most representative of the DG fills.

8.2.3 Embankment Select Material

The fills should be built so as to maximize the beneficial innate properties of the material while minimizing or mitigating the deleterious material properties, all the while giving due consideration to the economic and risk conditions. Consequently, we introduce here divisions of the material to be used in fill construction, and how these differing materials should best be utilized.

General Fill Material
The bulk of the fills should be constructed with general fill material excavated from the DG and metamorphic materials. General fill material includes all DG material, as well as all metamorphic material not included as either Select Material A, B, or C.

Select Material A (SM-A)
Select material A (SM-A) is a 2-inch minus material that will be used to protect certain fill, DG, and bench surfaces (cuts) from erosion. The placement locations for SM-A are shown in the design plans. SM-A material shall be compacted to at least 90% relative compaction. The borrow location for SM-A material is located inside cut 7 between the station interval 137+00 to 138+50. Within this interval the borrow material is located within the first ten ft above the bottom of the new cut, from the back of the new cut to within ten ft of the present face. A typical cross-section of the cuts within this station interval is presented in the project plans. The gradation and quality specifications for SM-A are shown in Table 4 in section 10.2.

Select Material B (SM-B)
Select material B (SM-B) shall be used to encapsulate the outer 9.2 horizontal ft (5 ft perpendicular to face) of all fills. Its rocky, angular to sub-angular nature is expected to have a φ angle somewhere around 45˚, making it quite stable on a 1.5:1 face. The stability of SM-B on and in a 1.5:1 fill was analyzed in the previous section (8.2.3) on embankment stability analysis as metamorphic rock. The resultant FOS was 1.55. The primary purpose of SM-B is to provide protection against erosion (see section 8.2.6) for all fills. In addition, SM-B will add extra global stability to the outer shell of the fills, particularly DG fills, which, based on modeling simulations, could otherwise possibly be susceptible to localized, shallow, large-radius circular failures due to low cohesion. Finally, SM-B encapsulation will also act as a skeletal framework in which a filter bridge may form that

will function to stop the migration of fines from within the DG fills. The exposed faces of all 7 fills should be encapsulated by SM-B.

SM-B shall be obtained from 3 specific slope cuts within the metamorphic rocks. These SM-B borrow sites are located between station intervals 142+75 to 146+00 (within cut 8), 149+50 to 152+00 (within cut 9), and 157+00 to 161+75 (within cut 10). The select material should come from the bedrock material at these locations and shall not include grubbed or organic material. Overburden soil lying on top of the bedrock should also be excluded. The depth and shape of the SM-B bedrock deposits varies within each of these station intervals, as well as between different intervals. Field observations combined with limited seismic refraction results have been used to create cross-sections on 25-foot stationing through these three intervals that delineate the boundaries between the overlying soil and the underlying select material. These cross-sections are included in the project plans. The precise delineation between the overburden and the SM-B material should be called in the field by the RE during excavation, with the consultation of OGDN, for each of the 3 station intervals, whenever possible.

Calculations have determined that these 3 source locations should yield about 101,000 yards^3 of SM-B. Calculations also indicate that about 78,000 yards^3 of SM-B material will be required to properly encapsulate all 7 fills.

SM-B material should not be placed on the fill slope as a later veneer after the fill has been constructed. SM-B material should be placed in horizontal lifts simultaneously with the general fill material, lift for lift, so that the individual lifts of the general fill material and the horizontally juxtaposed SM-B material are intertongued and compacted simultaneously. There shall be no rock larger than 2 feet (maximum diameter) within the SM-B encapsulation material when it is compacted on the fill. A schematic showing the encapsulation and its lift-by-lift placement is shown in Plate 10.

Select Material C (SM-C)

No material that is to be excavated from the cuts (except, of course, grubbed material) is considered completely unsuitable and in need of disposal, but some cut material, because of potentially low φ angles, is considered inadequate for constructing 1.5:1 fills without reinforcement. This inadequate material is designated as Select Material C (SM-C).

SM-C material consists primarily of soil weathered from the metamorphic rock. In some places it is located in the top portion of a cut, or in the middle of a long cut, or it may comprise entire cuts (smaller cuts, not one of the primary 10 cuts). Because the mining of SM-B from Cut 8, Cut 9, and Cut 10 within the metamorphic rocks will result in only poor quality SM-C material remaining in these areas, all metamorphic material excavated up-station of Station 134+00 (to the end of the project at station 161+75) that is not designated and mined as SM-B or SM-A material should be designated as SM-C and be subject to treatment as such.

Treating this SM-C as unsuitable material (and in need of disposal) was not considered a viable option, given the considerable amounts involved, and the costs both of disposal and

bringing in offsite material to replace it in the cut/fill balance. Mixing this SM-C material selectively in multiple fills was deemed unenforceable for construction by the PDT.

Therefore, SM-C material shall be utilized in a single 1.5:1, geogrid reinforced fill. Fill 6 (from about station 139+50 to 142+25) has been selected to be this fill primarily because of its proximity to the source of the SM-C, and also because it is big enough to contain all 50,000 yards^3 of SM-C that is expected to be excavated. This fill must be constructed as a reinforced soil slope (RSS) with geogrid reinforcement, due to the low φ angle of the material. The analysis, design, and construction of this fill are discussed below in section 8.2.4.

8.2.4 Reinforced Soil Slope (RSS) - Fill 6

Fill 6, located approximately between stations 139+50 and 142+25, is the only fill within this project that is designed to be geogrid reinforced. This RSS shall be constructed with fill material designated as SM-C, except for the outside encapsulation of SM-B. General fill material shall be placed in this fill only when all SM-C material that is to be excavated for this project has been excavated and placed within fill 6.

Analyses and modeling of the fill stability was performed using the ReSSA software program. This program utilizes limit equilibrium methods, specifically the Comprehensive Bishop and the AASHTO Bishop methods, both of which satisfy force and moment static equations. This modeling involved variations in geogrid strengths, lengths, and reduction factors (long-term creep, construction damage, long-term durability) that diminish the Ultimate Strength (T_{ult}) and determine the Long Term Design Strength (LTDS) of the geogrids. The RESSA program allows the modeler to control the parameters (geosynthetic-soil interface angle of friction, relative orientation of reinforcement force, pullout resistance factors and a complimentary scale effect correction factor, and adhesion along geogrid-soil interface) that determine the relative amount of interaction that occurs between the geogrid and the soil medium, which it is intended to reinforce. It allows the modeler to focus on particular areas of failure to determine the potential critical failure surface(s) (rotational and translational) that are particular to a discrete area of failure so that geogrid lengths and strengths may be designed as economically as possible without sacrificing overall slope strength. All of the above features were implemented, and the above parameters appropriately tested, during the analyses and design of the RSS.

Analysis resulted in geogrid layering (shown in Table 5 in section 10.2) that provides a 150-foot high, 1.5:1 fill slope with a 1.30 factor of safety against failure when constructed with material having a φ angle of 22˚ and a cohesion (C) of about 800 psf, which are considered to be the representative parameter values for the SM-C material. All geogrid reinforcement shall be uniaxial with a minimum required LTDS of 2000 lb/ft. Plate 11 presents schematic typicals demonstrating the basic geogrid layout for the RSS. Details and specifications for the design and construction of this RSS are provided in the project plans and nSSP's.

8.2.5 Embankments - Founding and Settlement

All fills are located in moderately narrow small valleys with moderately steep side slopes that act to contain the sides of the fills. The fills are essentially wedged into these valleys, which helps to reduce potential negative effects possibly created by settlement during and after construction, and the consequent shifting within the founding soils beneath the fills. The narrowed bottoms of the fills lie in the general proximity of the existing thalwegs of these valleys, the front two-thirds (the portion towards the face of the fill) of which are fairly flat-lying at slope ratios between 3.3:1 (17˚) and 5.5:1 (10˚). This basin geometry of the fill founding surfaces adds protection against forces that might otherwise act to incite movement at, or near, the base of each fill.

Fills down-station of station 120+00 (fills 1 through 4) will be founded on native DG with a variable thickness of residual soil and decomposed DG over variably weathered DG. Based on borings performed over the past 30 years (USBR, 1960; SHN, 2002; Graves, 2010) and field reconnaissance and observations of the founding slopes and incised thalwegs within the DG below the roadway by Mr. Lewis, it is thought that the DG founding conditions generally involve about 5 to 15 ft of residual soil, which overlies roughly another 5 to 100 ft of decomposed to moderately weathered DG before encountering fresh granite. These founding conditions do not provide optimal founding conditions, but rather one that will settle continually during the process of fill construction, with the vast majority of such founding settlement occurring simultaneously with the construction process due to the granular nature of the material. This is likely to result in a small amount of internal movement within the fills as they are constructed and as they adjust. This is not expected to create any stability issues within the fills, however, due partly to the confining and containing geometry of the founding surfaces described above, as well as the weight from the growing upper portion of the fills that should act to keep compaction within the depths of the fill at sufficient densities. Each of the 4 fills constructed on DG slopes will likely undergo at least 14 inches of settlement due to the compaction of the founding material alone. In some locations where the DG residual sandy soils are at their thickest, this synchronous (with fill construction) settlement may possibly be as high as 20 inches.

Fills up-station of station 134+00 (fills 6 and 7) will be founded on native metamorphic rocks with a variable thickness ranging from about 5 to 20 ft of residual soil and weathered metamorphic material on top. These founding conditions will undergo roughly half of their expected settlement during the process of fill construction, with the remaining half taking place during the year following completion of the fill. Surcharging (by storing excavated soil not yet placed in another fill) the completed fill will accelerate this process, if acceleration is desired. This year-long founding settlement is likely to result in a small amount of internal settlement-derived movement within the fills, but it is not expected to create any stability issues within the fills for the same general reasons that were mentioned above for DG founding conditions. The total amount of foundation settlement for fill 6 and 7 is expected to be no more than 8 inches.

The foundation location for Fill 5 has specific settlement issues that should be considered in the design and construction process that are related to its being a disposal site from the early 1990's until 2007. During that time, material from slides, erosion, and other maintenance collected debris from Buckhorn Grade and Highway 299 west of Buckhorn Summit, was disposed here. Strict engineering, quality control, and proper compaction were not performed consistently on this material. Beginning during the construction season of 2008, a substantial quantity of good quality material excavated a few miles to the east from another safety project called the Bottom of Buckhorn Project was disposed here to create the fairly large fill that now occupies the site. Compaction of this material was not subject to inspection. A surveying array was installed atop the fill to monitor settlement on October 27, 2009, less than a month after the existing fill was completed, and then shot on a quarterly basis (about every 3 months). By November, 2010, the settlement rates of the entire array appeared to have asymptotically reached zero. During this time, the greatest total settlement observed was about 6 inches.

Settlement activity within the compacted fills is expected to be minimal due to the 93% relative compaction requirement recommended (section 10.3) for these fills. Fills composed of metamorphic material are expected to demonstrate no more than 2 inches of this post-construction internal settlement (only in the larger parts of the fill where the vertical column of fill material is as high as 80 ft), and it will occur slowly over the course of a few years. DG fills may demonstrate a very small but relatively insignificant amount of post-construction internal settlement (less than 1 inch for the thickest portion of the fill) due to late stage particle breakage.

8.2.6 Embankments-Erosion

Fills planned for this project, if unprotected, will be moderately (metamorphic fills) to highly (DG fills) susceptible to erosion. Erosion in fills constructed with DG material could be very severe to the point of fill failure or loss, particularly if surface flow were to be misdirected during significant storm events on to unprotected DG surfaces. Such erosion could result in the loss of more than just the roadway portion of the fill within a single large storm event. Lesser flows, such as overland sheet flow, can also destroy an unprotected DG fill, but the time and number of storm events required is moderately greater. Fill 6, constructed of metamorphic residual soil, will be fairly susceptible to erosion if left unprotected, because of its high percentage of fines and relative lack of rock. Fills that are constructed primarily of metamorphic material excavated from cuts 5 and 6 will be slightly less susceptible to erosion due to the higher rock content expected to be present in this material, but there will still be sufficient quantities of fines present to make these fills moderately susceptible to erosion if unprotected.

In contrast to the unprotected erosion scenarios discussed above, fills constructed with a thick encapsulation of Select Material B (SM-B) will be substantially armored and protected against erosion, regardless if the fill is constructed of DG or metamorphic material. All the fills (1 through 7) should be encapsulated by 9.2 horizontal feet (5 ft thick perpendicular to the slope face) of SM-B. This material should be laid down and

compacted simultaneously with the general fill material, lift by lift. SM-B should not be placed on the slope face as a side-cast veneer.

The top unpaved, horizontal to sub-horizontal, fill surfaces of the major fills, as well as the smaller grade-elevating fills, should be armored to protect their surfaces against erosion and rilling with a minimum of 6 inches of compacted (90%) Select Material A (SM-A) atop these surfaces to provide the needed protection.

The SM-B encapsulation surfaces will likely contain a small amount of fines in most locations. These fines will not be detrimental, as they will serve as binders to aid in local compaction, but they will be mildly susceptible to small localized erosion and stripping. To assure stabilization of these fines, and to provide these surfaces with a covering some might consider more aesthetically pleasing, the SM-B encapsulation surfaces should be shot with some type of growth-inducing hydroseed mulch.

8.2.7 Embankments - Drainage

As mentioned before in section 7.4, a few relatively low-flow seeps were noted in the founding areas of some of the fills. These should be covered with drainage blanket systems that will lie between the existing ground and the new fill. These systems are intended to protect the future fills from potential water-induced undermining and destabilization. These blanket systems are needed for locations in Fill 1, Fill 3, and Fill 4. These blanket systems involve four primary sections: 1) a permeable blanket in the area where the seep is defined, 2) a collector area where the water from the blanket area is funneled together, 3) an underdrain system that takes the collected water down the existing thalweg (beneath the future fill) and discharges it beyond the toe of the fill, and 4) a small energy dissipator at the point of discharge that prevents erosion. The permeable blanket should consist of at least 8 to 10 inches of angular drain rock enveloped above and below by non-woven Type B RSP fabric. The lower elevation edges of these blankets should contain 6-inch perforated pipe. The collector area consists of the same materials as the blanket area, but the blanket shape is tapered down and the pipes are angled into a common area where they are joined (not rigidly) into one 8-inch perforated pipe. This 8-inch perforated pipe should be surrounded by 6 inches of angular drain rock that is then wrapped in non-woven Type B RSP fabric, essentially forming an underdrain that extends down the existing thalweg until it daylights outside the fill and discharges into an open channel, rock-lined ditch that is capable of dissipating erosional energy. Similar underdrains (without the blanket and collecting components) should also be installed within the existing primary thalwegs beneath all the future fills. Plan view drawings showing the locations of these systems and underdrains in all 7 fills are presented in Plate 12.

Present culverts in the locations of the future fills should be properly abandoned (concreted and plugged) to prevent groundwater from finding them and focusing water directly at the foundation of the future fills.

9. Construction Considerations

9.1 Construction Advisories

Prior to cutting slopes, vegetation should be completely cleared and grubbed within the excavation and fill slope lines to prevent organics from being included in fill material. Trees larger than 6" at chest height that are situated within 5 feet outside of the excavation lines should also be cut. Smaller vegetation may remain in place in this area outside of the cut zone. Stumps from the trees cut within this 5-foot zone shall be left in place at a height of 10 inches to 24 inches above the surrounding ground.

Cuts excavated during the first season of construction should be allowed to weather the following rainy/wet season without cover or protection. Appropriate and necessary BMP and storm water protection measures should be in place below them and proper BMP methods should be followed to prevent sediment discharge violations. This exposure of the unprotected cuts to the weathering season is intended to instigate the sloughing processes of the DG cut slopes that are expected to occur during the first post-cutting wet season, and expose any localized planar weaknesses, failures, or rockfall issues that the metamorphic cut slopes may possess. Following the wet season, cut slopes shall be evaluated by OGDN and the Office of Construction to determine which slopes might require trimming, additional cutting, and or scaling during the next construction season. In addition, trees located near the top hinge points of some cut slopes may be deemed problematic after undergoing the interim wet season, and shall be designated for cutting during the next construction season. Problematic trees include those that appear likely to fall soon, and those that are close enough to a newly developed edge (from wet season sloughing) that they could act as levers under the force of winds to cause the top of slope to fail.

Cut slopes in the metamorphic rocks are likely to shed some rockfall during construction, so appropriate caution around these cuts should be exercised. The cuts in station intervals 130+60 to 136+50 and 160+00 to 161+75 are considered the most likely locations for such rockfall during construction.

No work shall begin on anchor installations for the DTWM Drapery Systems until 10 days after the cut slope excavation (of the slope to be draped) has been completed. Prior to installation the exact anchor locations shall be marked on the ground by a representative from OGDN. When possible, DTWM Rockfall Drapery System installation should be delayed until after the cut slope has sat through at least one wet season, because this would allow weaknesses and potential failures in the slope face and crest to become better exposed, which would improve anchor location selection.

Boundaries between the SM-B and SM-C materials in the cuts in the eastern half of the project that are defined in the plans should be considered as close approximations when possible. The precise boundaries should be called by the RE (in consultation with a representative from OGDN) in the field as excavation proceeds, if possible.

9.2 Construction Considerations that Influence Design

Due to the likelihood, as mentioned earlier, of sloughing and erosion, as well as the potential for rockfall and local instabilities during the first wet season following cutting, work should be staged, if possible, so that the cuts most likely to be problematic are given priority in the order that cutting is to occur. Cuts in DG (Cuts 1, 2, 3, and 4, not necessarily in that order) should receive the highest priority. These should be followed by Cut 5, Cut 6, and then the up-station end of Cut 10 (station 160+00 to 161+75). Such staging will allow the winter observation of any developing problems so that specific recommendations can be made for mitigation and repair work to be performed during the following construction season. Such staging will also help to synchronize the greatest proportion and amount of post-cutting problems that might arise from these slopes with a wet season when the contractor is still on contract and present so that winter cleanup may proceed swiftly and efficiently without traffic and pavement directly below the problematic cut slope(s), since the existing roadway, which is a sufficient distance from the toe of the planned cuts, will still be in use. This staging will require a minimum of at least two construction seasons.

If possible, project staging, and possibly specifications and plans, should be formulated so that cut slopes that are to hold rockfall mitigating DTWM Drapery Systems (Cut 6, Cut 8, and Cut 9) are cut and exposed for a wet season before the draperies are installed. This will help to prevent the possibility of anchors being installed in an area above the slope that might later become destabilized by rockfall or potential instability during the first post-cutting wet season.

9.3 Construction Monitoring

Cut slopes should be monitored visually while they are being cut, primarily for loose rock or sections of rock. Such monitoring will also serve to detect problems early, should they arise, so that changes, if necessary, to the cut slope design may be implemented as early in the construction process as possible. Visual monitoring basically entails observing the slope above a cut and looking for cracks and fissures that are precursory to tension cracks that would indicate imminent slope failure or sloughing. Visual observation of the cut face for cracks and notable shifts of material should also be performed.

Periodic visual monitoring of the cut slopes and the areas in front of them through the wet season is considered necessary to make sure that BMP installations are not destroyed, rendered useless by sloughing, or overloaded by erosional debris, and that they are functioning as intended. This monitoring is also important so that cut slope evolution can be observed and understood in order to better plan for any possible trimming or additional cutting that may be required.

9.4 Differing or Problematic Site Conditions

Should differing site conditions arise during construction please contact Mr. Lewis of ODGN.

10. Recommendations and Specifications

10.1. Cut Slopes

- Prior to cutting slopes, it is recommended that trees larger than 6" at chest height that are situated within 5 feet outside of the excavation lines be cut. Stumps from trees cut within this 5-foot zone shall be left at a height of 10 inches to 24 inches above surrounding ground.

- Cut slope ratios of 0.75:1 are recommended for all cut slopes, with the exception of the northern end of cut 5 from station 124+75 to 126+25. It is recommended that beginning at station 124+75 the slope ratio shall begin flattening to reach a 1.5:1 slope ratio by station 125+25 that will continue to 126+25.

- 20-foot wide benches are recommended for Cut 2, Cut 5, and Cut 10.

- It is recommended that as many cut slopes as possible be allowed to overwinter unprotected during interim wet season between construction seasons. It is recommended that priority for early cutting be given to the 4 DG cut slopes (Cuts 1, 2, 3, and 4) first, followed by Cut 5 and then Cut 6.

- Blasting is not recommended for this project.

- Temporary BMP's are recommended at the bottom of all cut slopes during the interim construction wet season.

- It is recommended that permanent BMP's and sand traps be installed near the end of the second construction to capture in-situ sediment.

- It is recommended to apply a hydroseed mulch or similar erosion prevention product to the cut slopes at the end of the final construction season.

- Standardized 8-foot wide unpaved shoulders with a 5 to 8% back slope are recommended at the base of all cut slopes for rockfall catchment.

- Double-Twisted-Wire Mesh (DTWM) Drapery Systems are recommended for the top of Cut 6, Cut 8, and Cut 9 between station intervals 131+25 to 132+75, 143+50 to 145+00, and 150+00 to 151+25. It is recommended that these draperies extend down to within 70 ft of final grade and that they wrap over the top of the cut hinge points a minimum of 5 ft. Drapery drawings and specifications are provided in the project plans and nSSP's. Location and dimensional information is provided in Table 3 below.

Table 3. Drapery system installation locations & Information.

DRAPERY STATION INTERVAL	Design Cut Height (ft)	Drapery Bottom Height Above Grade (ft)	Approximate Drapery length (ft) *
Cut 6 (metamorphic) Station 130+75 to 134+00			
131+25	90	70	30
131+50	110	70	55
131+75	112	70	57.5
132+00	112	70	57.5
132+25	110	70	55
132+50	100	70	42.5
132+75	90	70	30
Cut 8 (metamorphic) Station 142+50 to 146+25			
143+50	80	70	17.5
143+75	81	70	18.75
144+00	90	70	30
144+25	90	70	30
144+50	90	70	30
144+75	90	70	30
145+00	85	70	23.75
Cut 9 (metamorphic) Station 149+25 to 152+10			
150+00	105	70	48.75
150+25	90	70	30
150+50	100	70	42.5
150+75	106	70	50
151+00	110	70	55
151+25	84	70	22.5
Approximate Total Square Feet	18906		

* Length on slope face (not vertical height). Includes approximately 5 ft wrapping over top hinge point.

- It is recommended that no work begin on anchor installations for the DTWM Drapery Systems until 10 days after cut slope excavation (of the slope to be draped) has been completed.

10.2 Embankments

- It is recommended that the 7 major fills proposed for this project be constructed at a slope ratio of 1.5:1 and that they be compacted to at least 93% compaction (CTM216).

- It is recommended that Select Material A (SM-A) be used to protect certain fill surfaces as shown in the plans. It is recommended that SM-A be excavated from Cut 7 between the station interval 137+00 to 138+50 as shown in the plans and discussed in section 8.2.1. The gradation and quality specifications shown below in Table 4 for SM-A are recommended:

Table 4. Select Material A (SM-A) specifications.

Gradation Requirements			Quality Requirements		
Sieve Size	Percent Passing		Test	CTM	Requirement
2"	100		SE	217	20-35
1"	75-100		R-value	301	50 Min
3/4"	65-85		PI	204	1-7
No. 4	40-60		% Crush Particles	205	75%
No. 30	12-30		Durability Index	229 c & f	35 Min
No. 200	5-15		Unit Weight	212 (Rodding Method)	105 lb^3

- It is recommended that Select Material B (SM-B) be used to encapsulate the outer 9.2 horizontal ft (5 ft perpendicular to face) of all fill slopes.

- Portions of Cut 8, Cut 9, and Cut 10, between the station intervals 142+75 to 146+00 (within cut 8), 149+50 to 152+00 (within cut 9), and 157+00 to 161+75 (within cut 10) are the recommended locations for obtaining SM-B. The select material should come from the bedrock material at these locations and shall not include grubbed or organic material. Overburden soil lying on top of the bedrock should also be excluded. Cross-sections showing the dimensions of the SM-B in-situ are included in the project plans.

- It is recommended that SM-B material be placed in horizontal lifts simultaneously with the general fill material, lift for lift, so that the individual lifts of the general fill material and the horizontally juxtaposed SM-B material are compacted simultaneously.

- It is recommended that SM-B material not be placed on the fill slope as a later veneer after the fill has been constructed. It is recommended that no rock larger than 2 feet (maximum diameter) shall be compacted within the SM-B encapsulation material.

- It is recommended that all material excavated up-station of station 134+00 that is not considered SM-A or SM-B be classified as Select Material C (SM-C) and be subject to treatment as such.

- It is recommended that Fill 6, located approximately between stations 139+50 and 142+25, be constructed only with material designated as SM-C (except for the outside encapsulation of SM-B) until all SM-C material that is to be excavated for this project has already been excavated and placed within fill 6.

- It is recommended that Fill 6 be reinforced with geogrid according to the details and specifications in the project plans and nSSP's. The recommended geogrid layering is given in Table 5 below:

Table 5. Fill 6 Geogrid Layers & Lengths.

Layer #	Elevation from bottom of toe (ft)	Maximum Length (ft)		Layer #	Elevation from bottom of toe (ft)	Maximum Length (ft)
1	2	50		13	50	50
2	4	50		14	55	50
3	6	50		15	60	50
4	8	50		16	70	50
5	10	50		17	80	120
6	15	50		18	90	50
7	20	50		19	100	50
8	25	50		20	110	120
9	30	50		21	120	50
10	35	50		22	130	50
11	40	50		23	140	120
12	45	50		24	150	50

- It is recommended that all fill faces (the encapsulating surfaces) be sprayed with some type of hydroseed mulch at the completion of the fill.

- It is recommended that the seeps identified in Plate 5 be covered with drainage blanket systems that will lie between the present ground and some of the new fills as described in section 8.2.6. These blanket systems are recommended for locations beneath Fill 1, Fill 3, and Fill 4.

- The installation of underdrains within the primary thalwegs that presently exist beneath all the future fills is recommended prior to, or during, fill construction. These shall be constructed according to the details in the project plans and project specifications.

- Present culverts in the locations of the future fills should be properly abandoned (concreted and plugged) to prevent groundwater from finding them and focusing water directly at the foundation of the future fills.

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APPENDICES

APPENDIX A.

Plates 1 – 12.

APPENDIX B.

Seismic Refraction Results

APPENDIX C.

Laboratory Tests and Log of Test Borings (LOTB's) from SHN (2002)

APPENDIX A

PLATES 1 -12

Plate 1. Vicinity Map

Plate 2. Aerial Photo of Project Showing Locations of Cuts and Fills

Plate 3. Topographic Map of Project Area with Locations of Cuts and Fills

Plate 4. Geologic Map (from Albers, 1964)

Plate 5. Geologic Mapping

Plate 6. Aerial Photo of Project Area Showing Locations of Seismic Lines

Plate 7. Photos of Decomposed Granite Cut Slopes

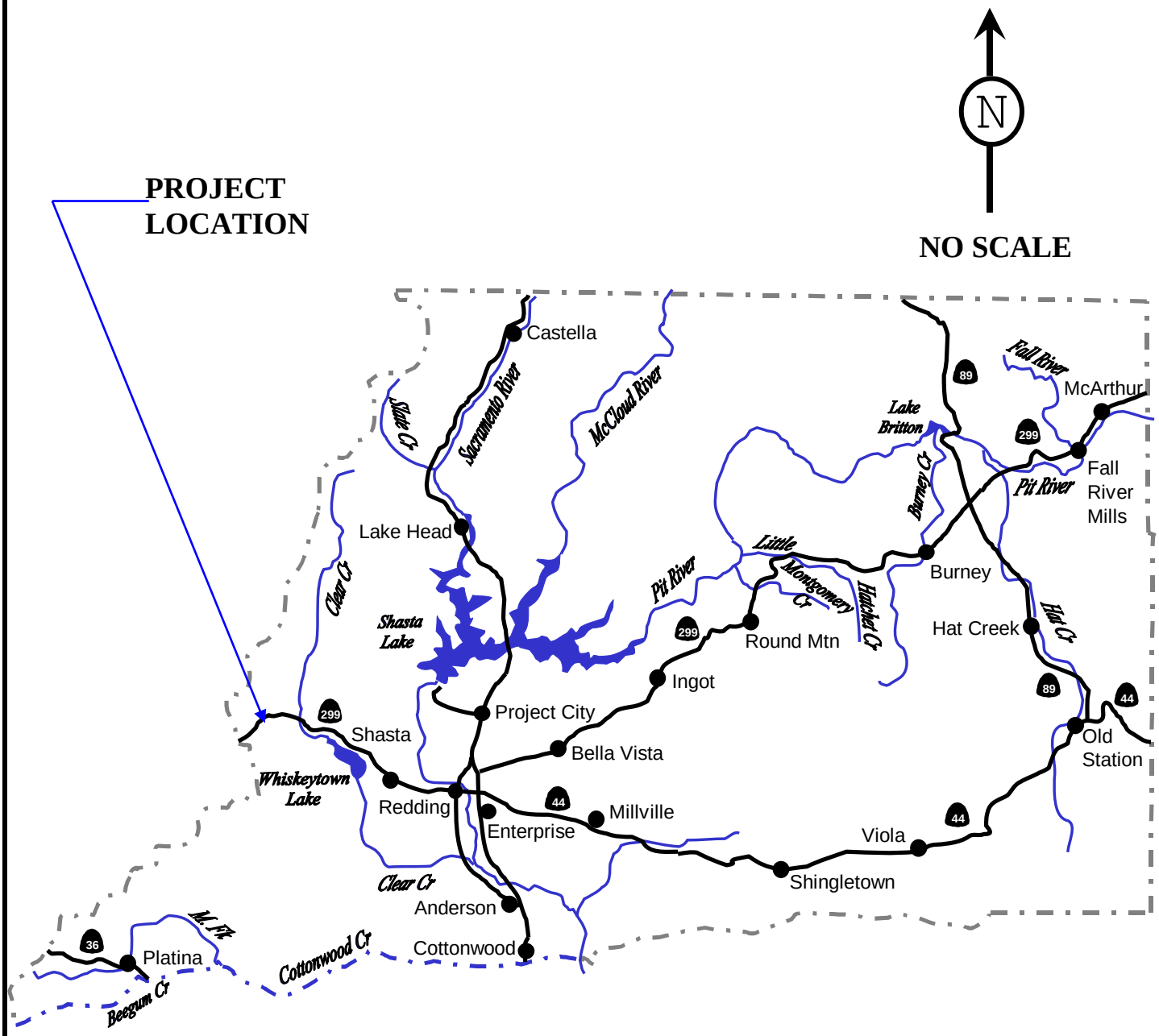
Plate 8. Photo of Albite Dike Swarm in Decomposed Granite

Plate 9. Photos of Decomposed Granite Erosion

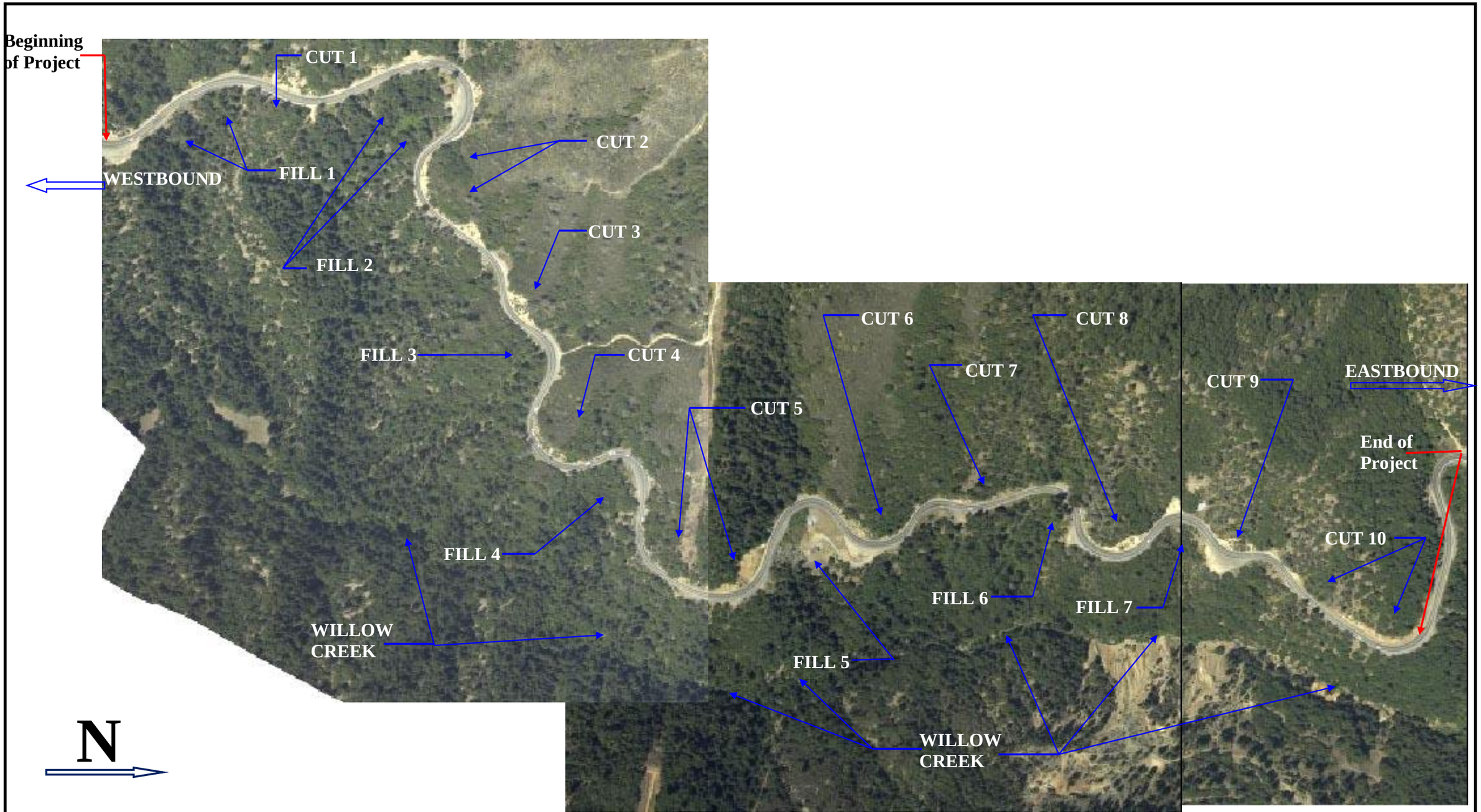
Plate 10. Select Material B Placement and Compaction

Plate 11. Fill 6 RSS Geogrid Layout Cross-Section and Plan View

Plate 12. Layout of Fill Blanket Systems and Underdrains



CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**VICINITY MAP**
	02-SHA-299 PM 2.5/4.3 GEOTECHNICAL DESIGN REPORT	Plate No. 1



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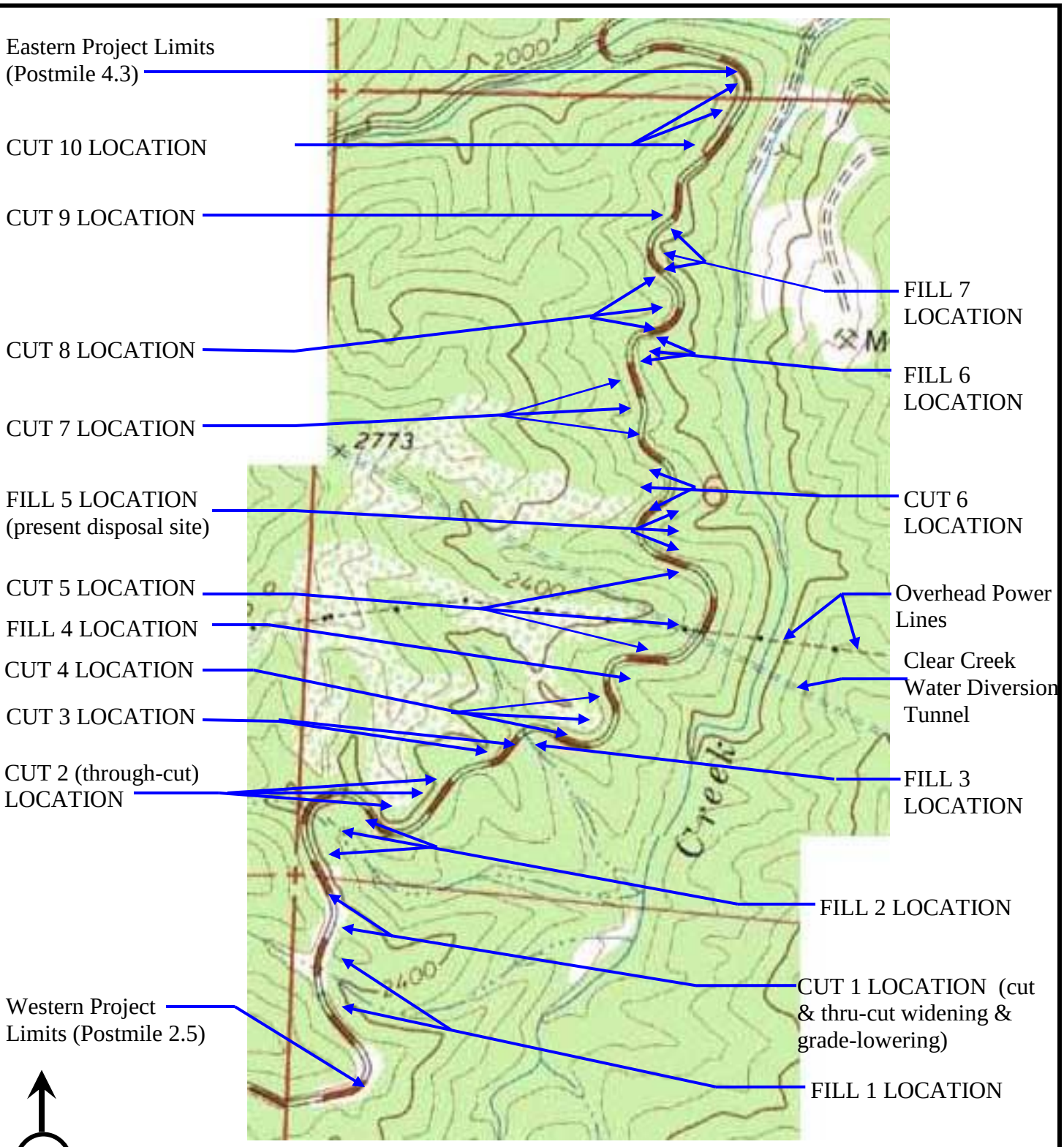
Date: January 2011

AERIAL PHOTO OF PROJECT AREA SHOWING LOCATION OF CUTS AND FILLS

02-SHA-299 PM 2.5/4.3
GEOTECHNICAL DESIGN REPORT

Plate No. 2



Approximate Scale

¼ Mile (1320 feet)

Base Map Reference: MapTech Inc. from 7.5 minute series (topographic), 1:24,000, U.S. Geologic Survey.

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Date: January 2011

TOPOGRAPHIC MAP

02-SHA-299 PM 2.5/4.3
GEOTECHNICAL DESIGN REPORT

Plate No. 3

EXPLANATION
Geologic Units

Jurassic - Cretaceous

bhgd | bqd

Shasta Bally batholith.
bhgd *biotite hornblende granodiorite & quartz diorite*
bqd *coarse biotite granodiorite & quartz diorite*

gn

Gneiss and amphibolite derived from Copley, Balaklala and Bragdon Formations.

Mississippian-Carboniferous

Mbp

Bragdon Formation.
Phyllite created by contact metamorphism of Bragdon Formation with Shasta Bally Batholith

---

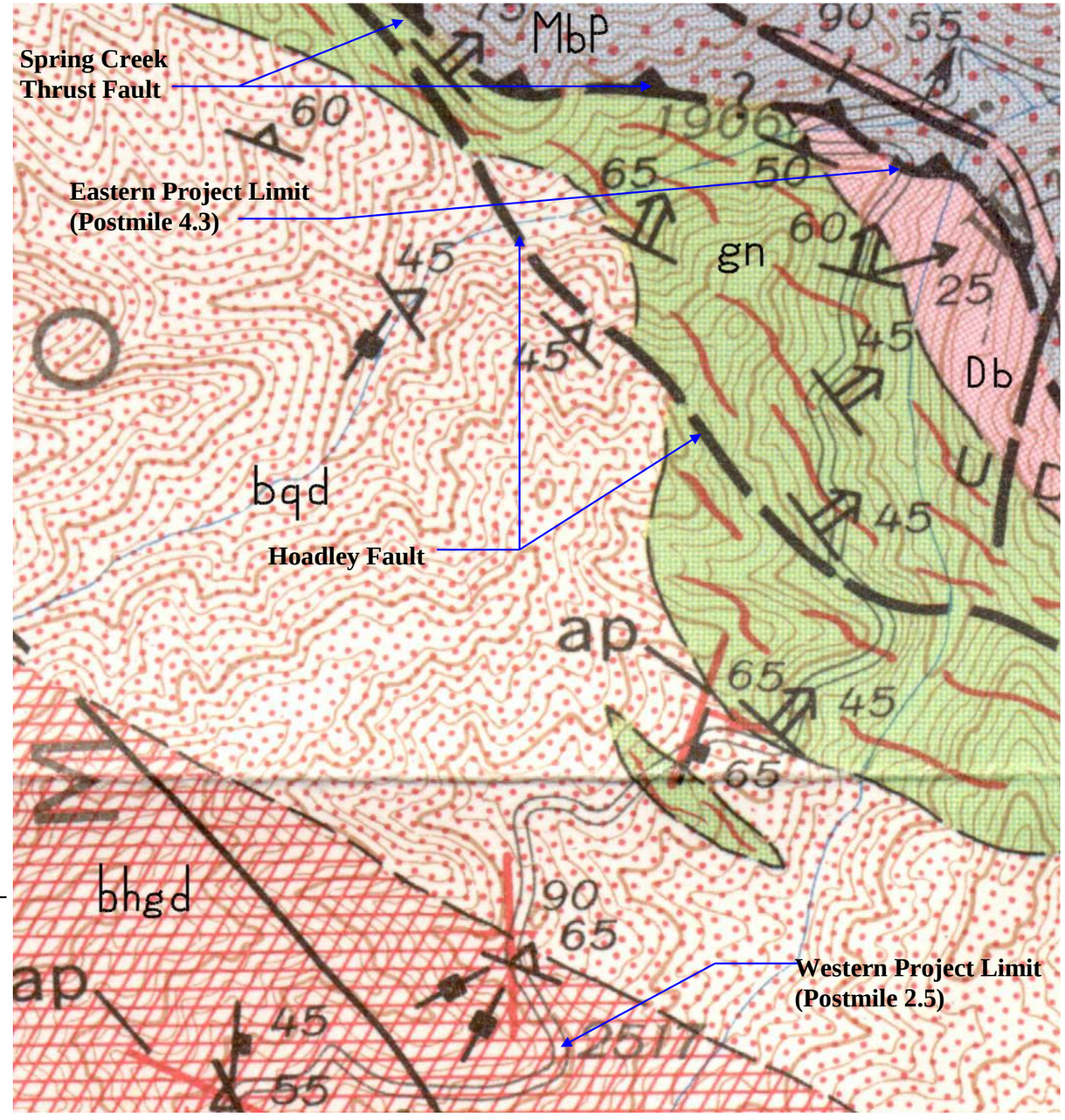
Devonian

Db

Balaklala Rhyolite.
Non-porphyritic quartz keratophyre and quartz keratophyre containing quartz phenocrysts

N

From *Geologic Map and Section of the French Gulch Quadrangle, Shasta and Trinity Counties, California* in *Geology of the French Gulch Quadrangle, Shasta and Trinity Counties, California* by J.P. Albers, 1964.



EXPLANATION
Structural Features

Contact, showing dip
Long dashed where approximately located; short dashed where indefinite; dotted where concealed

Fault, showing dip
Dashed where approximately located; queried where probable; dotted where concealed. U, upthrown side; D, downthrown side

Vertical fault

Spring Creek thrust
Mainly between Bragdon formation and underlying rocks, but in places between Copley greenstone and tuff of the Balaklala rhyolite. Sawteeth on upper plate. Queried where doubtful; dotted where concealed

Plunge of fold axis

Inclined Vertical
Attitude of beds

Strike and dip of beds and plunge of lineation

Inclined Vertical
Attitude of schistosity

Strike and dip of schistosity and plunge of lineation

Inclined Vertical
Attitude of compositional layering in gneiss

Strike and dip of compositional layering in gneiss, and plunge of lineation

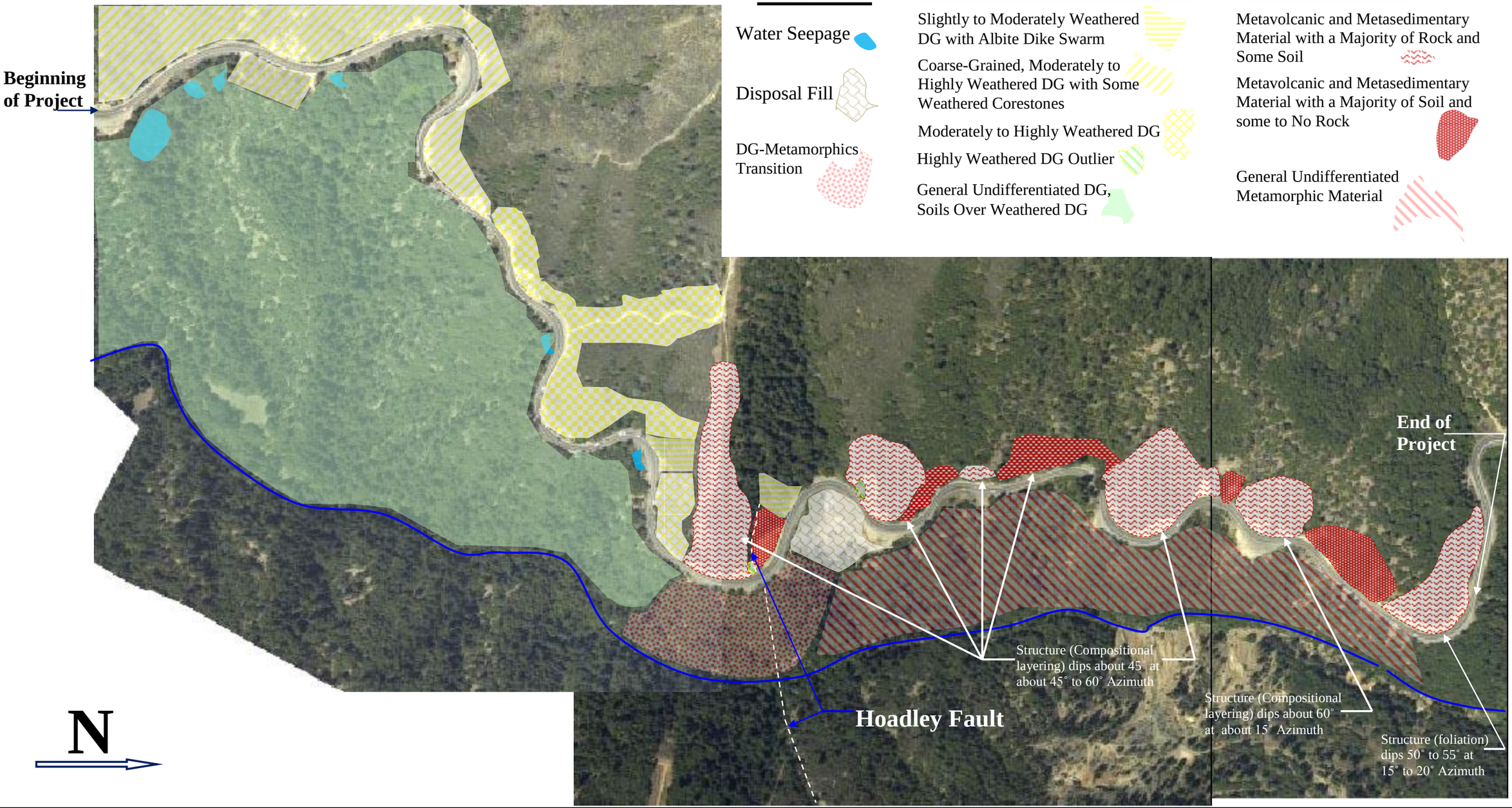
Inclined Vertical
Attitude of primary flow banding in granitic rocks as shown by alined crystals or inclusions

Strike and dip of sheeting

Inclined Vertical
Attitude of cleavage

Inclined Vertical
Attitude of joints

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**GEOLOGIC MAP**
	02-SHA-299 PM 2.5/4.3 **GEOTECHNICAL DESIGN REPORT**	Plate No. 4



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design-North

EA: 02-1E1001

Date: January 2011

AERIAL PHOTO OF PROJECT AREA WITH GEOLOGICAL MAPPING

02-SHA-299 PM 2.5/4.3
GEOTECHNICAL DESIGN REPORT

Plate No. 5

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design-North

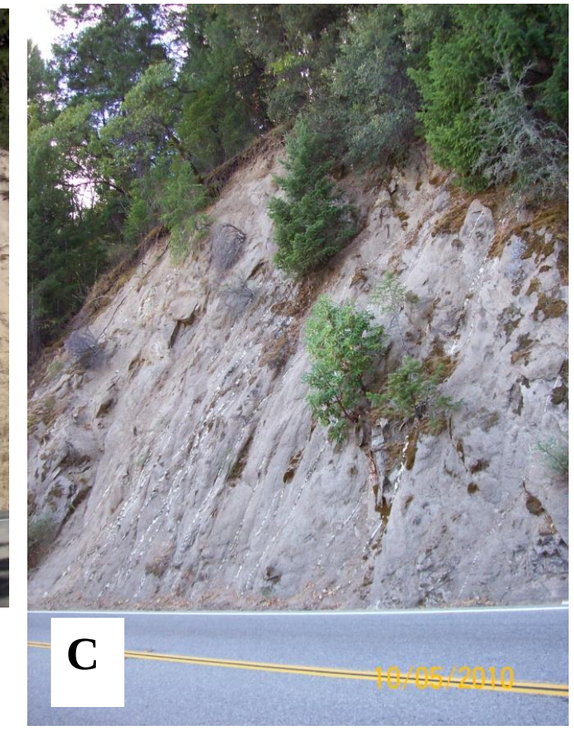
EA: 02-1E1001

Date: January 2011

LOCATIONS OF SEISMIC REFRACTION LINES

02-SHA-299 PM 2.5/4.3
GEOTECHNICAL DESIGN REPORT

Plate No. 6



Photos of DG Cut Slopes from the Buckhorn Grade.

A) Cut slope is highly sculpted. Weathered corestones lend rugged look to surface and play strong part in shaping face.

B) Moderately weathered DG with numerous unweathered to slightly weathered corestones.

C) Coarse grained, slightly to moderately weathered DG.

D) Slightly to moderately weathered DG with slightly weathered corestones.

E) Moderately weathered DG with two distinct slightly weathered corestones.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**PHOTOS OF DECOMPOSED GRANITE CUT SLOPES**
	02-SHA-299 PM 2.5/4.3 **GEOTECHNICAL DESIGN REPORT**	Plate No. 7

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design-North

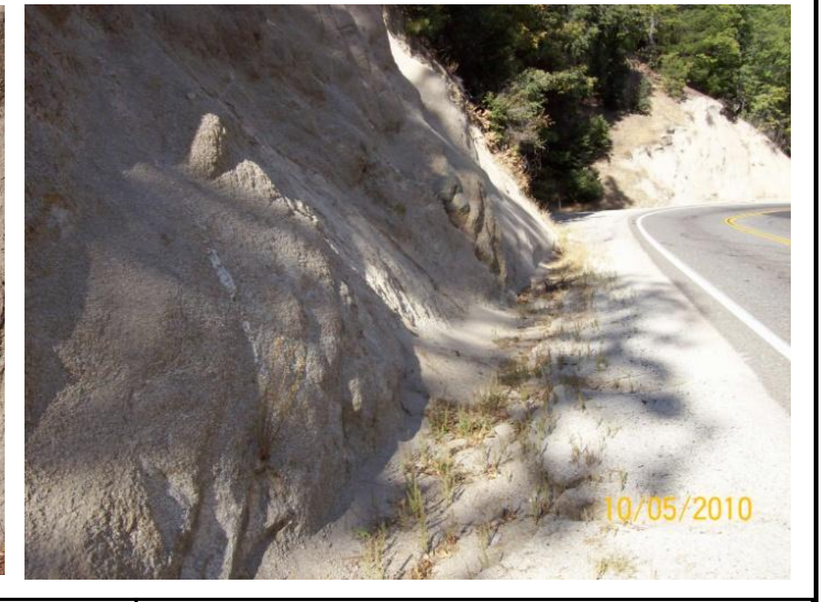
EA: 02-1E1001

Date: January 2011

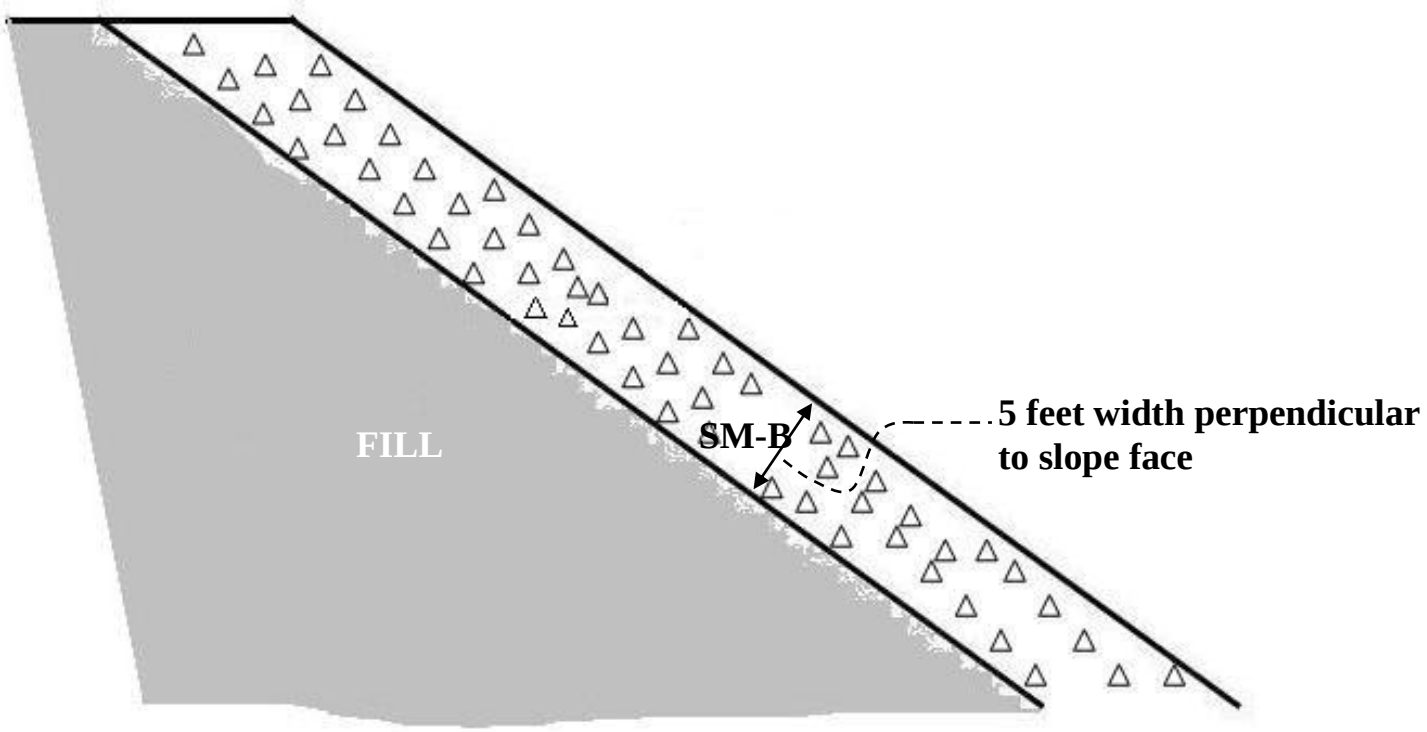
PHOTO OF APLITE DIKE SWARM IN DG CUT SLOPE

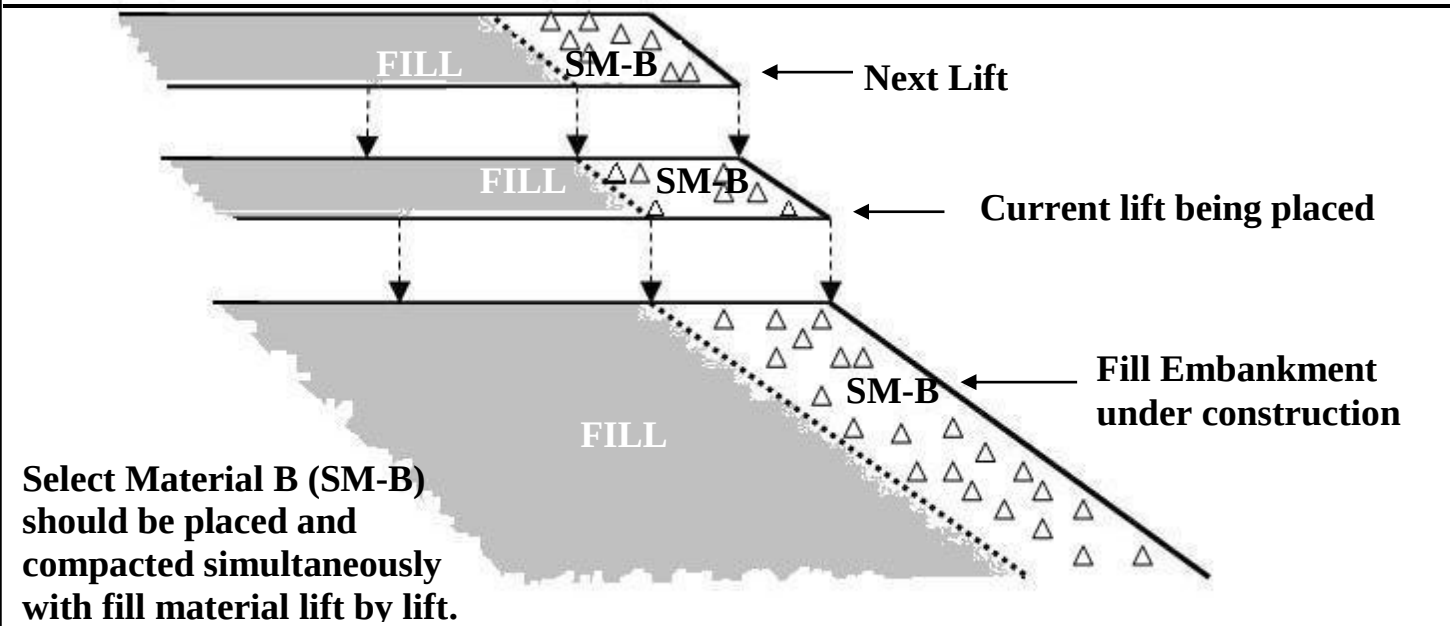
02-SHA-299 PM 2.5/4.3
GEOTECHNICAL DESIGN REPORT

Plate No. 8



Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: November 2010	**PHOTOS OF EROSION IN DECOMPOSED GRANITE**
		02-SHA-299 PM 2.5/4.3 **GEOTECHNICAL DESIGN REPORT**	Plate No. 9

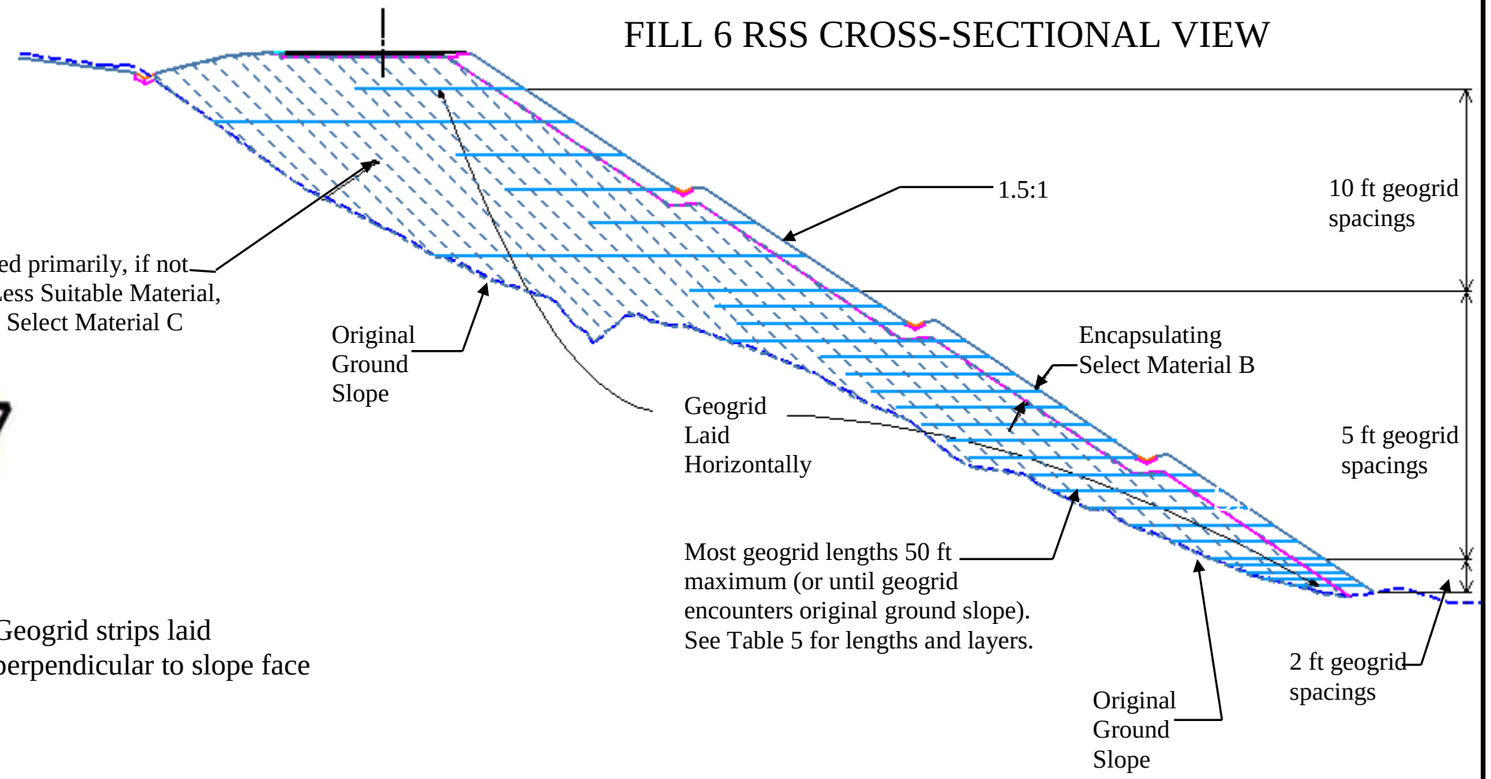




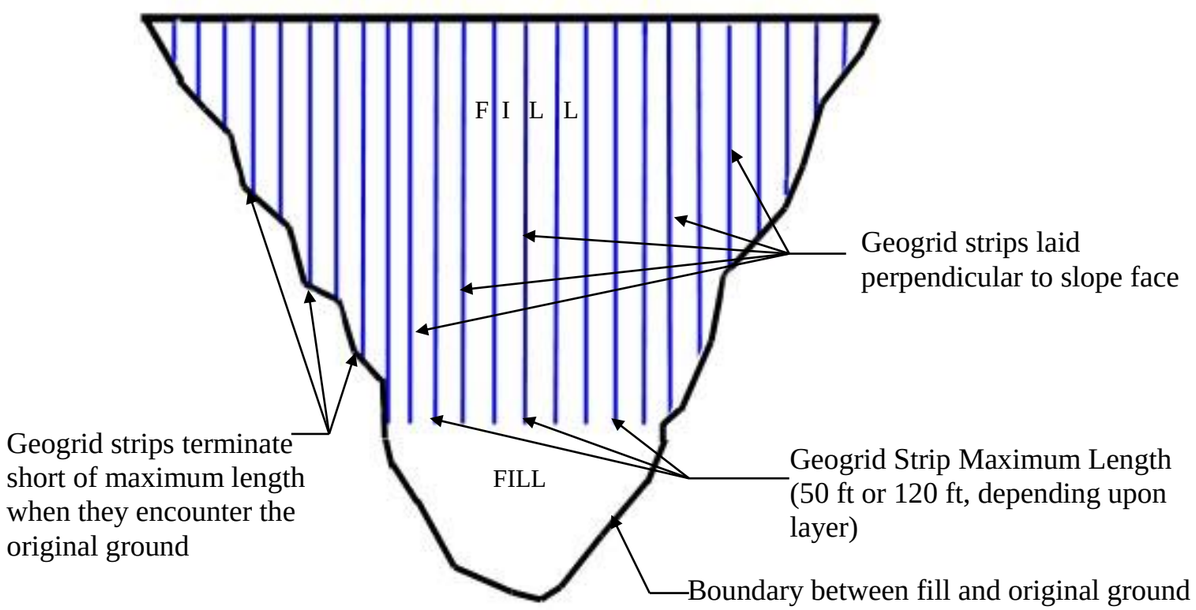
Fill Encapsulated by Select Material B (SM-B). Upper drawing depicts a fill embankment constructed with fill material encapsulated by 5 ft (Perpendicular to slope face) of compacted SM-B. Lower drawing shows schematically that SM-B should be placed and compacted simultaneously with fill material lift by lift. SM-B is not to be applied as a later veneer. The faces of all fills shall be encapsulated as shown.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**FILLS ENCAPSULATED BY SELECT MATERIAL**
	02-SHA-299 PM 2.5/4.3 **GEOTECHNICAL DESIGN REPORT**	Plate No. 10

FILL 6 RSS CROSS-SECTIONAL VIEW



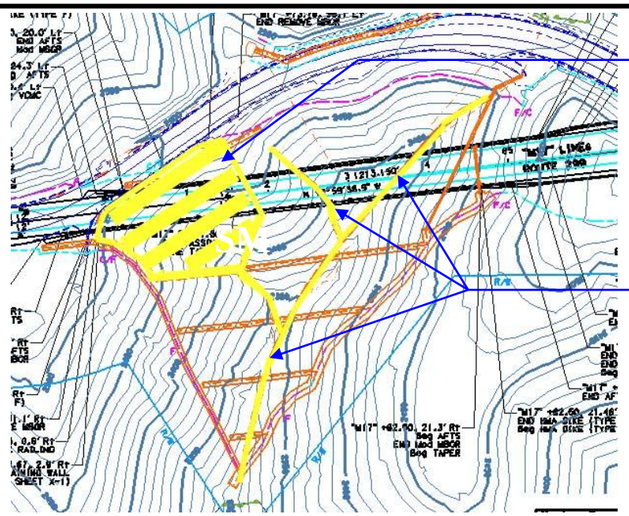
SLOPE FACE



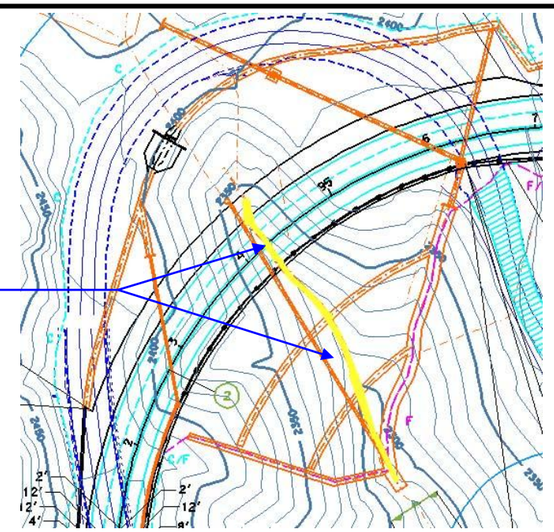
PLAN VIEW OF A HORIZONTAL SLICE OF RSS

Drawings are intended as general schematics and are not to exact scale

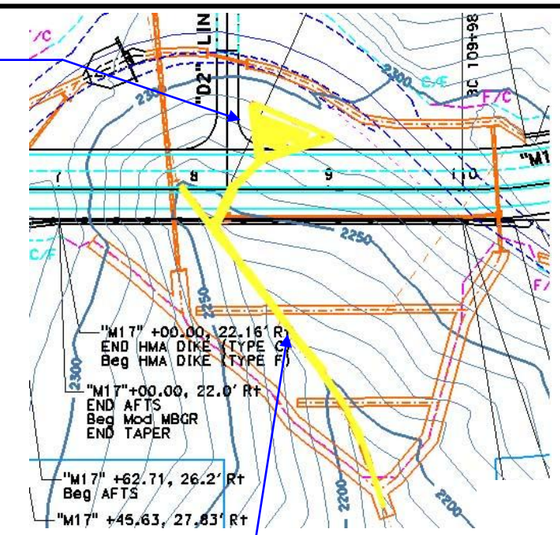
CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**FILL 6 RSS GEOGRID LAYOUT CROSS-SECTION & PLAN VIEW**	
	02-SHA-299 PM 2.5/4.3 GEOTECHNICAL DESIGN REPORT		Plate No. 11



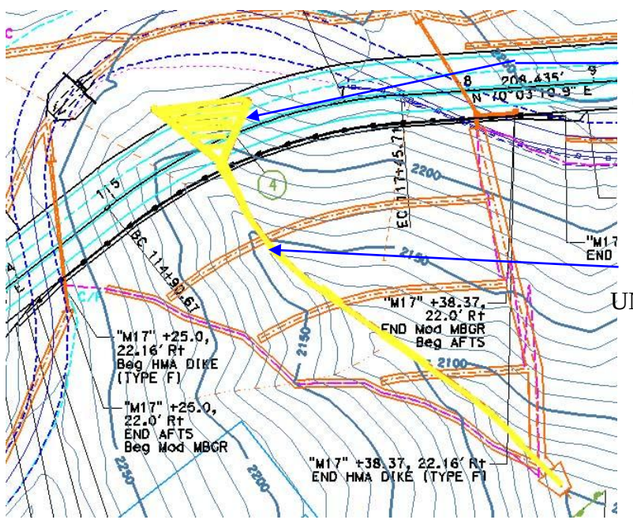
FILL 1BLANKET SYSTEM & THALWEG UNDERDRAINS



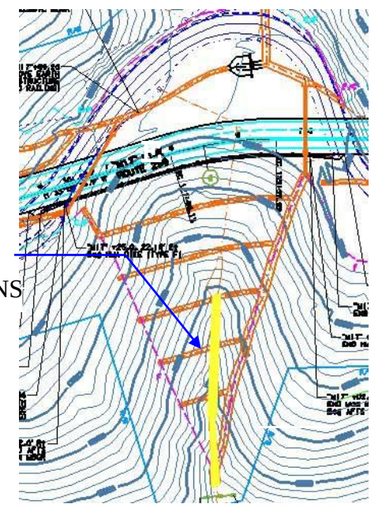
FILL 2 THALWEG UNDERDRAIN



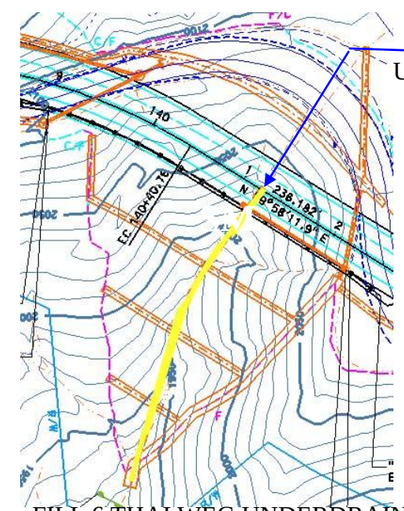
FILL 3 BLANKET SYSTEM & THALWEG UNDERDRAINS



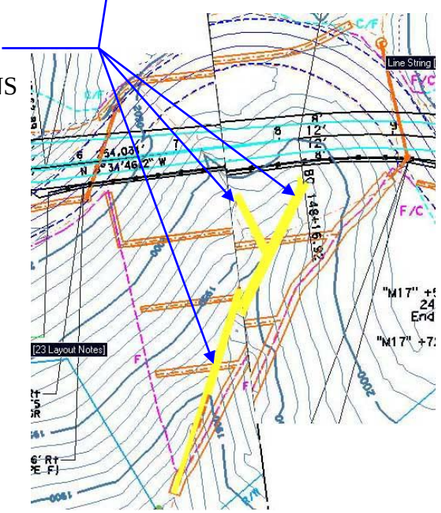
FILL 4 BLANKET SYSTEM & THALWEG UNDERDRAIN



FILL 5 THALWEG UNDERDRAIN



FILL 6 THALWEG UNDERDRAIN



FILL 7 THALWEG UNDERDRAINS

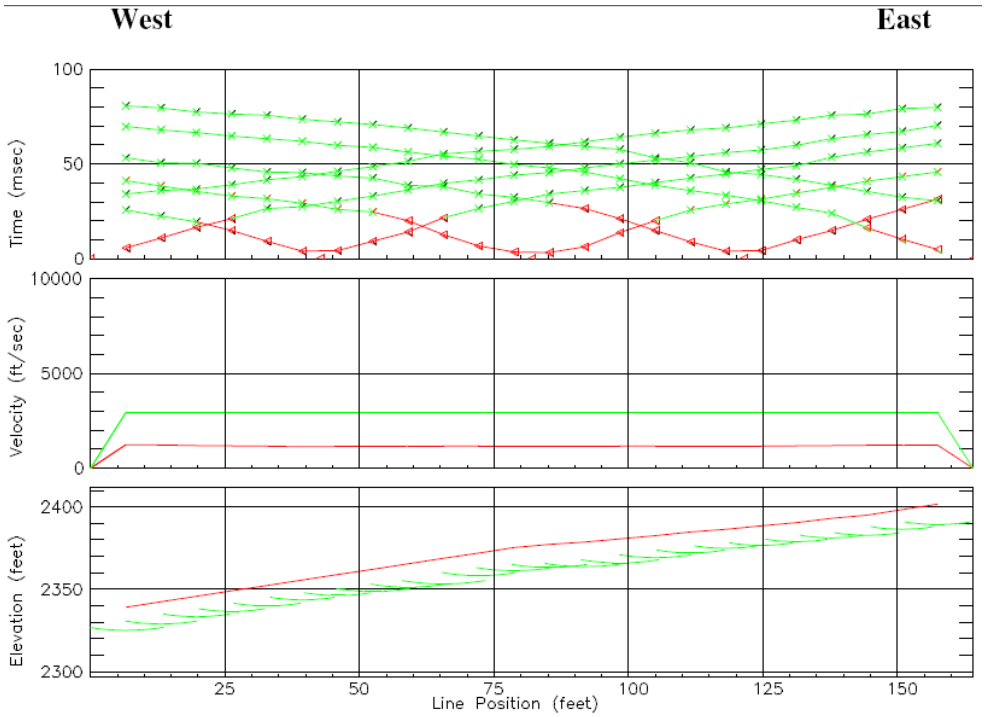
Plan View of Blanket Systems and Thalweg Underdrains Layouts overlaid on topography and design details (Shown in yellow).

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design-North	EA: 02-1E1001 Date: January 2011	**LAYOUT OF FILL BLANKET SYSTEMS AND UNDERDRAINS**
		02-SHA-299 PM 2.5/4.3 **GEOTECHNICAL DESIGN REPORT**	Plate No. 12

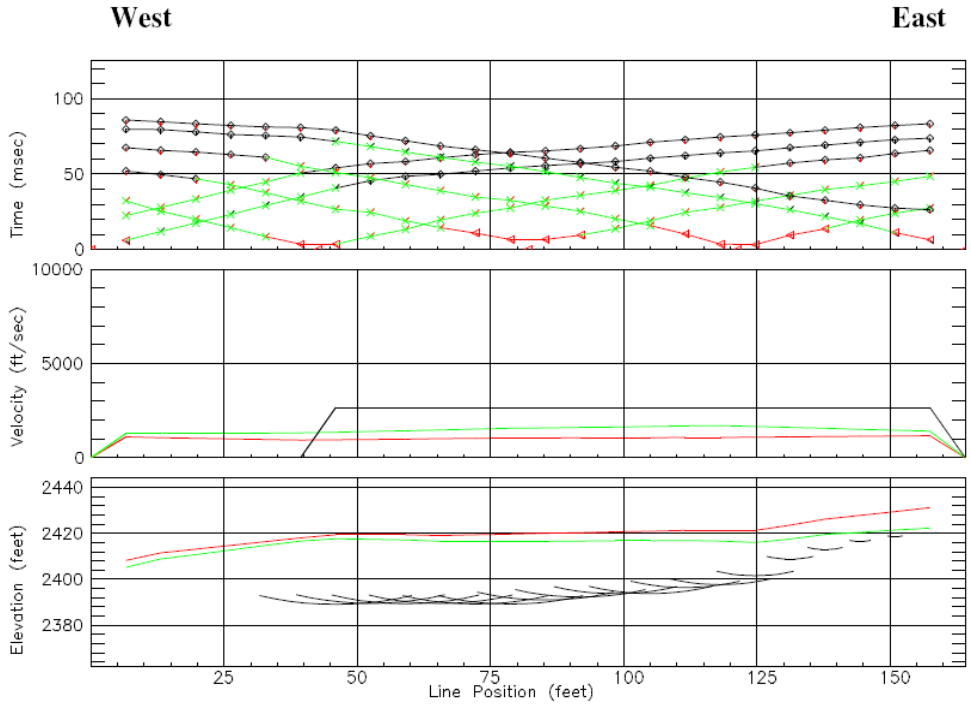
APPENDIX B

SEISMIC REFRACTION RESULTS

(Parsed from report by Leeds and Owen, December 10, 2009)



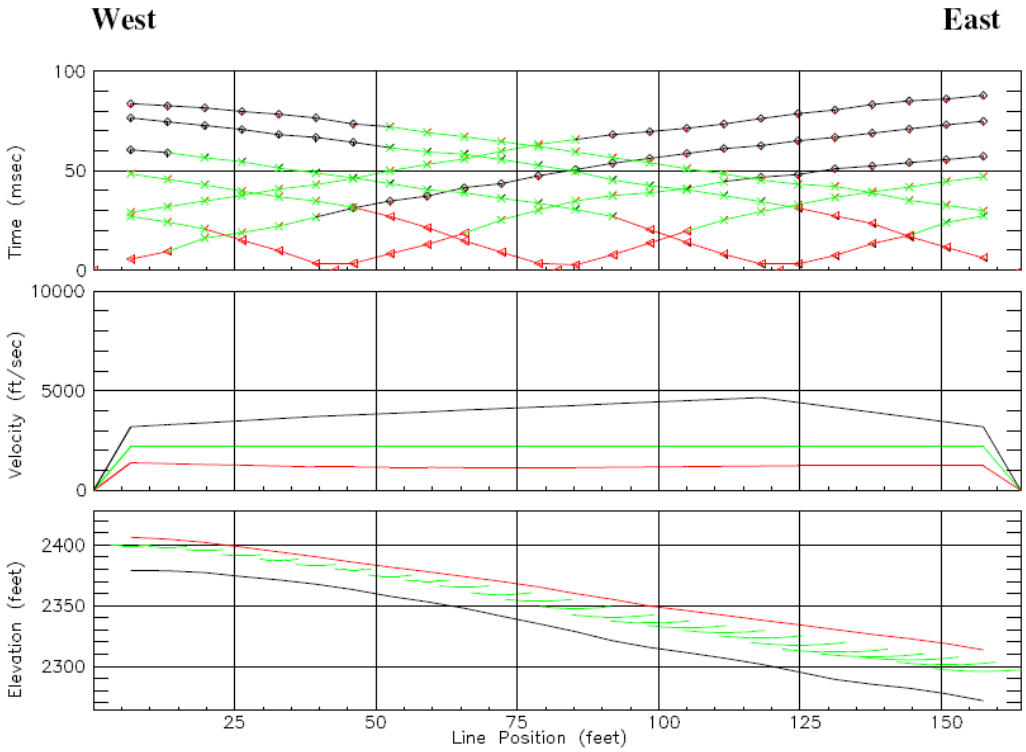
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 1.



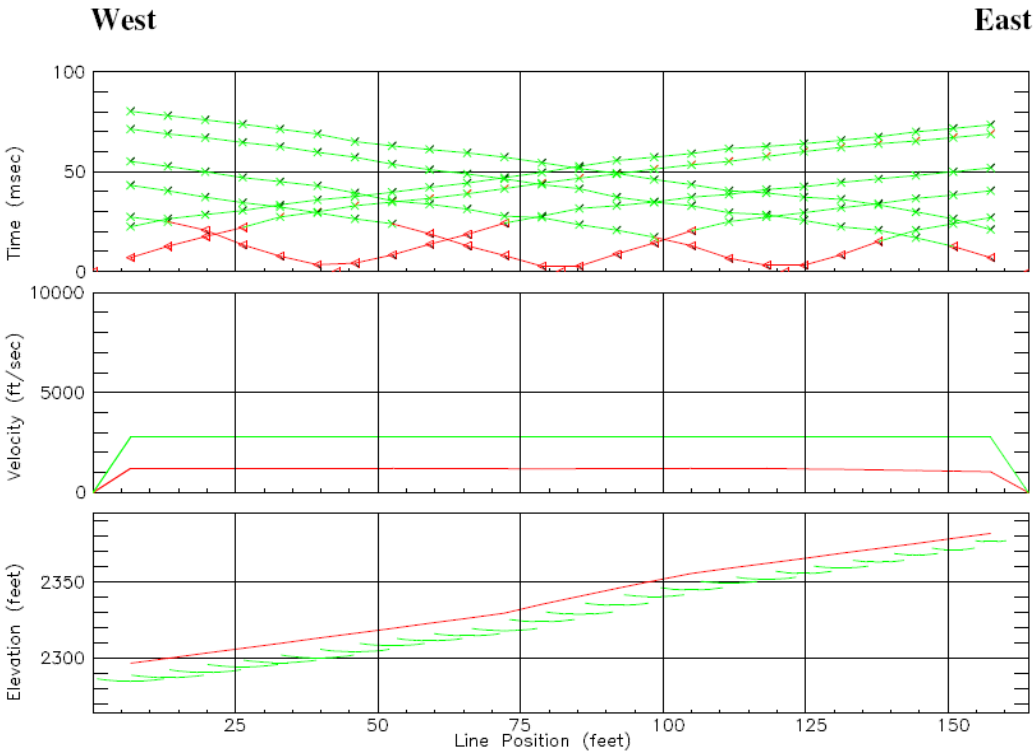
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 2.

APPENDIX B

(continued)



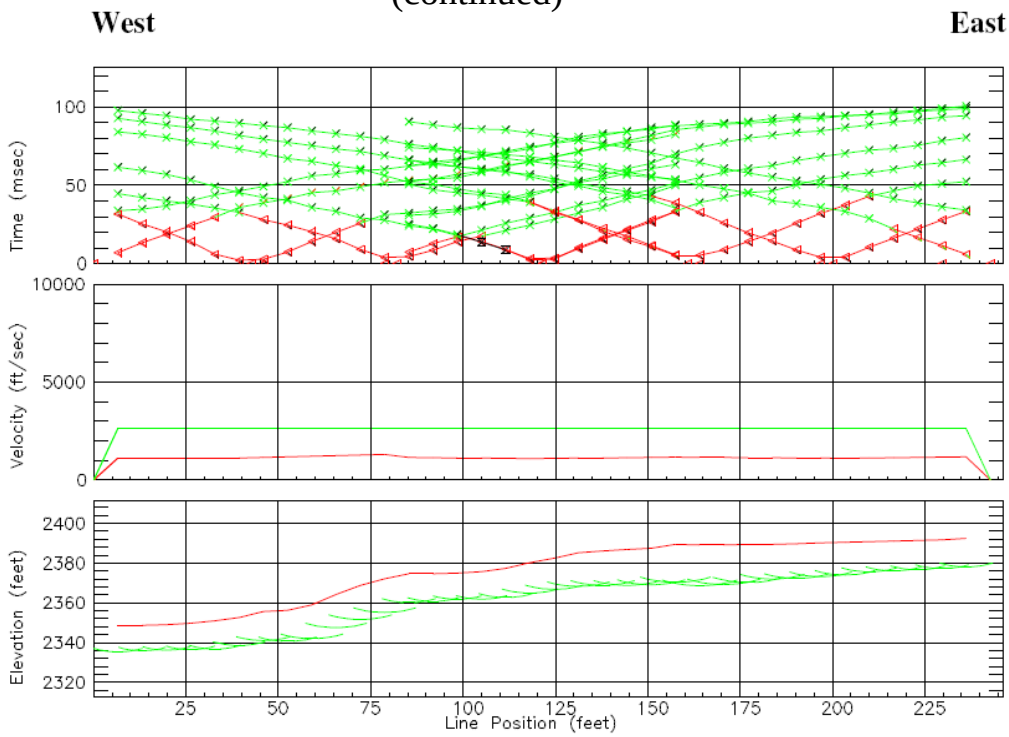
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 3.



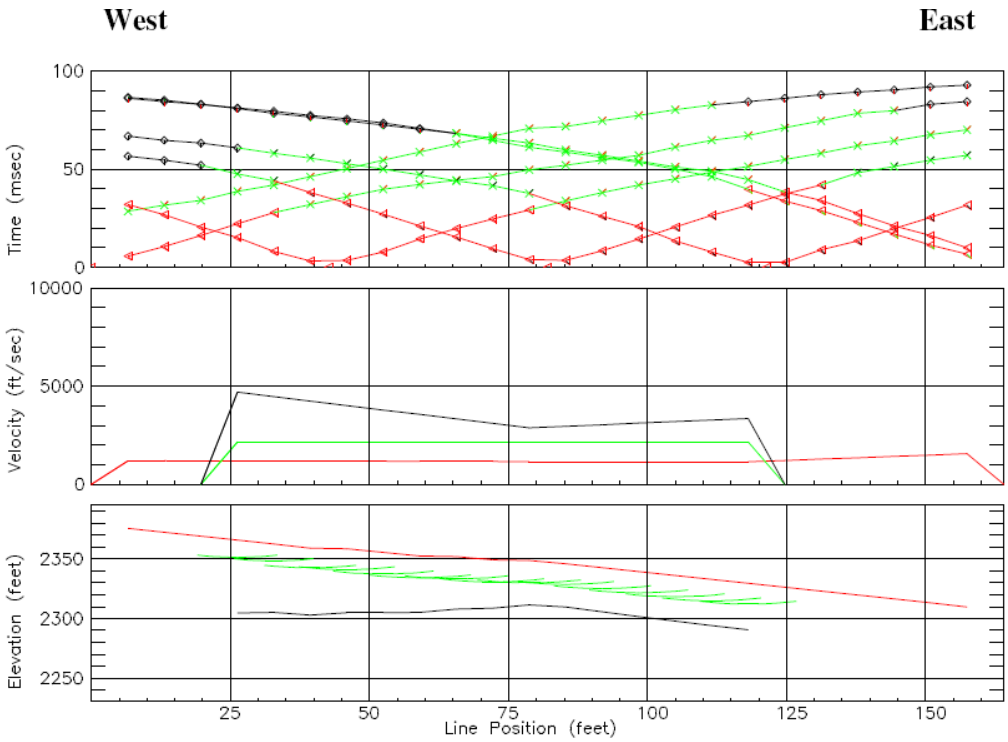
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 4.

APPENDIX B

(continued)



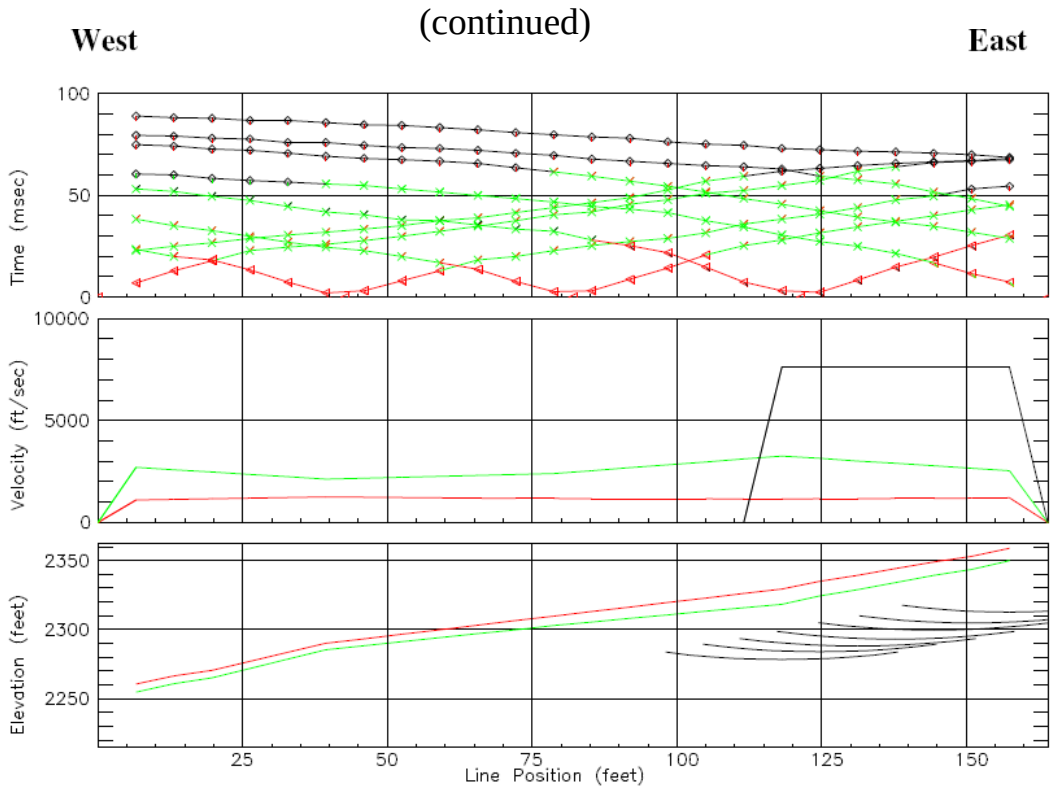
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 5.



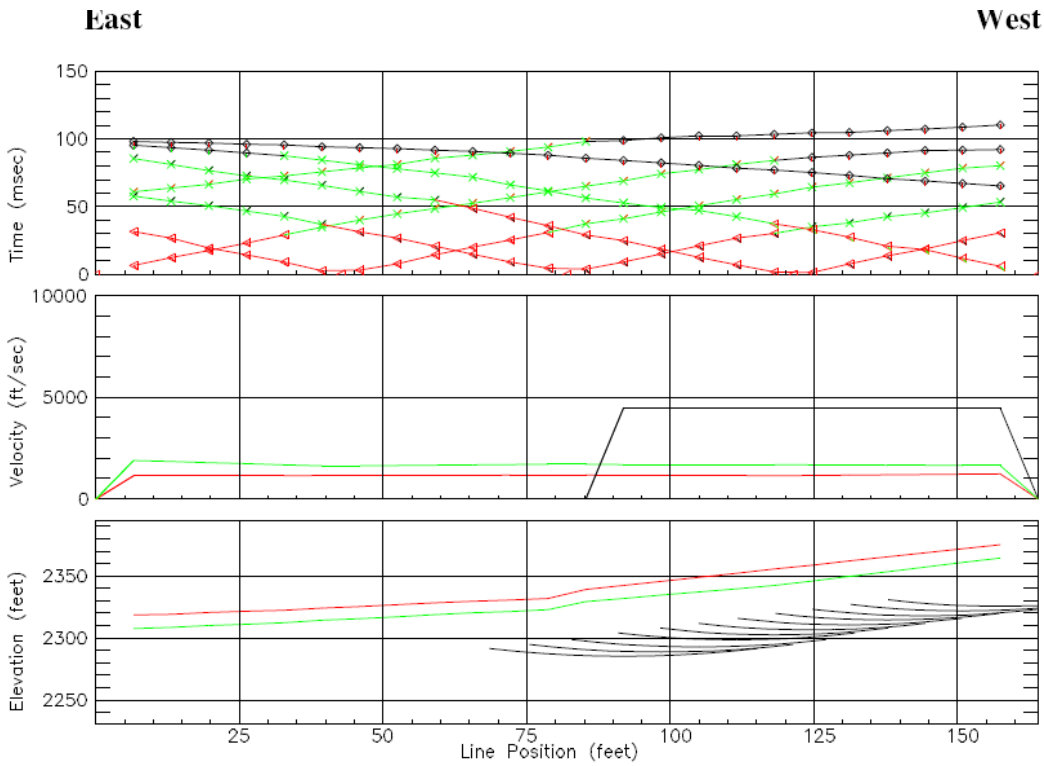
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 6.

APPENDIX B

(continued)



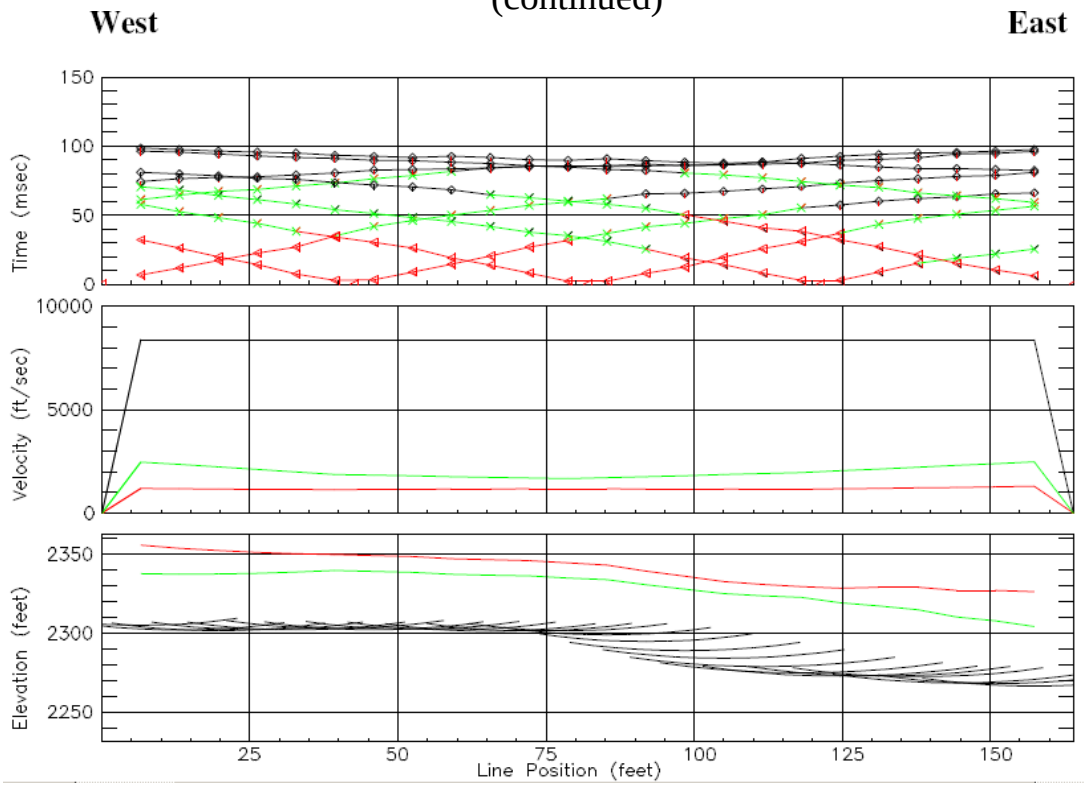
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 7.



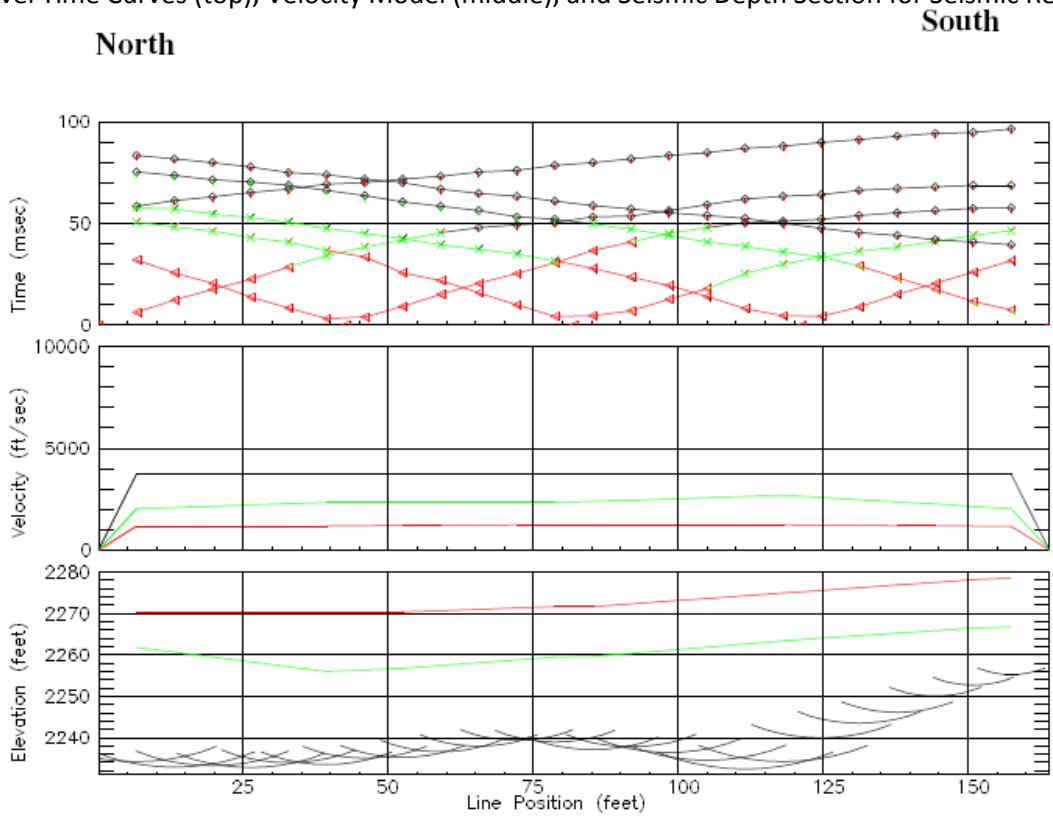
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 8.

APPENDIX B

(continued)



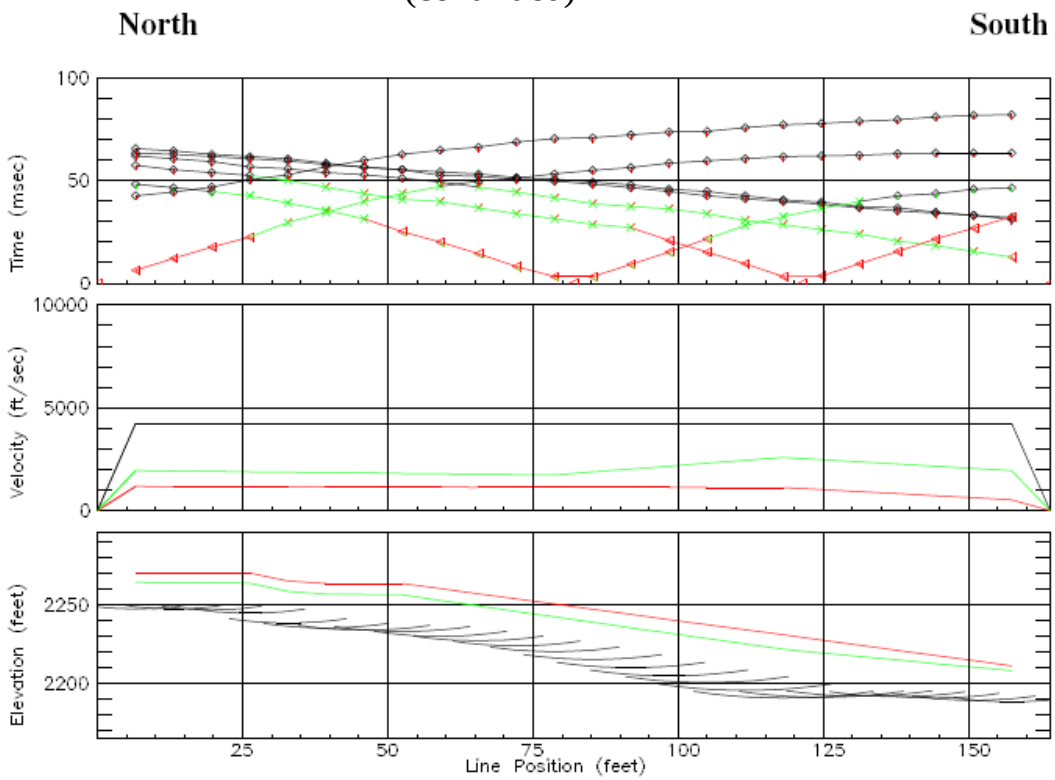
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 9.



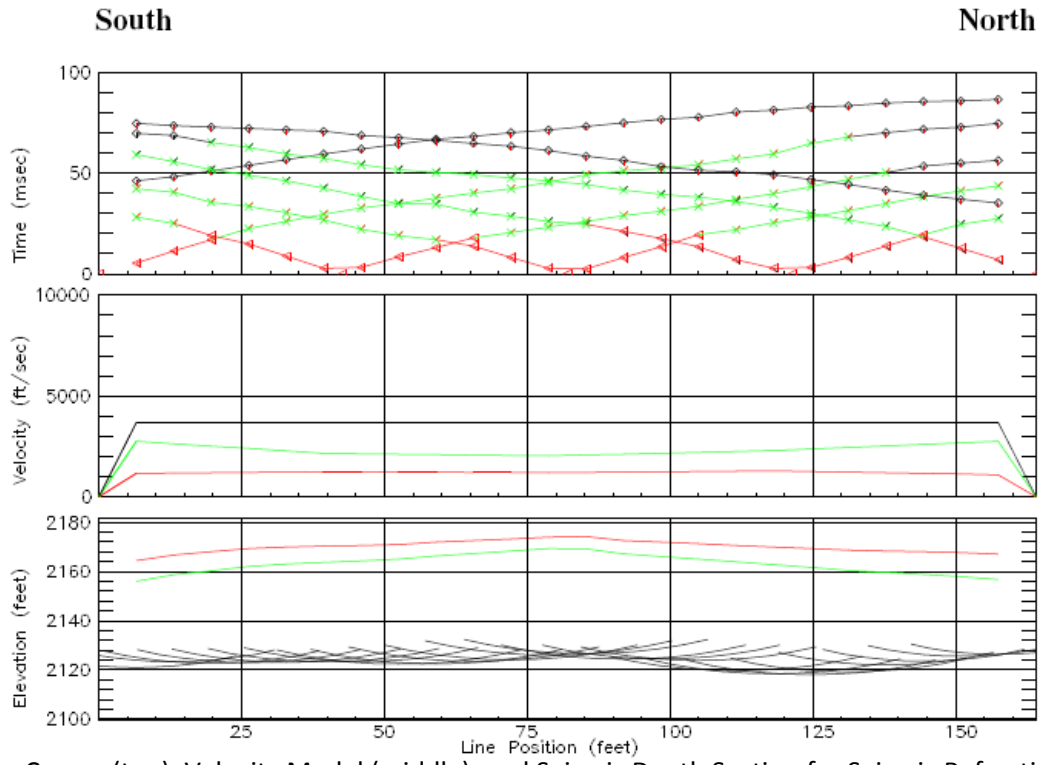
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 10.

APPENDIX B

(continued)



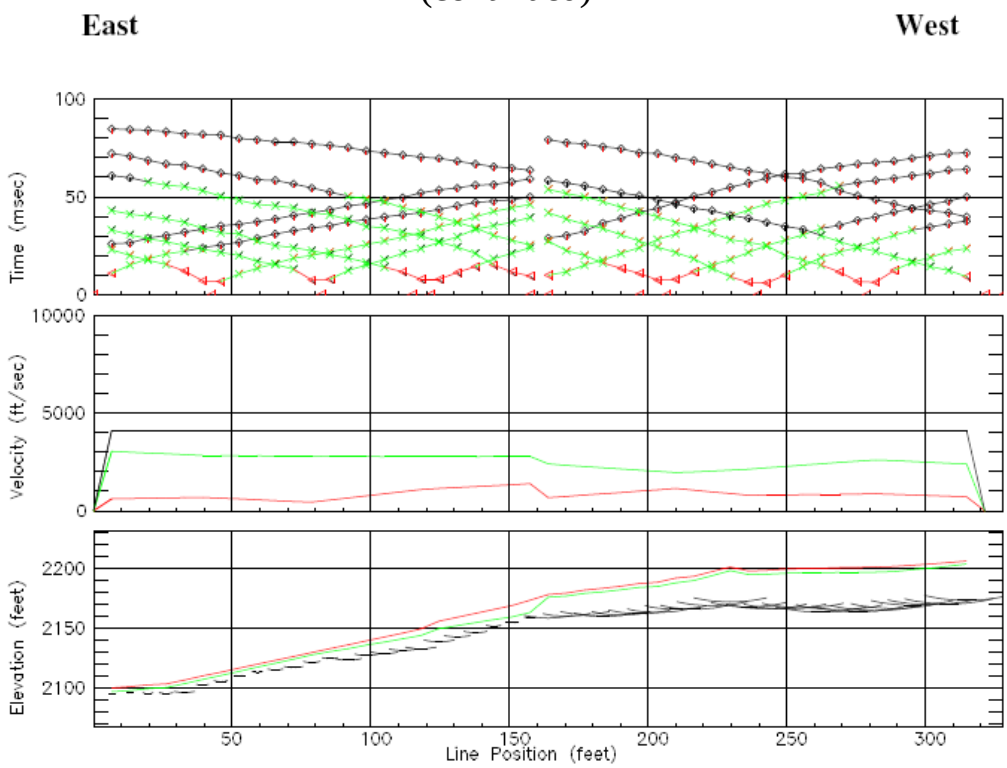
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 11.



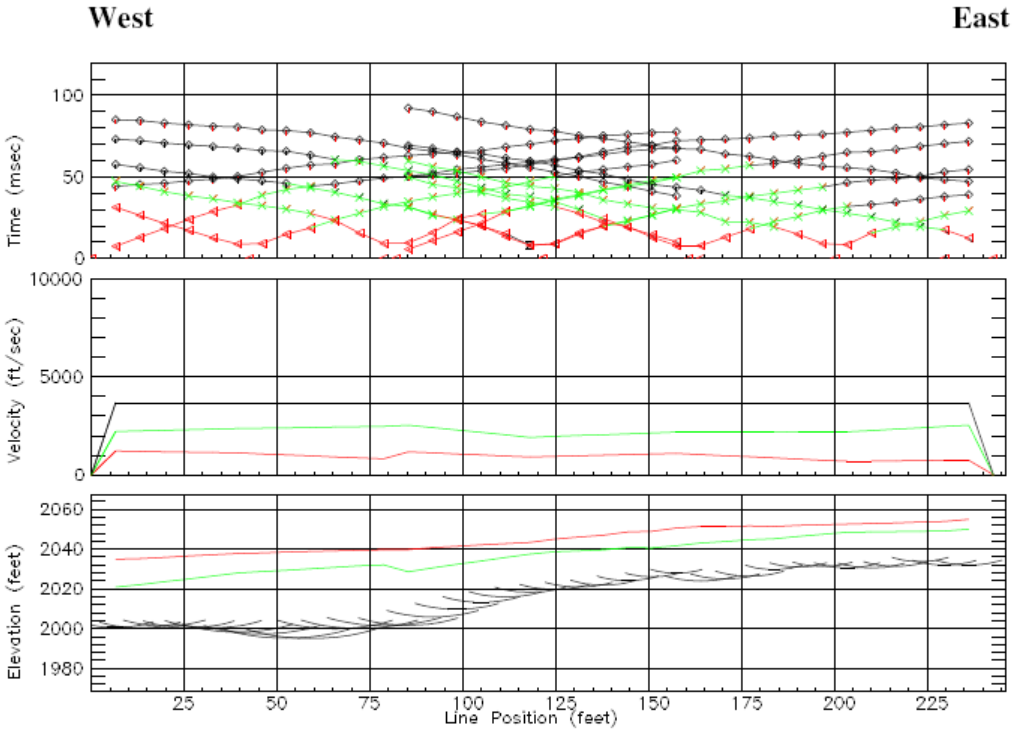
Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 12.

APPENDIX B

(continued)



Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 14 (lines 13 and 14 combined).



Travel Time Curves (top), Velocity Model (middle), and Seismic Depth Section for Seismic Refraction Line 16 (line 15 was omitted in the field).

APPENDIX C

Laboratory Test Results and Logs of Test Borings

Performed under contract by SHN Consultants (2002)

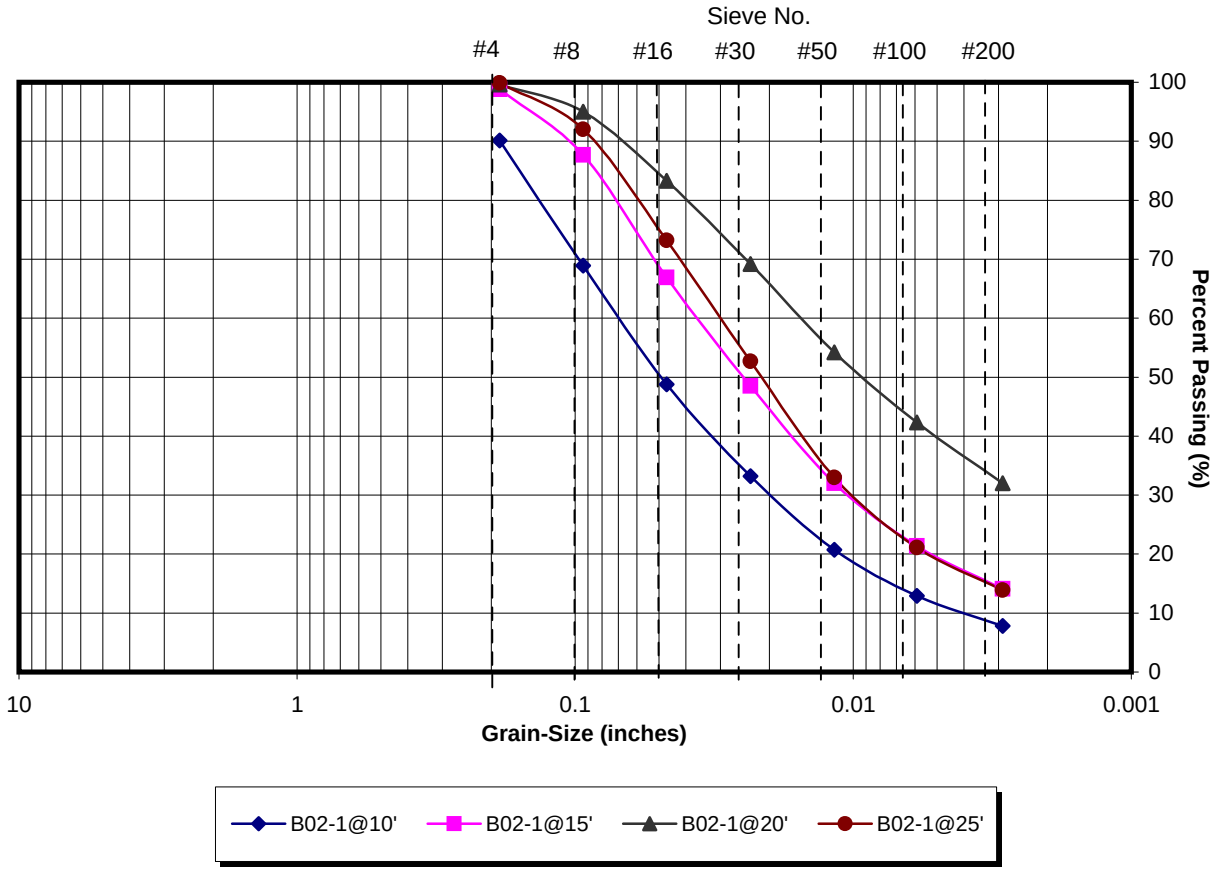
For Caltrans (EA 02-270310)

1. **Gradation Analyses**
   B02-1, B02-2, B02-3, B02-5, B02-6, B02-7, B02-8
2. **Atterberg Limits & Classifications**
   B02-1, B02-2, B02-3, B02-5, B02-7, B02-8
3. **Direct Shear Tests**
   B02-1@10', B02-1@20', B02-2@20', B02-2@30', B02-2@40'
   B02-3@10', B02-3@15', B02-5@35', B02-7@10', B02-7@5', B02-8@15', B02-8@20'
4. **Logs of Test Borings**
   B02-1, B02-2, B02-3, B02-4, B02-5, B02-6, B02-7, B02-8

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



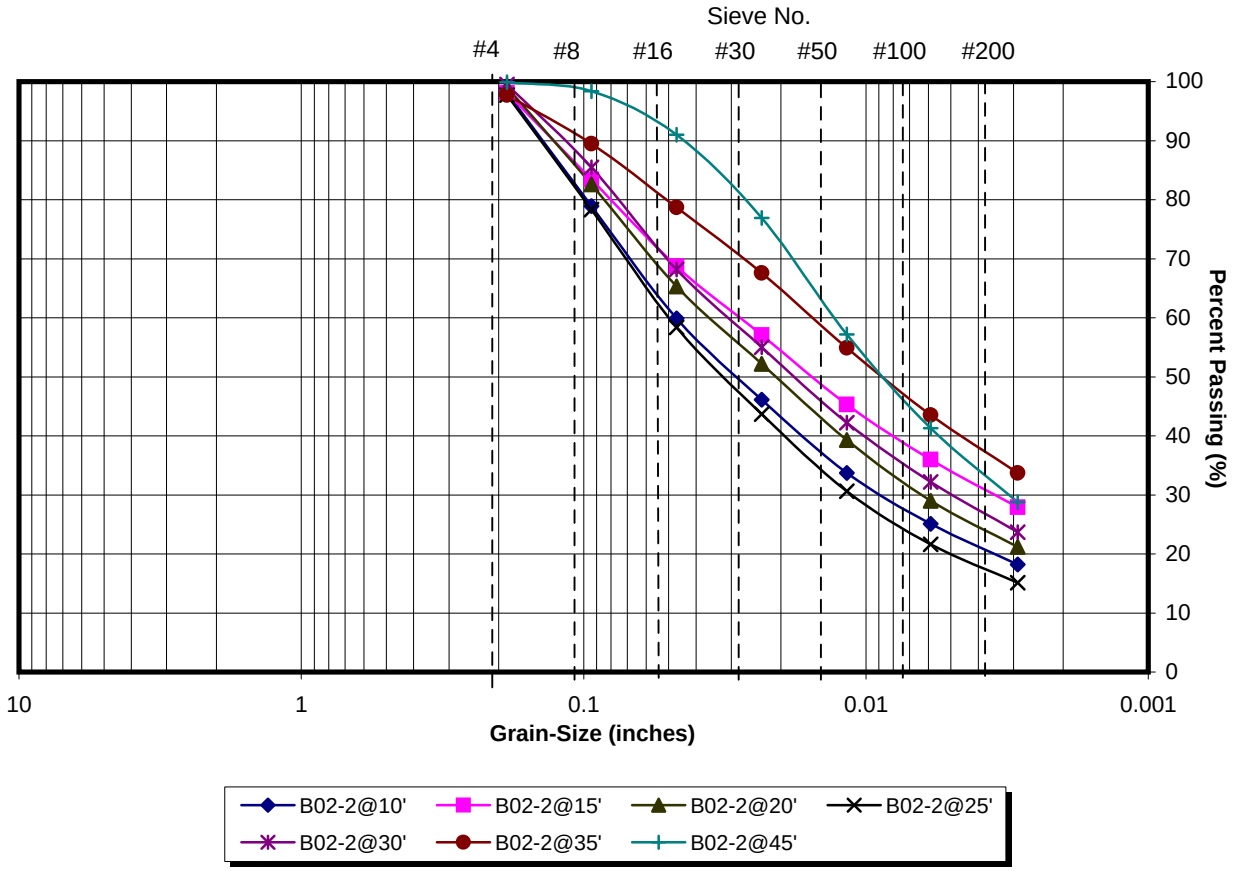
Drill Hole No.	B02-1	B02-1	B02-1	B02-1			
Sample	2	3	4	5			
Depth (ft)	10	15	20	25			
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	90.1	98.8	99.6	99.9			
0.0929	68.9	87.7	95	92			
0.0465	48.8	66.9	83.3	73.2			
0.0236	33.2	48.5	69.2	52.7			
0.0118	20.7	32	54.2	33			
0.00591	12.9	21.4	42.3	21.1			
0.00295	7.8	14.1	32	13.9			

Borehole B02-1
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.021
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



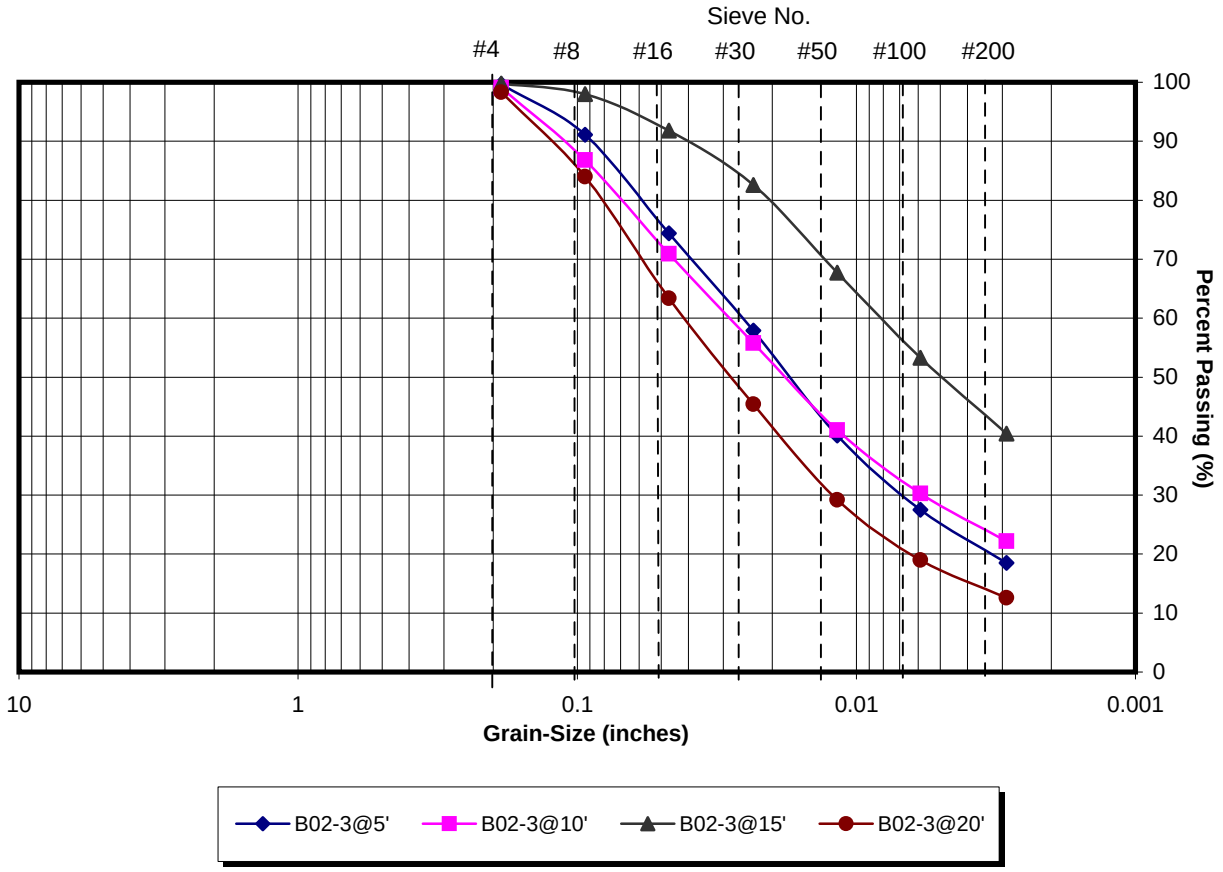
Drill Hole No.	B02-2	B02-2	B02-2	B02-2	B02-2	B02-2	B02-2
Sample	2	3	4	5	6	7	9
Depth (ft)	10	15	20	25	30	35	45
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	98.1	98.1	99	97.7	99.5	97.7	99.9
0.0929	78.9	83.4	82.6	78.3	85.5	89.5	98.4
0.0465	59.9	68.7	65.3	58.4	68.2	78.7	91
0.0236	46.1	57.1	52.2	43.7	55	67.6	76.9
0.0118	33.7	45.3	39.3	30.6	42.2	54.9	57.2
0.00591	25.1	36	29	21.6	32.2	43.5	41.3
0.00295	18.2	27.9	21.2	15.1	23.7	33.7	28.8

Borehole B02-2
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



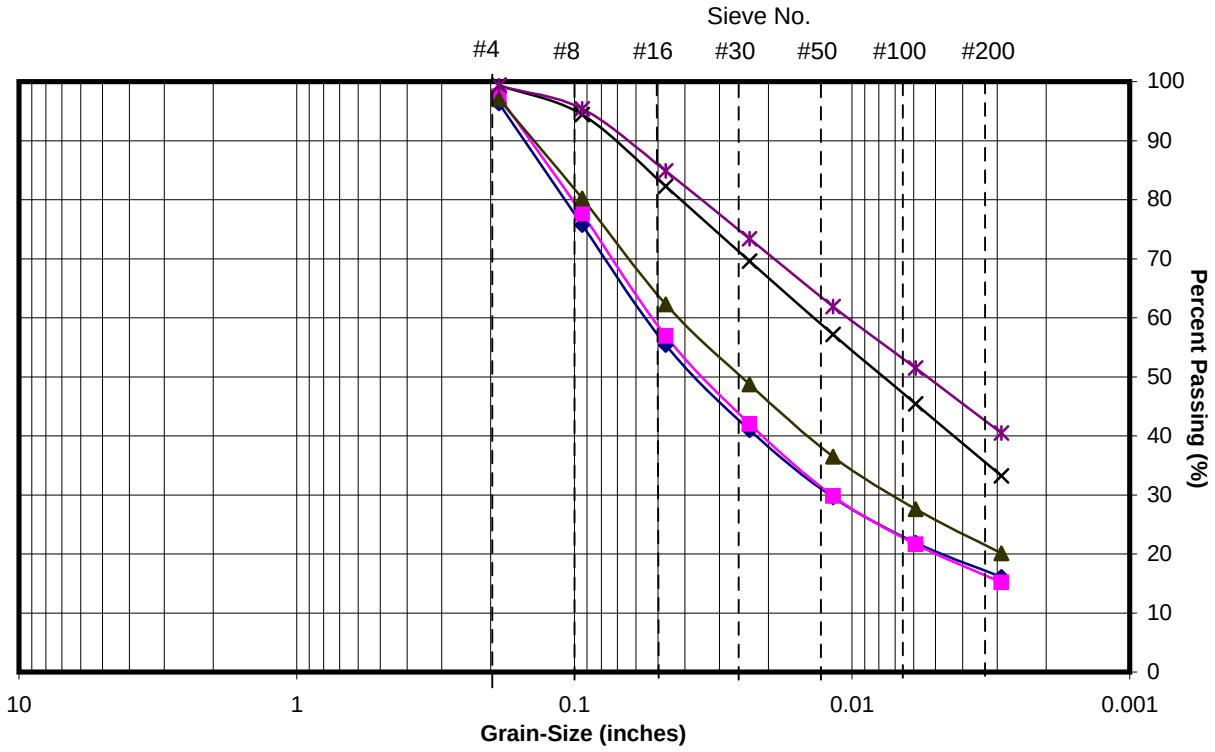
Drill Hole No.	B02-3	B02-3	B02-3	B02-3			
Sample	1	2	3	4			
Depth (ft)	5	10	15	20			
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	99.7	99.1	99.8	98.3			
0.0929	91.1	86.8	98	84			
0.0465	74.4	70.9	91.8	63.4			
0.0236	57.9	55.8	82.6	45.4			
0.0118	40.1	41	67.7	29.2			
0.0059	27.5	30.3	53.3	19			
0.0029	18.5	22.2	40.4	12.6			

Borehole B02-3
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



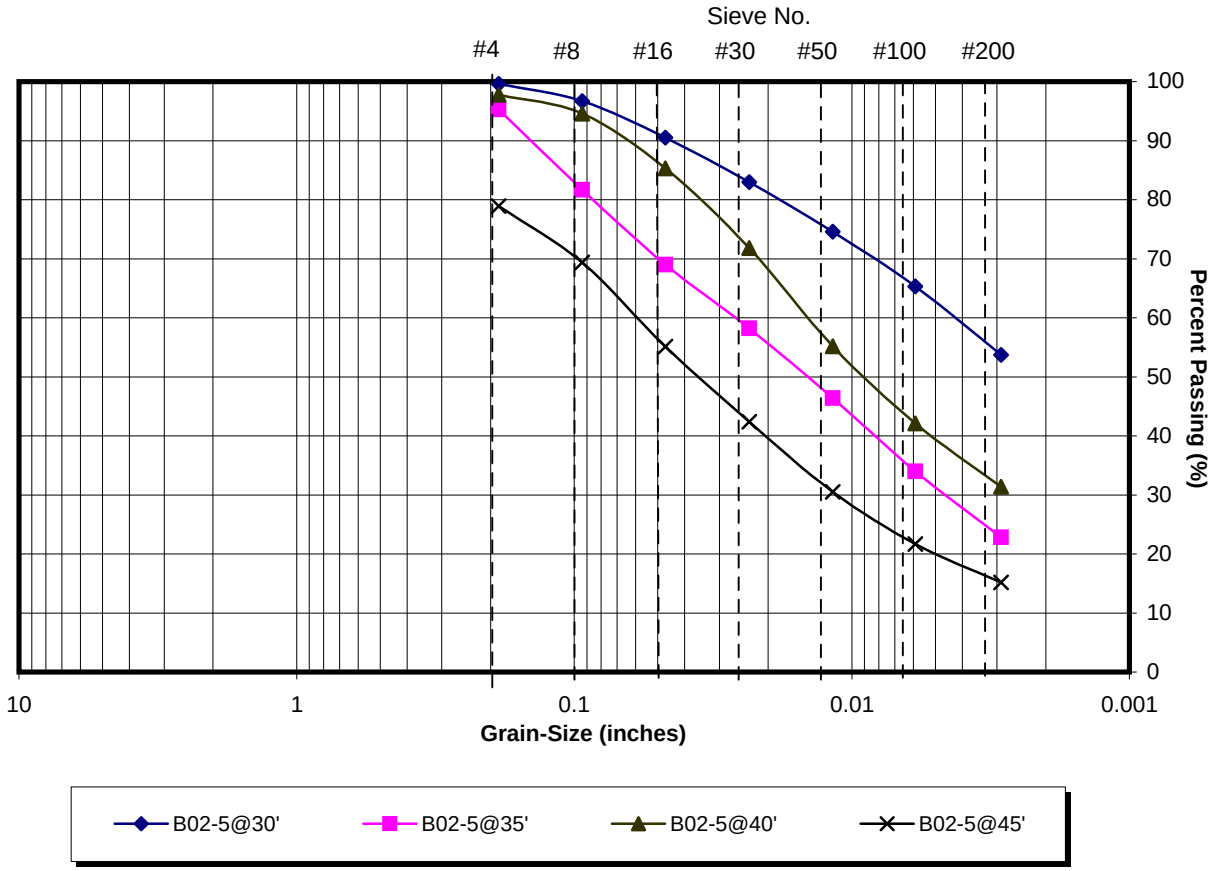
Drill Hole No.	B02-5	B02-5	B02-5	B02-5	B02-5		
Sample	1	2	3	4	5		
Depth (ft)	5	10	15	20	25		
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	96.3	97.5	97	99.4	99.3		
0.0929	75.7	77.6	80.2	94.4	95.4		
0.0465	55.4	56.9	62.3	82.3	84.9		
0.0236	41	42	48.7	69.6	73.4		
0.0118	29.6	29.8	36.5	57.2	61.9		
0.00591	21.9	21.6	27.6	45.4	51.5		
0.00295	16.1	15.2	20.1	33.2	40.5		

Borehole B02-5
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



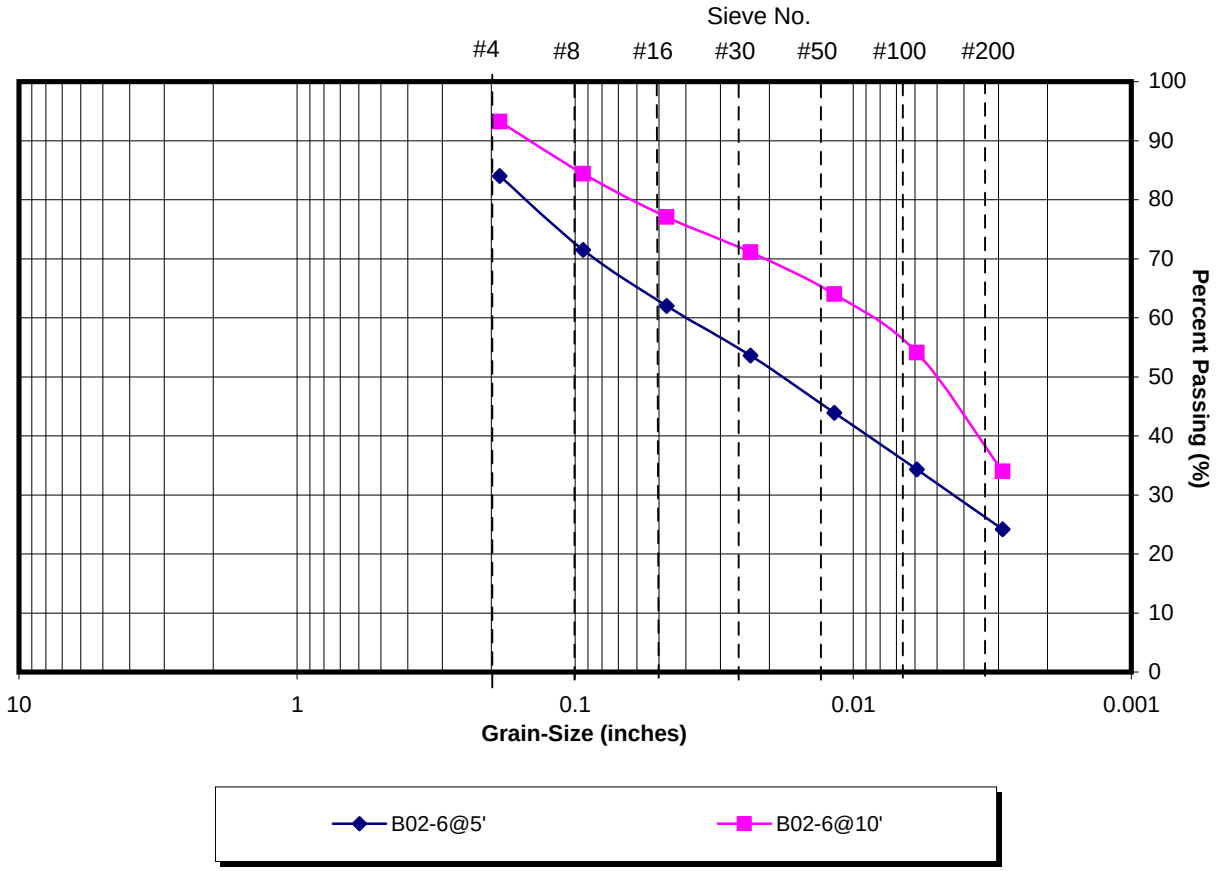
Drill Hole No.	B02-5	B02-5	B02-5	B02-5			
Sample	6	7	8	9			
Depth (ft)	30	35	40	45			
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	99.6	95.3	97.8	78.9			
0.0929	96.7	81.7	94.6	69.4			
0.0465	90.5	69	85.3	55.1			
0.0236	83	58.2	71.8	42.4			
0.0118	74.6	46.4	55.2	30.5			
0.00591	65.3	34	42.1	21.7			
0.00295	53.7	22.8	31.4	15.2			

Borehole B02-5 (cont.)
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



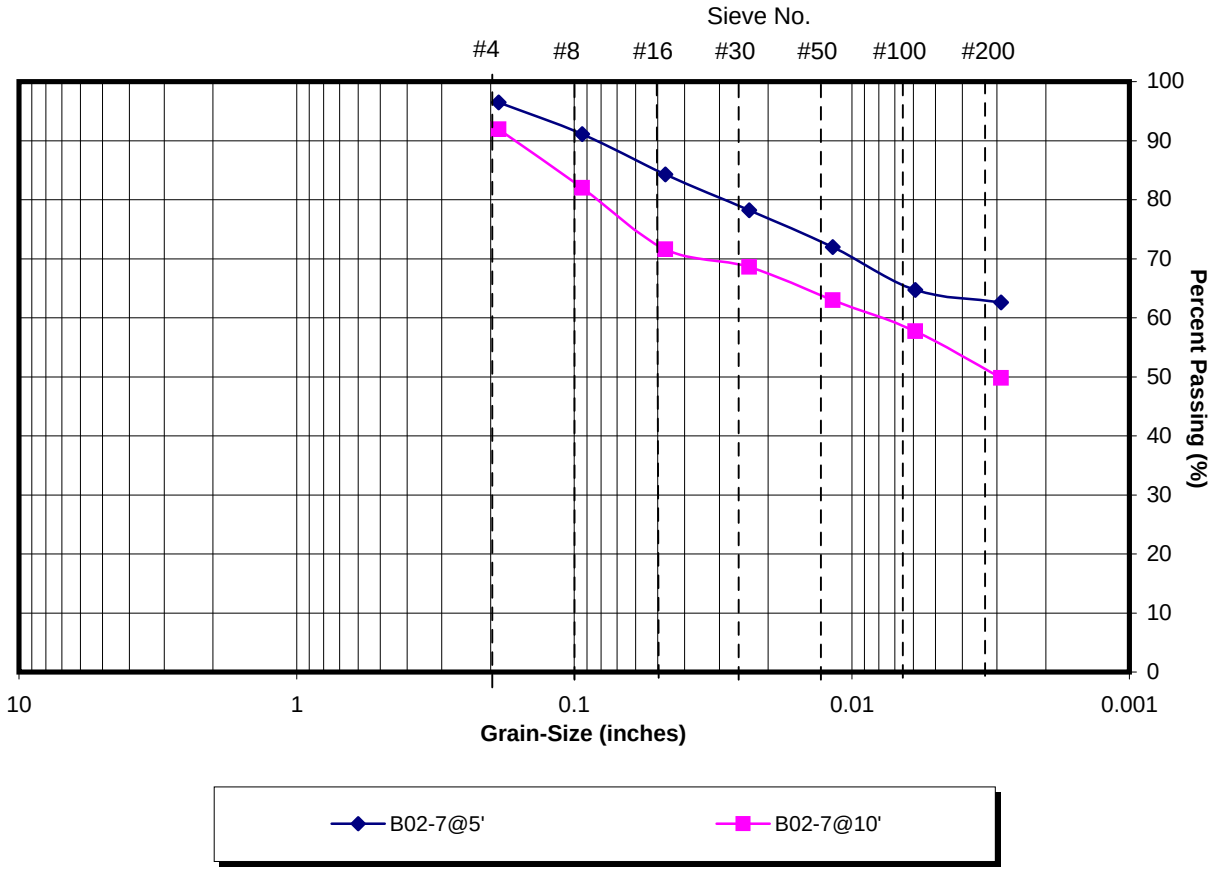
Drill Hole No.	B02-6	B02-6					
Sample	1	2					
Depth (ft)	5	10					
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	84	93.2					
0.0929	71.5	84.4					
0.0465	62	77.1					
0.0236	53.6	71.1					
0.0118	43.9	64					
0.00591	34.3	54.1					
0.00295	24.2	34					

Borehole B02-6
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



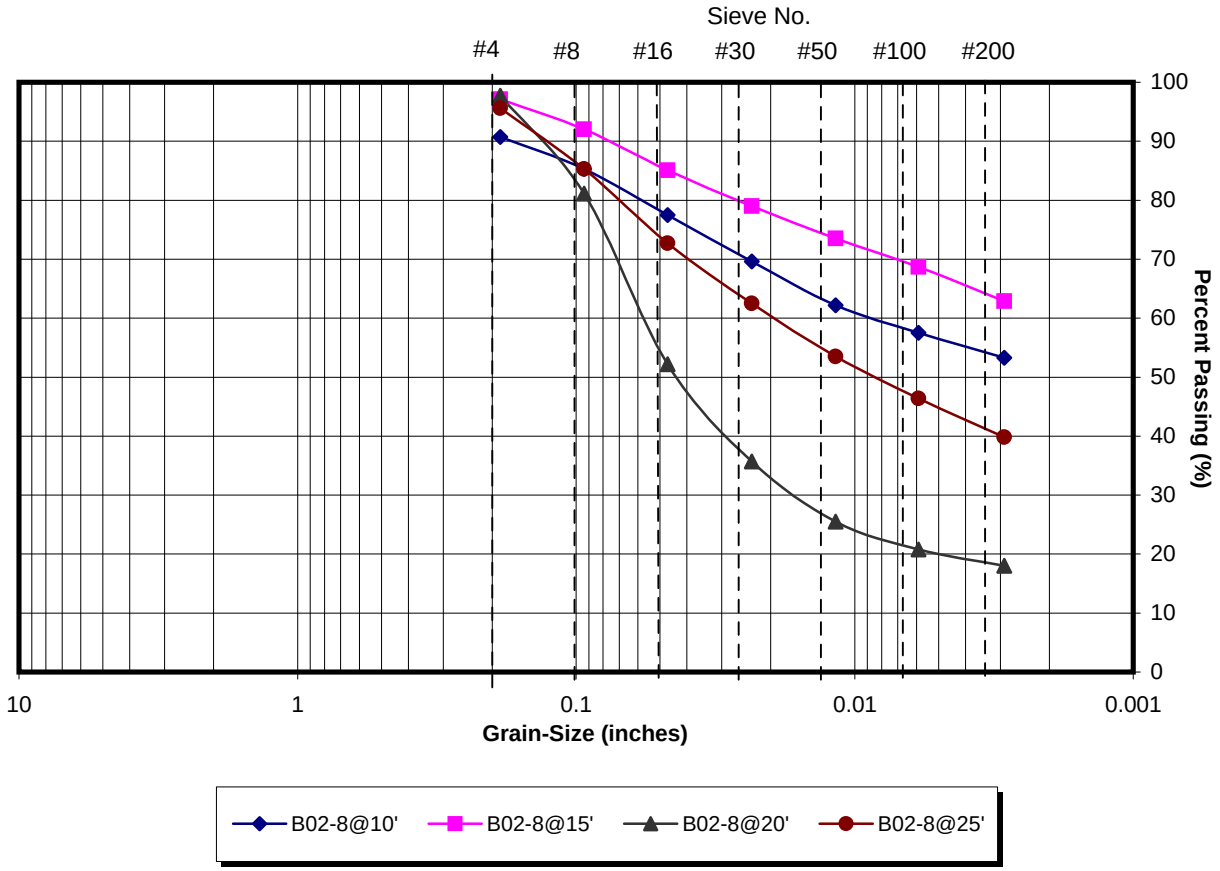
Drill Hole No.	B02-7	B02-7					
Sample	1	2					
Depth (ft)	5	10					
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	96.5	91.9					
0.0929	91.1	82					
0.0465	84.3	71.6					
0.0236	78.2	68.6					
0.0118	72	63					
0.00591	64.7	57.7					
0.00295	62.6	49.8					

Borehole B02-7
Buckhorn Grade

Project: Buckhorn Grade
Location of Project: Shasta Co., CA
Client: Caltrans

Project No.: 502001.02
Tested By: SHN
Date of Testing: 09/17/2002

GRAIN-SIZE DISTRIBUTION



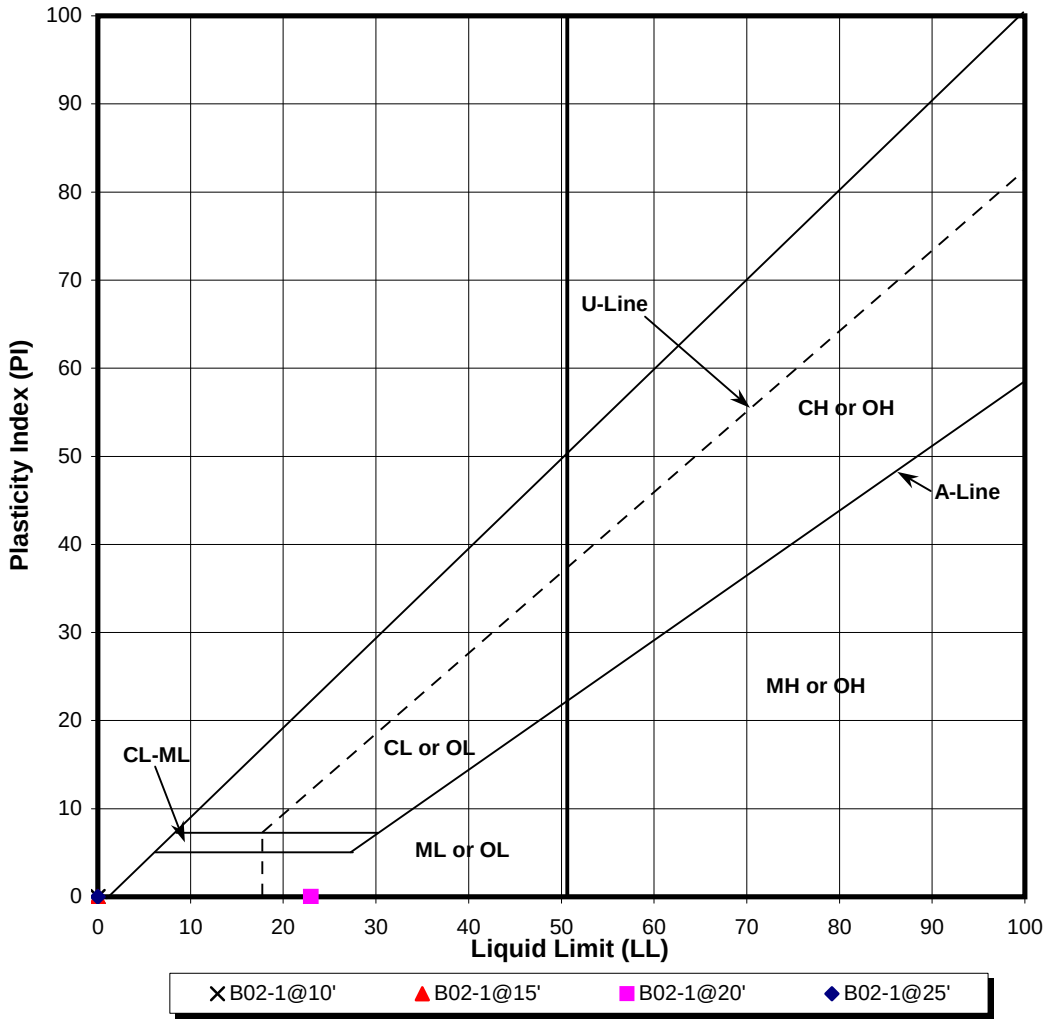
Drill Hole No.	B02-8	B02-8	B02-8	B02-8			
Sample	2	3	4	5			
Depth (ft)	10	15	20	25			
Sieve (inches)	Percent Passing (%)						
3							
2							
1							
0.75							
0.5							
0.375							
0.187	90.7	97.1	97.7	95.6			
0.0929	85.3	92	81.1	85.3			
0.0465	77.5	85.1	52.2	72.7			
0.0236	69.6	79	35.7	62.5			
0.0118	62.2	73.5	25.5	53.5			
0.0059	57.5	68.7	20.8	46.4			
0.0029	53.3	62.9	18	39.8			

Borehole B02-8
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/17/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-1	10.0	2	Silty SAND (SM)	0	0	0
B02-1	15.0	3	SAND with silt (SW-SM)	0	0	0
B02-1	20.0	4	Silty SAND (SM)	23	23	0
B02-1	25.0	5	Silty SAND (SM)	0	0	0

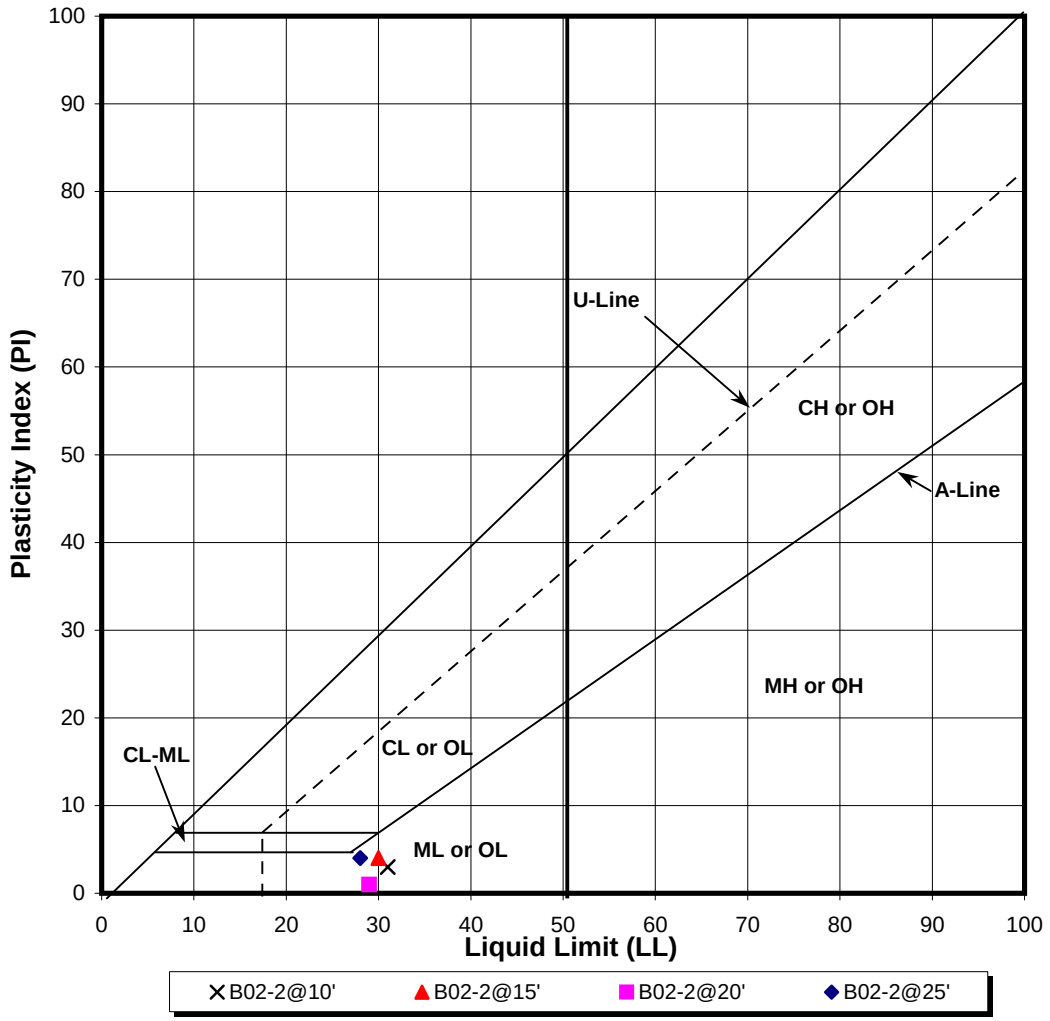
ASTM D4318 & D2487

Borehole B02-1
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/20/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-2	10.0	2	Silty SAND (SM)	31	28	3
B02-2	15.0	3	Silty SAND (SM)	30	26	4
B02-2	20.0	4	Silty SAND (SM)	29	28	1
B02-2	25.0	5	Silty SAND (SM)	28	24	4

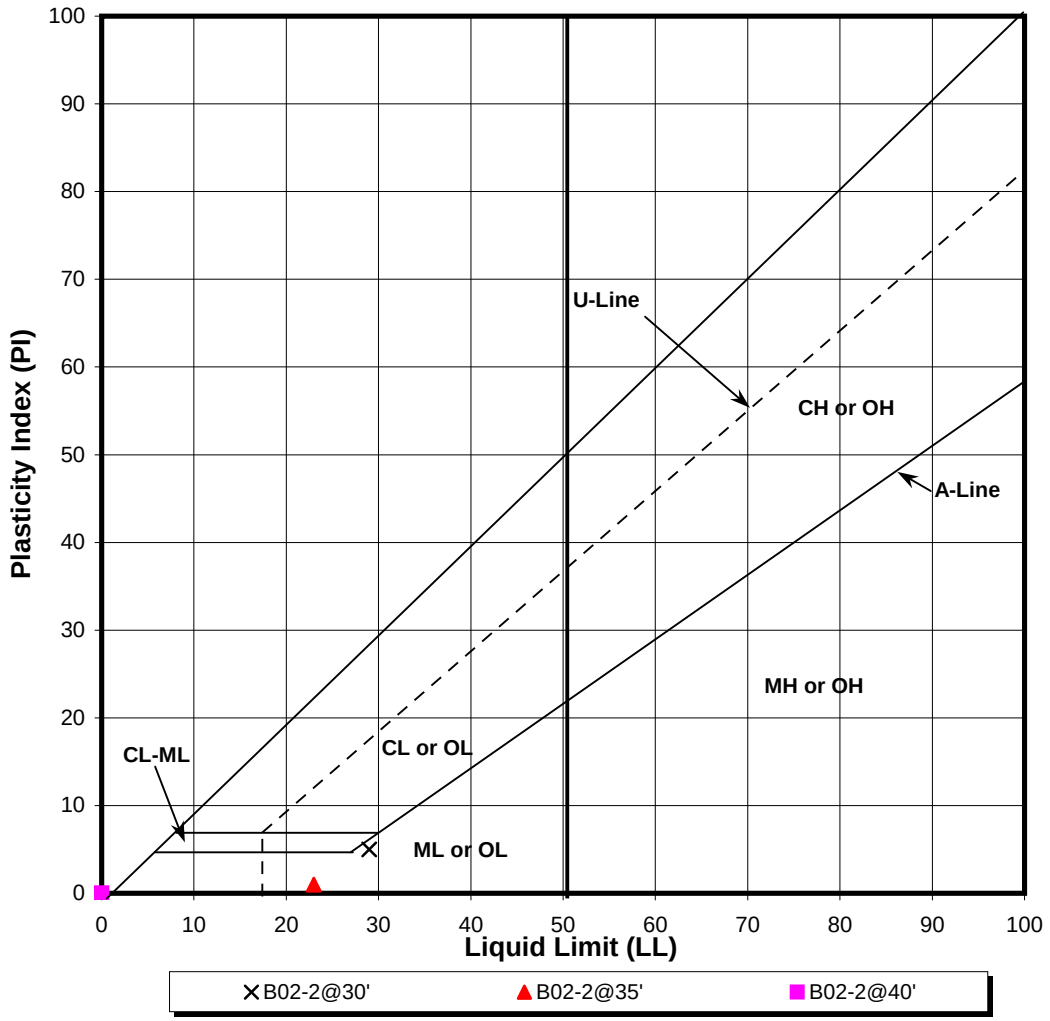
ASTM D4318 & D2487

Borehole B02-2
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/20/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-2	30.0	6	Silty SAND (SM)	29	24	5
B02-2	35.0	7	Silty SAND (SM)	23	22	1
B02-2	40.0	8	Silty SAND (SM)	0	0	0

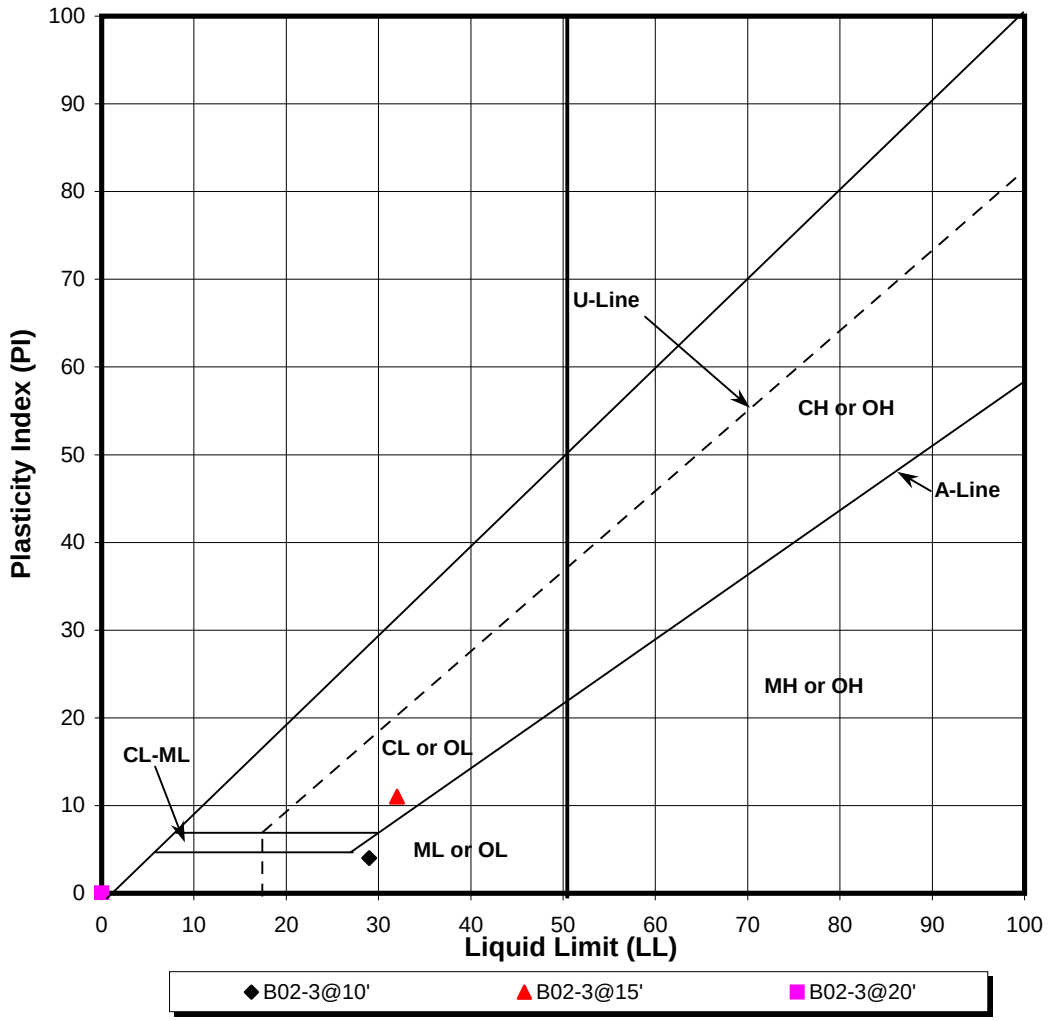
ASTM D4318 & D2487

Borehole B02-2 (cont.)
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/20/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-3	10.0	2	Silty SAND (SM)	29	25	4
B02-3	15.0	3	Clayey SAND (SC)	32	21	11
B02-3	20.0	4	Silty SAND (SM)	0	0	0

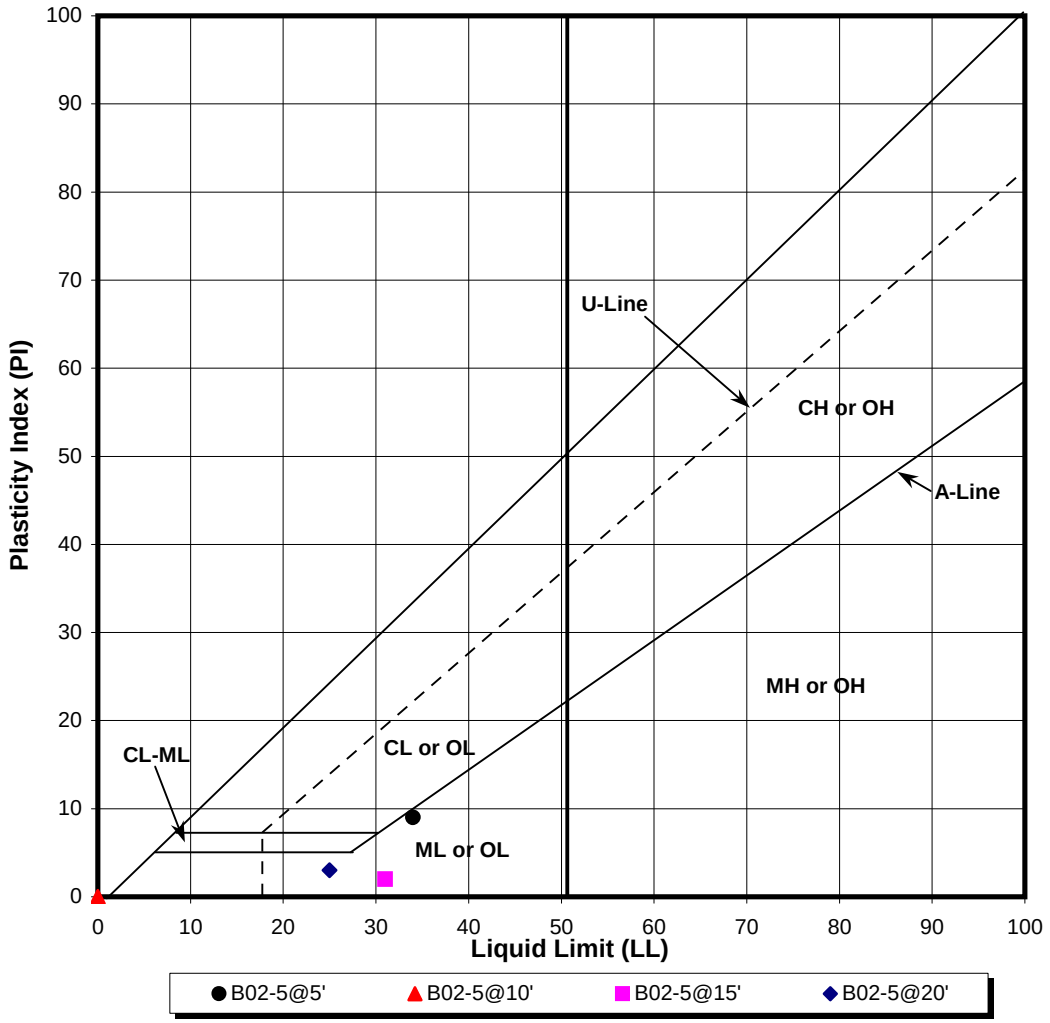
ASTM D4318 & D2487

Borehole B02-3
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/17/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-5	5.0	1	Silty SAND (SM)	34	25	9
B02-5	10.0	2	Silty SAND (SM)	0	0	0
B02-5	15.0	3	Silty SAND (SM)	31	29	2
B02-5	20.0	4	Silty SAND (SM)	25	22	3

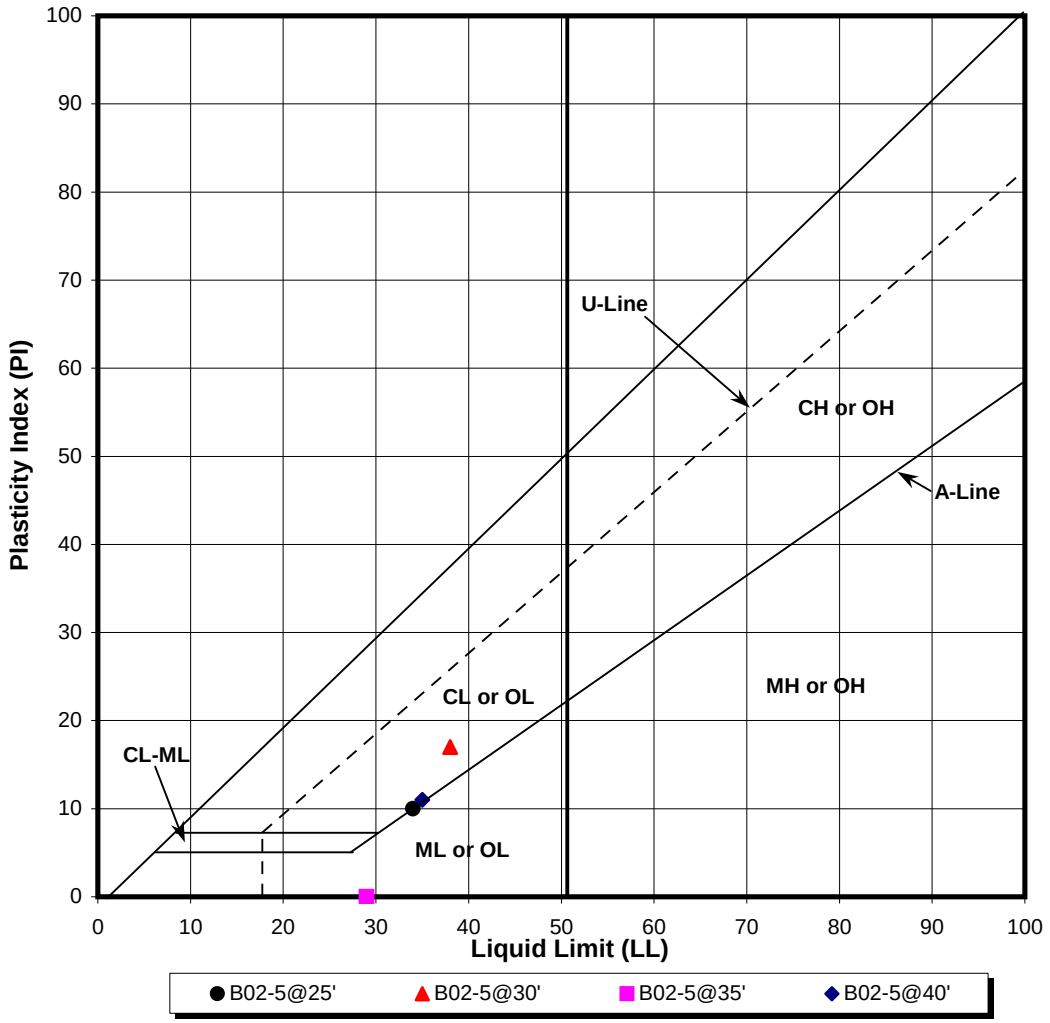
ASTM D4318 & D2487

Borehole B02-5
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/17/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-5	25.0	5	Silty SAND (SM)	34	24	10
B02-5	30.0	6	Sandy SILT (ML)	38	21	17
B02-5	35.0	7	Silty SAND (SM)	29	29	0
B02-5	40.0	8	Clayey SAND (SC)	35	24	11

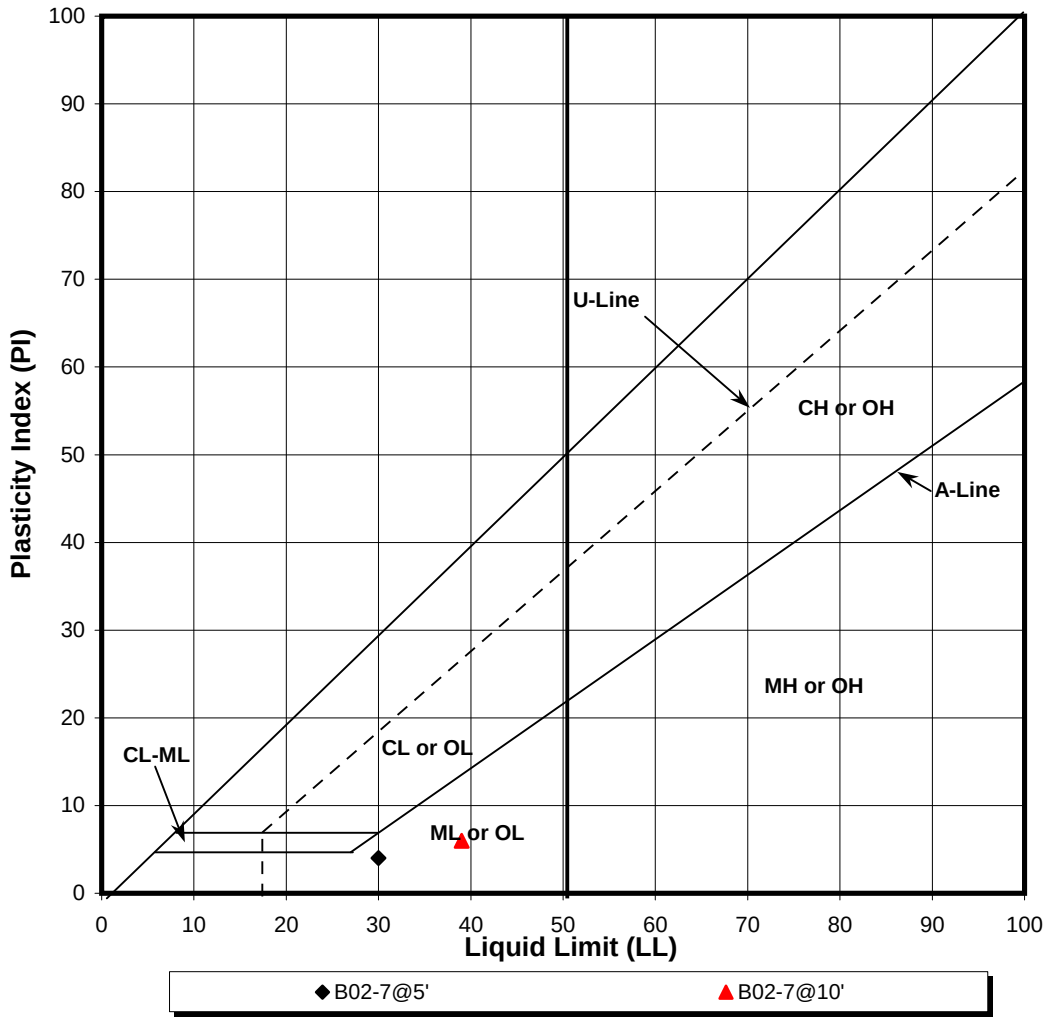
ASTM D4318 & D2487

Borehole B02-5 (cont.)
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/20/2002

ATTERBERG LIMITS



LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-7	5.0	1	Sandy SILT (ML)	30	26	4
B02-7	10.0	2	Sandy SILT (ML)	39	33	6

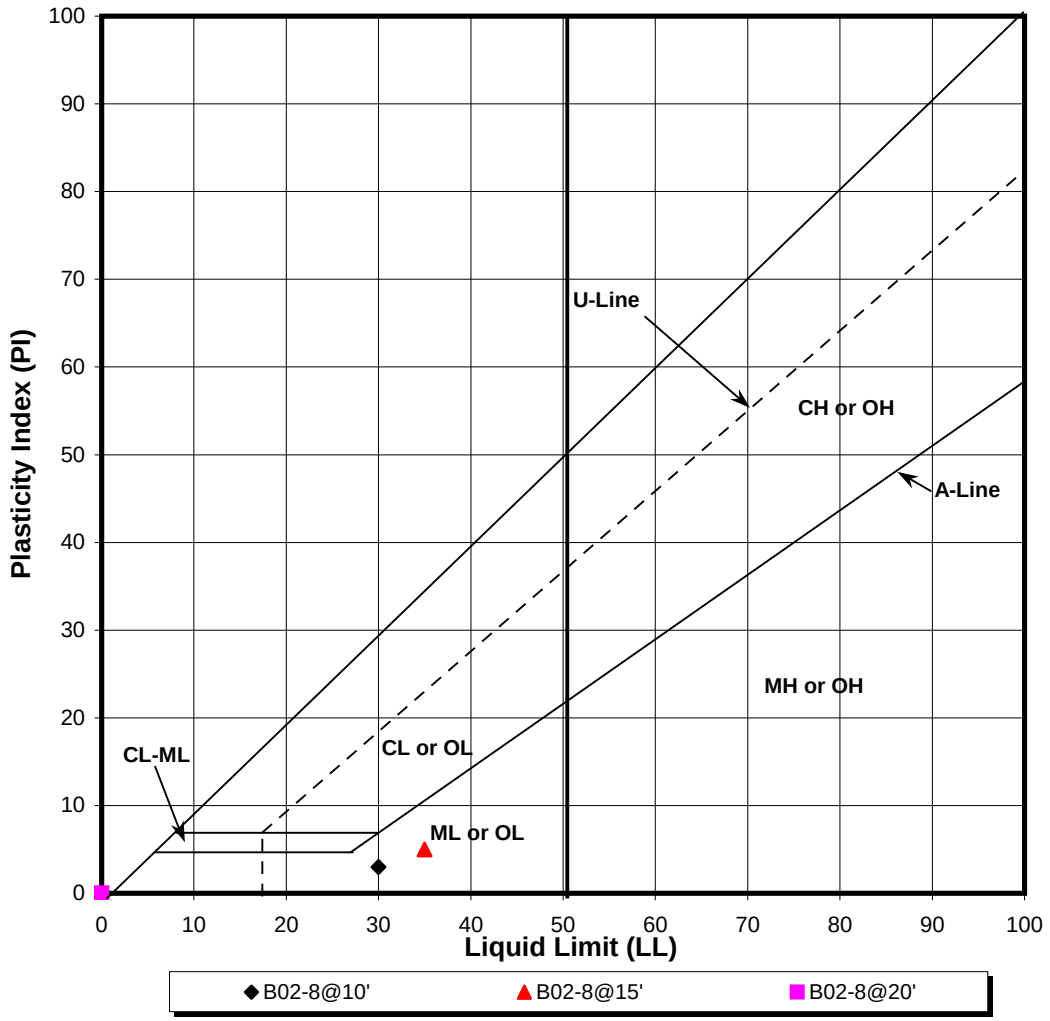
ASTM D4318 & D2487

Borehole B02-7
Buckhorn Grade

Project: Buckhorn Grade
Client: Caltrans

Project No.: 502001.021
Date of Testing: 09/20/2002

ATTERBERG LIMITS



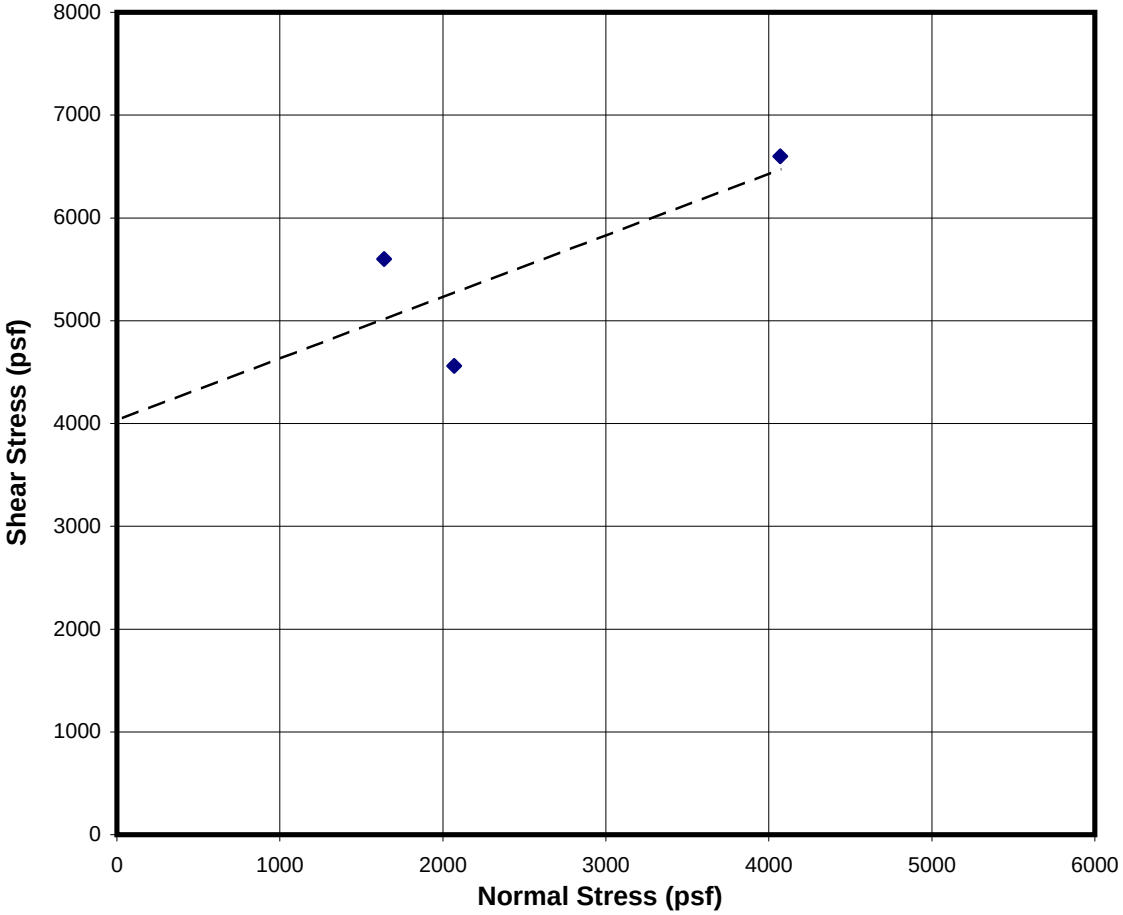
LEGEND			CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS		
Location	Depth, ft	Sample No.		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B02-8	10.0	2	Sandy SILT (ML)	30	27	3
B02-8	15.0	3	Sandy SILT (ML)	35	30	5
B02-8	20.0	4	Silty SAND (SM)	0	0	0

ASTM D4318 & D2487

Borehole B02-8
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/19/2002
		Sample No.:	B02-1@10'

DIRECT SHEAR DATA



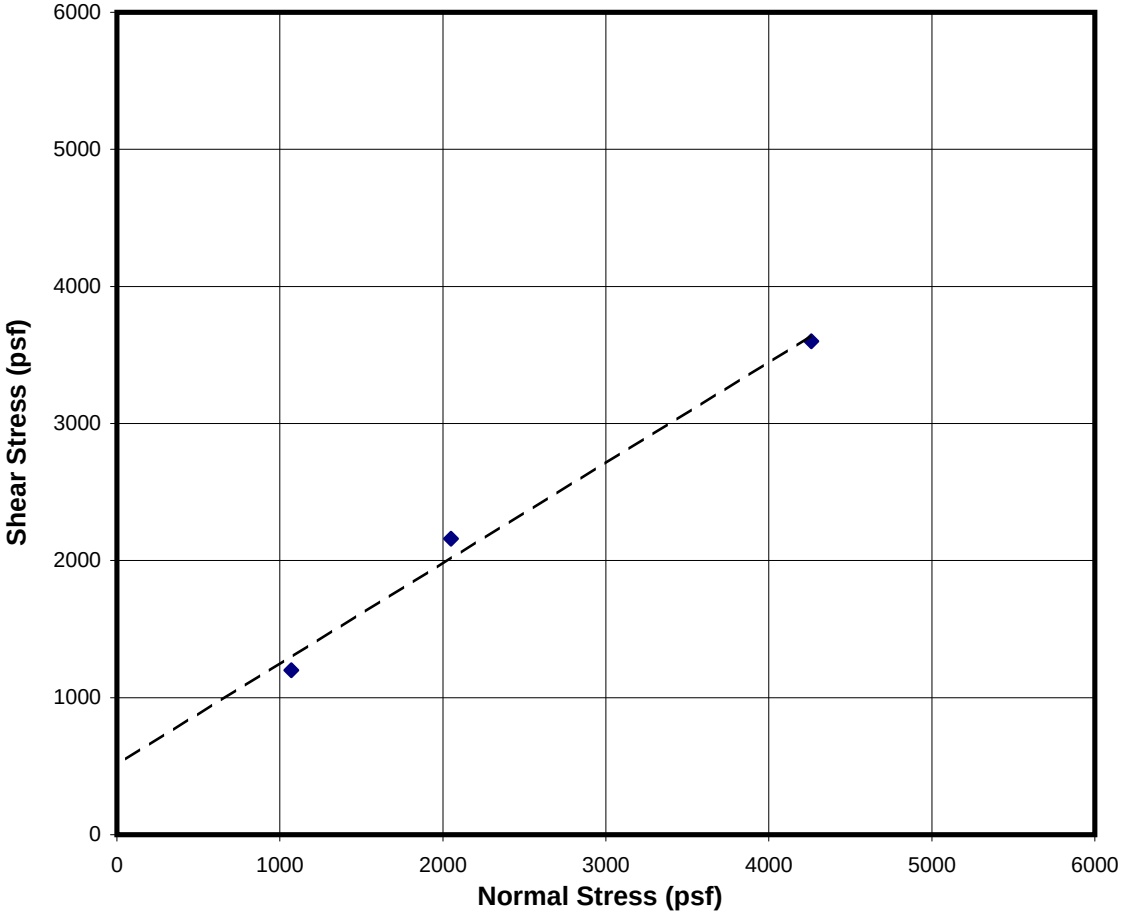
B02-1@10'			
Angle of Internal Friction:	31	degrees	Test Type
Cohesion :	4028	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1640	5600	9	112.3	15.3	112.9
2	2070	4560	7	114.9	8.7	115.3
3	4070	6600	7.9	107.5	9	111.2

Sample B02-1@10ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/13/2002
		Sample No.:	B02-1@20'

DIRECT SHEAR DATA



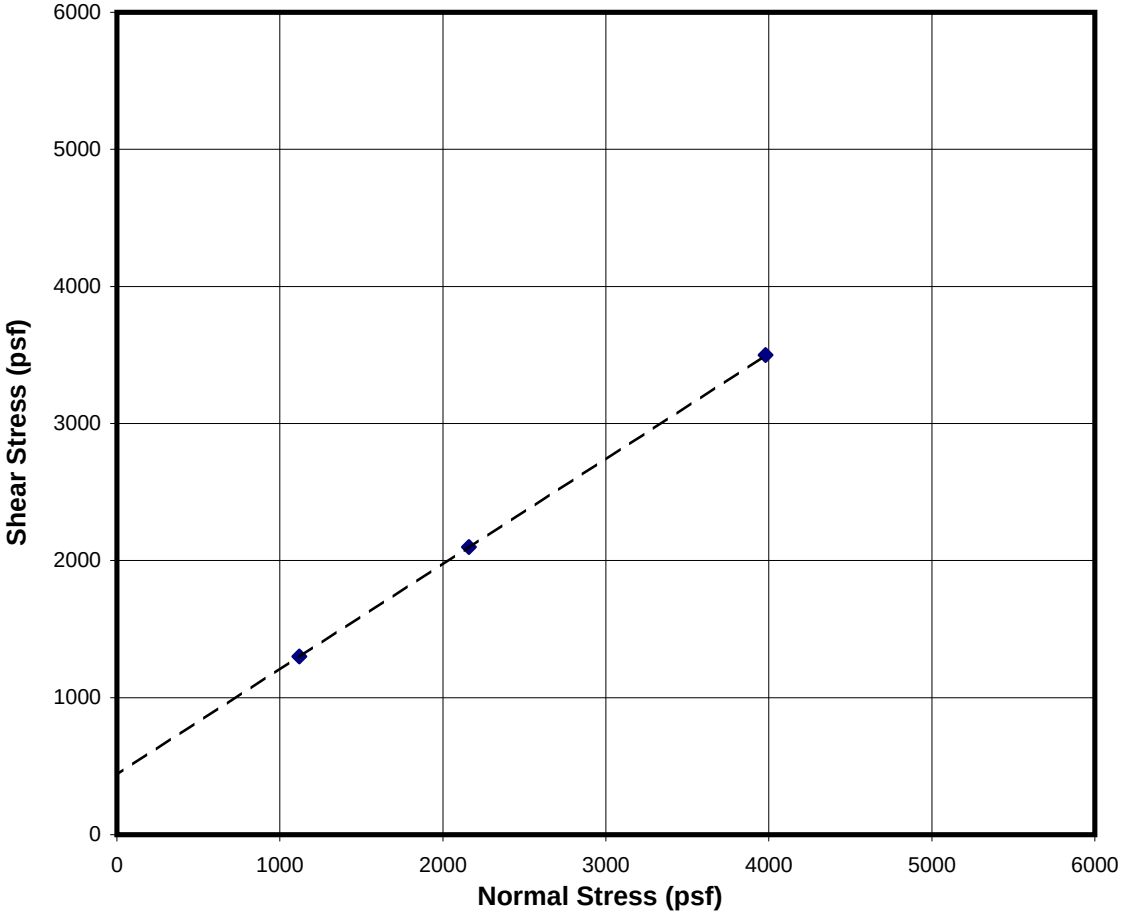
B02-1@20'			
Angle of Internal Friction:	36	degrees	Test Type
Cohesion :	511	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1070	1200	16.7	105	16.4	106.7
2	2050	2160	15.1	107.6	16.9	110.2
3	4260	3600	15.4	108.5	16.7	111.6

Sample B02-1@20ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/18/2002
		Sample No.:	B02-2@20'

DIRECT SHEAR DATA



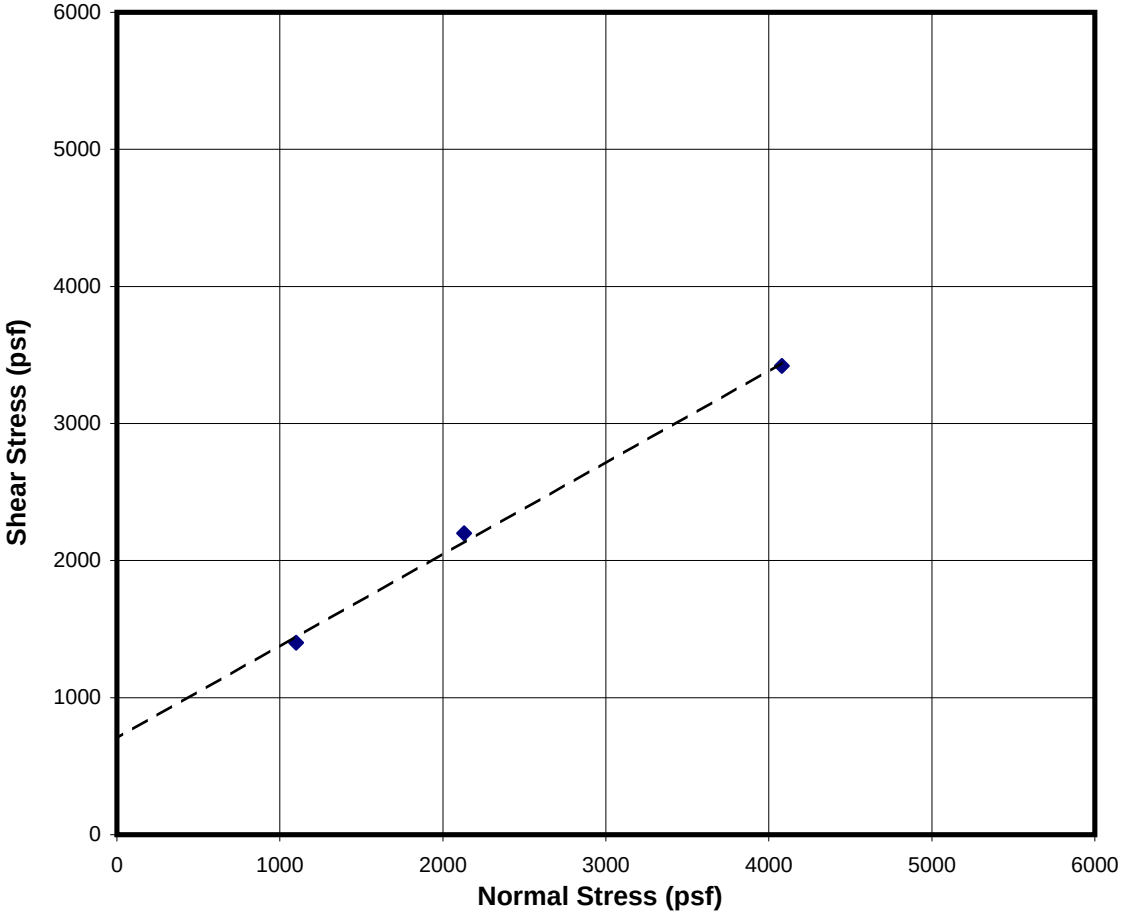
B02-2@20'			
Angle of Internal Friction:	38	degrees	Type
Cohesion :	438	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1120	1300	9.9	116.9	12.1	118.3
2	2160	2100	10.7	112.8	12.4	115.7
3	3980	3500	9.8	115.6	11.8	118.8

Sample B02-2@20ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/19/2002
		Sample No.:	B02-2@30'

DIRECT SHEAR DATA



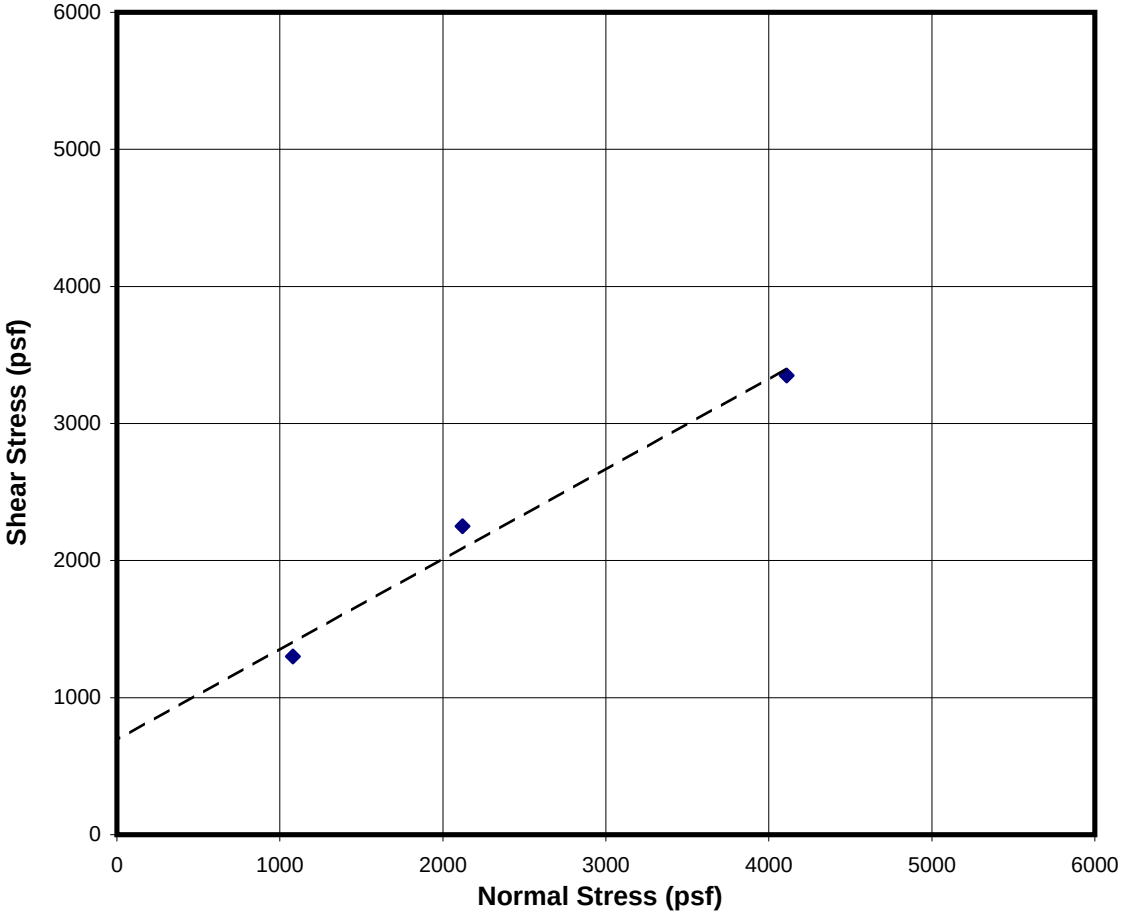
B02-2@30'			
Angle of Internal Friction:	34	degrees	Type
Cohesion :	705	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1100	1400	12.2	112.3	16.4	114.2
2	2130	2200	12.4	116.2	14.1	118.7
3	4080	3420	11.9	117.3	13.9	120.5

Sample B02-2@30ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/14/2002
		Sample No.:	B02-2@40'

DIRECT SHEAR DATA



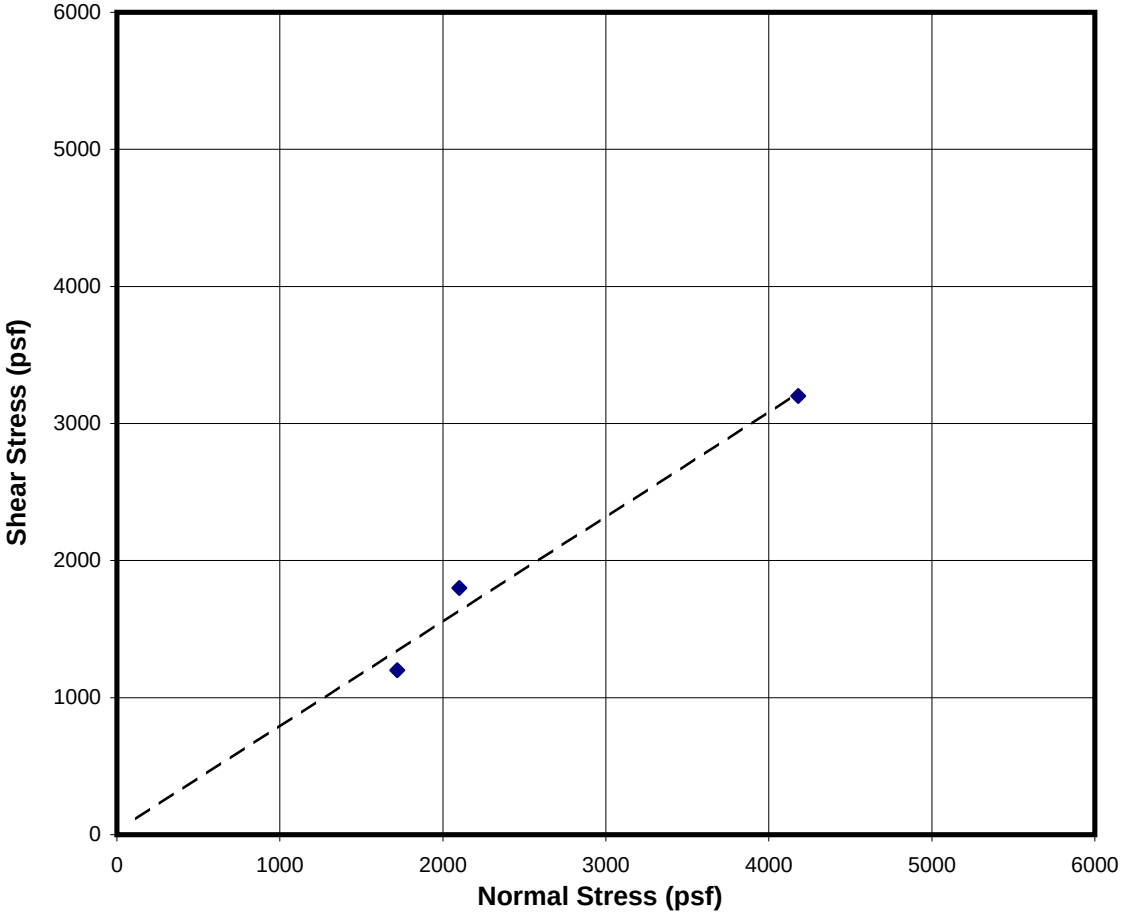
B02-2@40'			
Angle of Internal Friction:	33	degrees	Type
Cohesion :	692	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1080	1300	16.6	109.7	17.8	113.0
2	2120	2250	16.5	109.5	18.3	112.1
3	4110	3350	16.5	103.3	19.8	108.7

Sample B02-2@40ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/17/2002
		Sample No.:	B02-3@10'

DIRECT SHEAR DATA



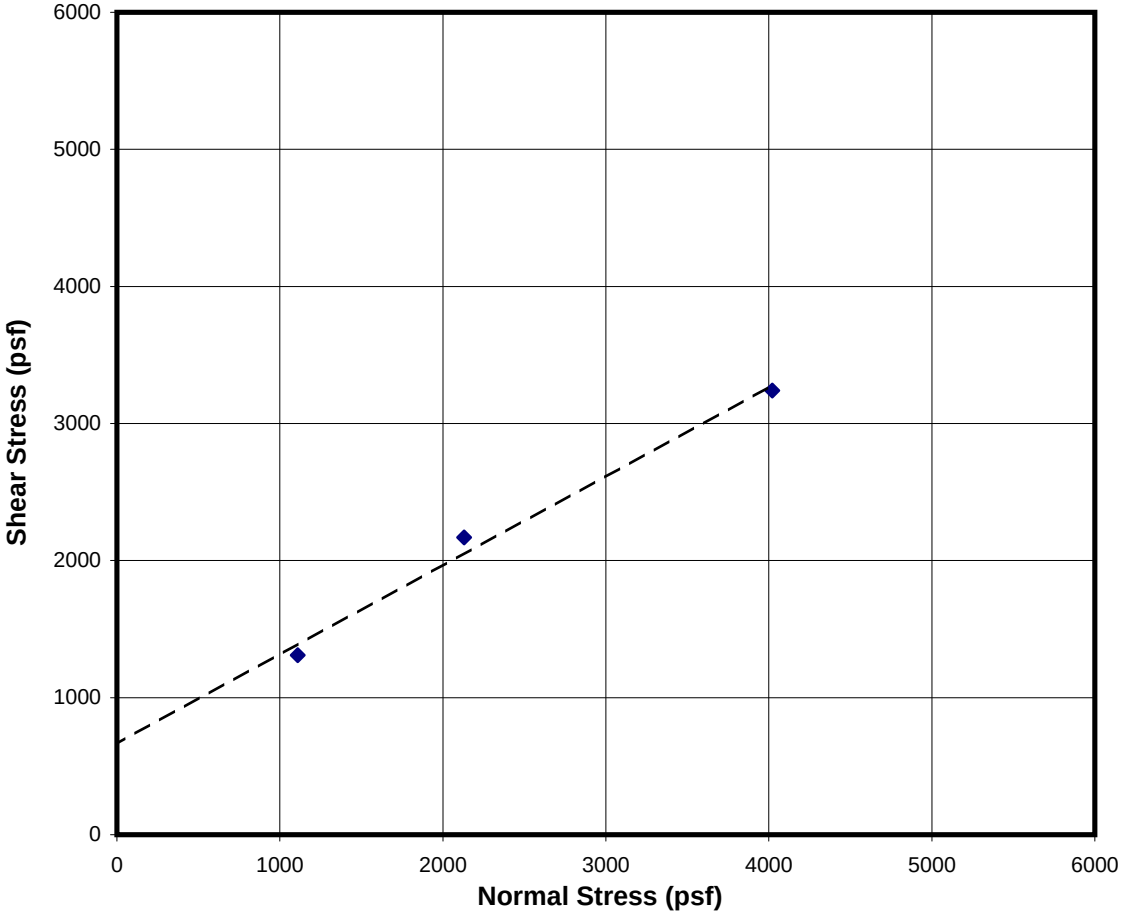
B02-3@10'			
Angle of Internal Friction:	37	degrees	Type
Cohesion :	24	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1720	1200	3.5	124.4	10.7	125.7
2	2100	1800	4.2	117.3	9.9	119.8
3	4180	3200	3.9	119.5	7.2	124.3

Sample B02-3@10ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/16/2002
		Sample No.:	B02-3@15'

DIRECT SHEAR DATA



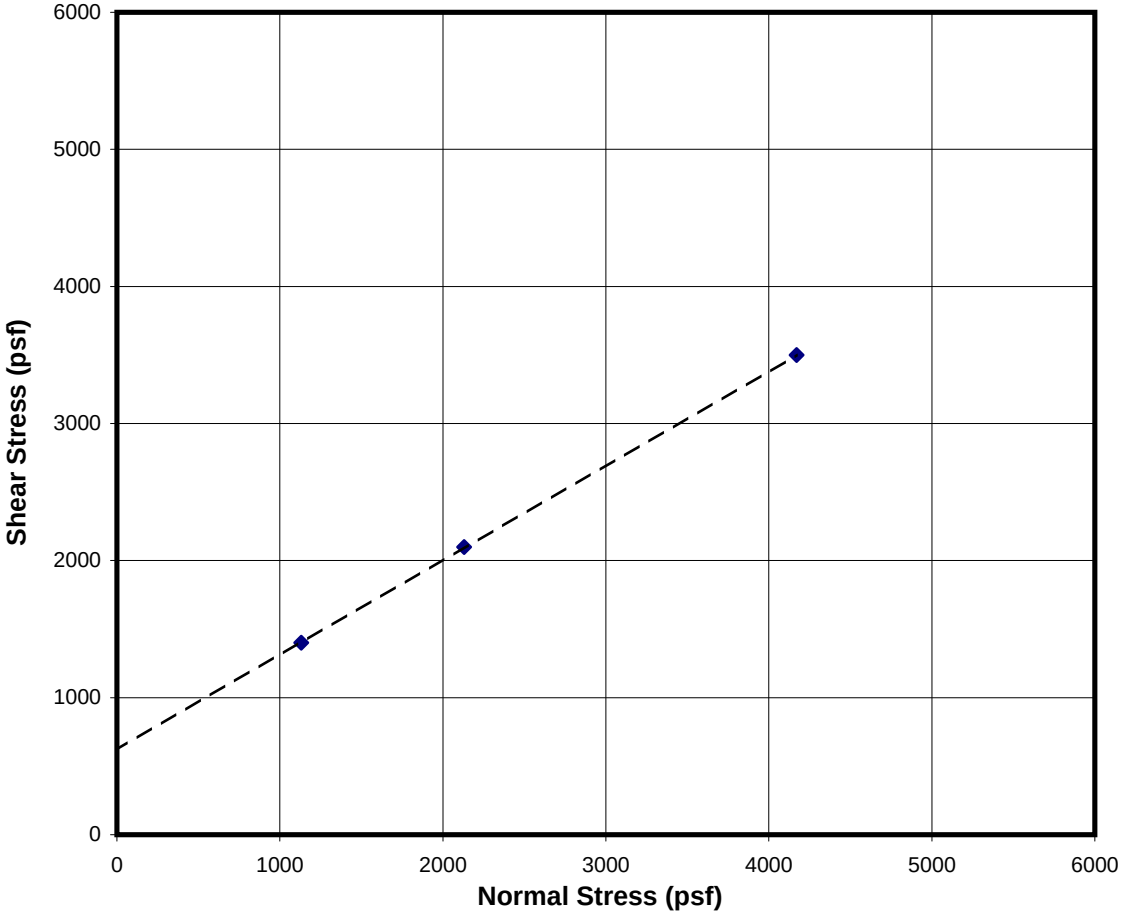
B02-3@15'			
Angle of Internal Friction:	33	degrees	Type
Cohesion :	665	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1110	1310	9.7	112.5	17.4	113.7
2	2130	2170	10.1	116.2	11.0	118.2
3	4020	3240	7.6	119.9	13.9	123.1

Sample B02-3@15ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/18/2002
		Sample No.:	B02-5@35'

DIRECT SHEAR DATA



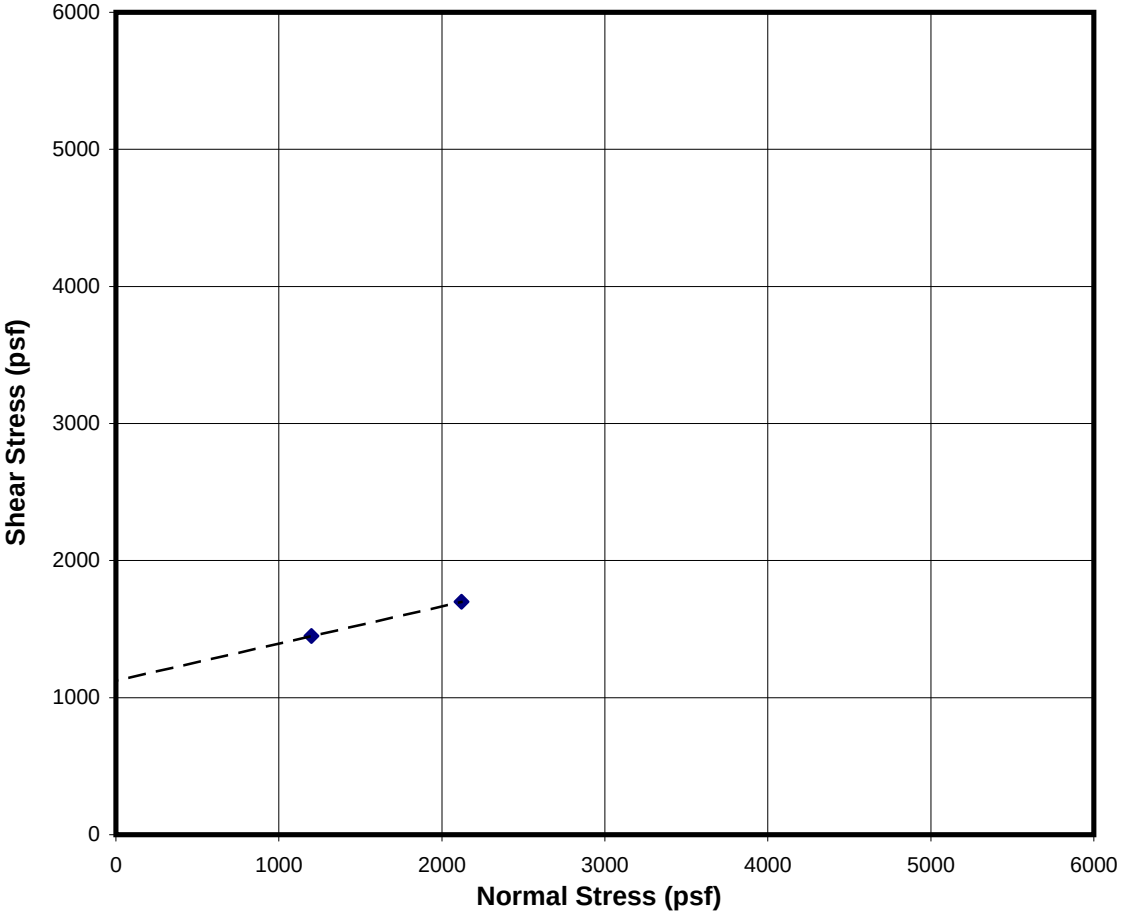
B02-5@35'			
Angle of Internal Friction:	35	degrees	Type
Cohesion :	624	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1130	1400	9.3	114.9	10.8	116.4
2	2130	2100	9.5	117.5	9.6	120.5
3	4170	3500	9.6	117.3	13.2	120.8

Sample B02-5@35ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/13/2002
		Sample No.:	B02-7@10'

DIRECT SHEAR DATA



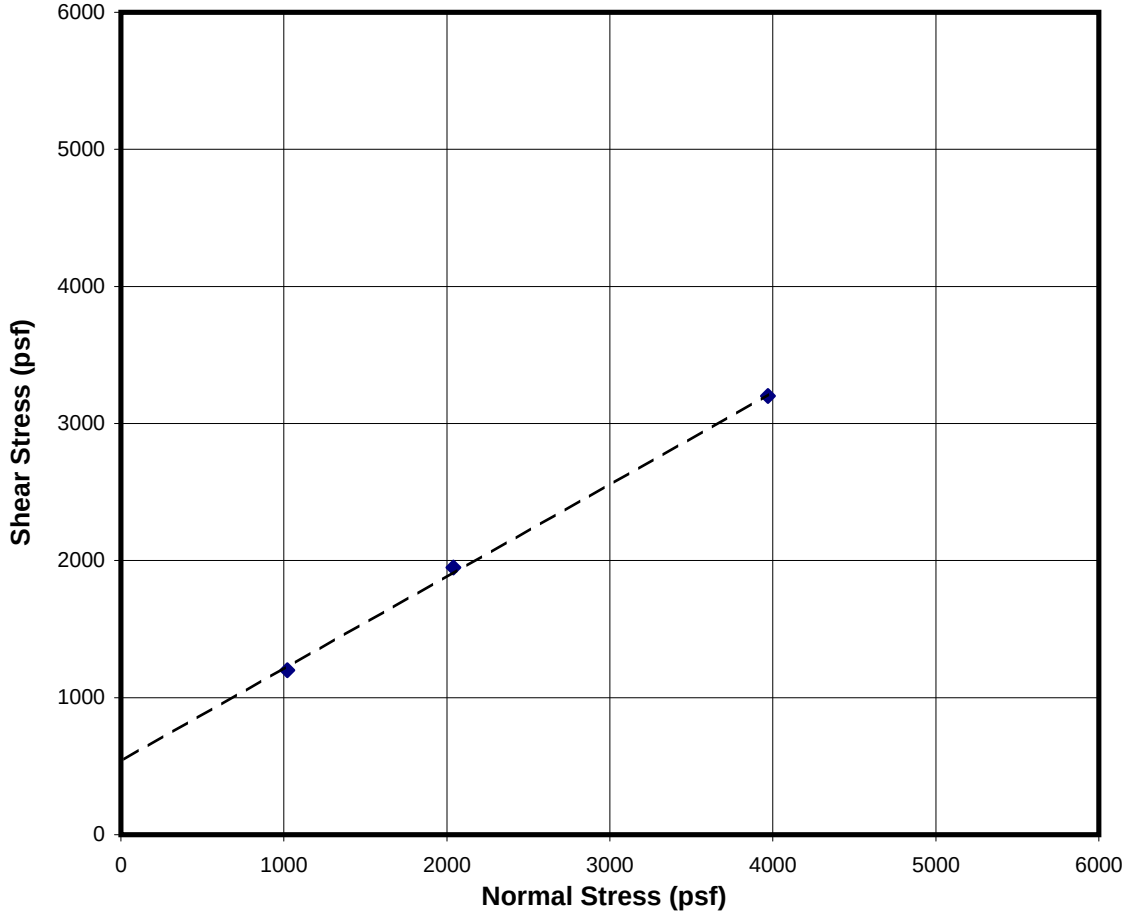
B02-7@10'			
Angle of Internal Friction:	15	degrees	Type
Cohesion :	1124	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1200	1450	15.0	107.5	18.1	108.4
2	2120	1700	13.5	107.3	18.7	109.0

Sample B02-7@10ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/19/2002
		Sample No.:	B02-7@5'

DIRECT SHEAR DATA



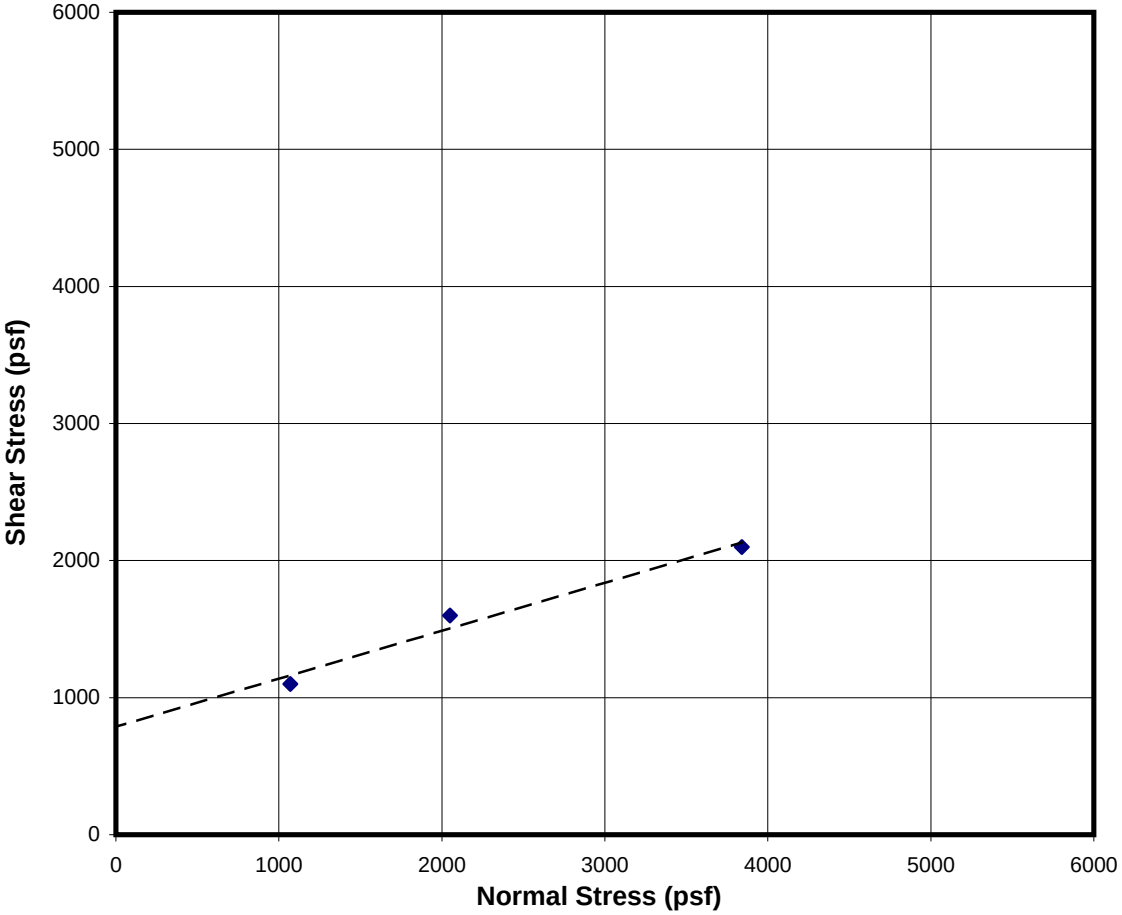
B02-7@5'			
Angle of Internal Friction:	34	degrees	Type
Cohesion :	537	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1020	1200	9.4	104.0	12.5	105.3
2	2040	1950	9.1	106.9	11.1	109.5
3	3970	3200	9.8	101.4	11.7	107.1

Sample B02-7@5ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/19/2002
		Sample No.:	B02-8@15'

DIRECT SHEAR DATA



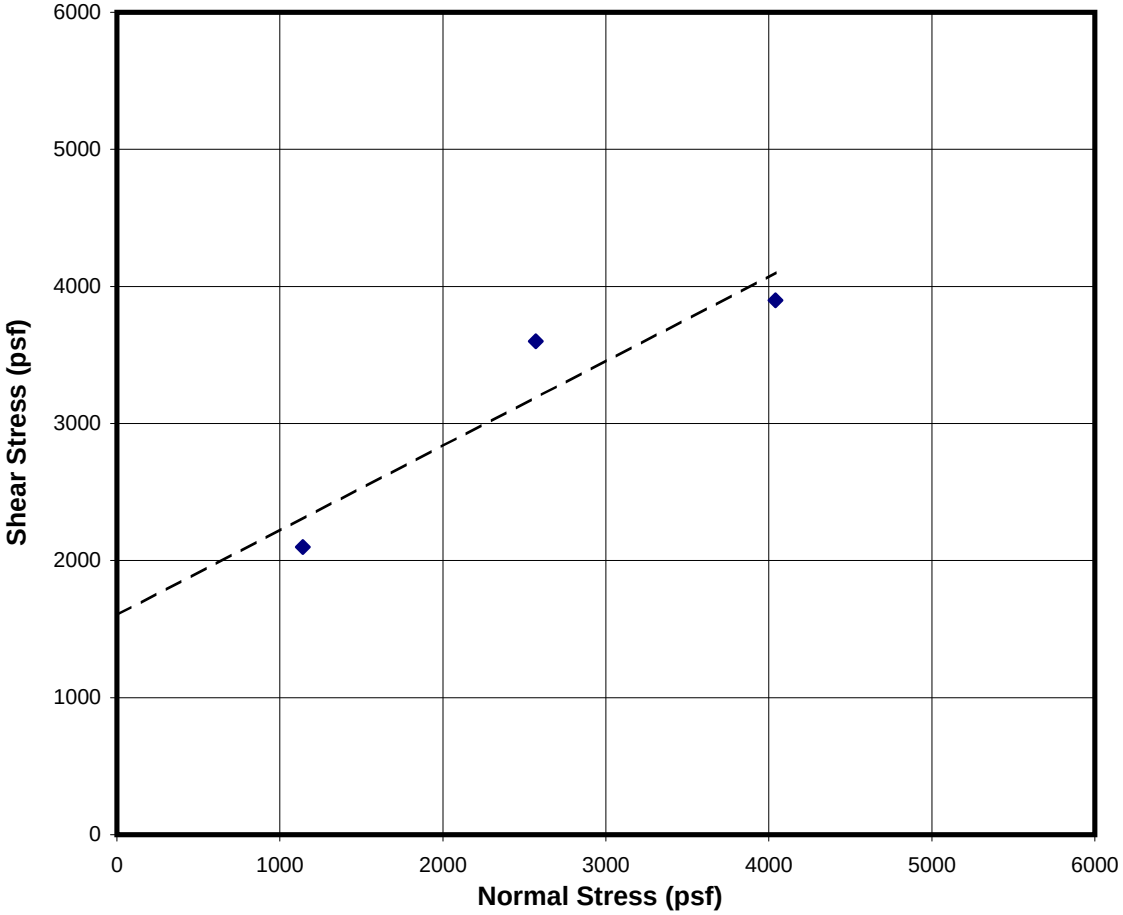
B02-8@15'			
Angle of Internal Friction:	19	degrees	Type
Cohesion :	786	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1070	1100	17.2	107.4	20.6	108.3
2	2050	1600	14.7	109.5	19.3	111.4
3	3840	2100	15.6	106.7	20.0	110.2

Sample B02-8@15ft.
Buckhorn Grade

Project:	Buckhorn Grade	**Project No.:**	502001.021
Location of Project:	Shasta Co., California	**Tested By:**	SHN
Client:	CALTRANS	**Test Date:**	09/14/2002
		Sample No.:	B02-8@20'

DIRECT SHEAR DATA



B02-8@20'			
Angle of Internal Friction:	32	degrees	Type
Cohesion :	1602	psf	Post Peak

Point No.	Normal Stress (psf)	Shear Stress (psf)	Initial		Final	
			Water Content (%)	Dry Density (pcf)	Water Content (%)	Dry Density (pcf)
1	1140	2100	10.9	116.9	13.1	118.1
2	2570	3600	9.8	121.7	12.2	123.4
3	4040	3900	8.4	118.8	11.9	122.2

Sample B02-8@20ft.
Buckhorn Grade

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

Caltrans Metric

CERTIFIED ENGINEER GEOLOGIST 9/26/02

PLANS APPROVAL DATE

REGISTERED GEOLOGIST JAMES A. BIANCHIN No. EG No. 1644 Exp. 6-2005 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

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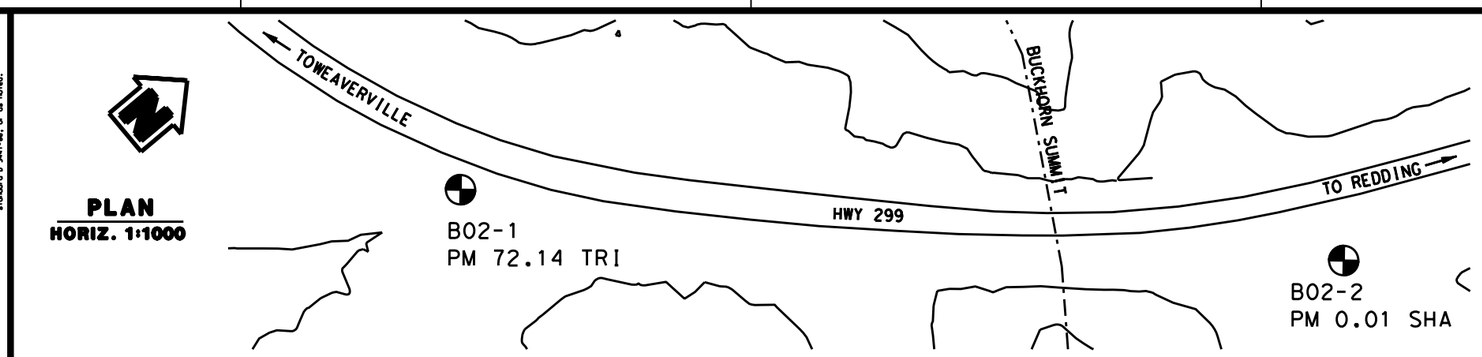
480 Hemsted Drive (530)221-5424
Redding, CA 96002 FAX (530)221-0135

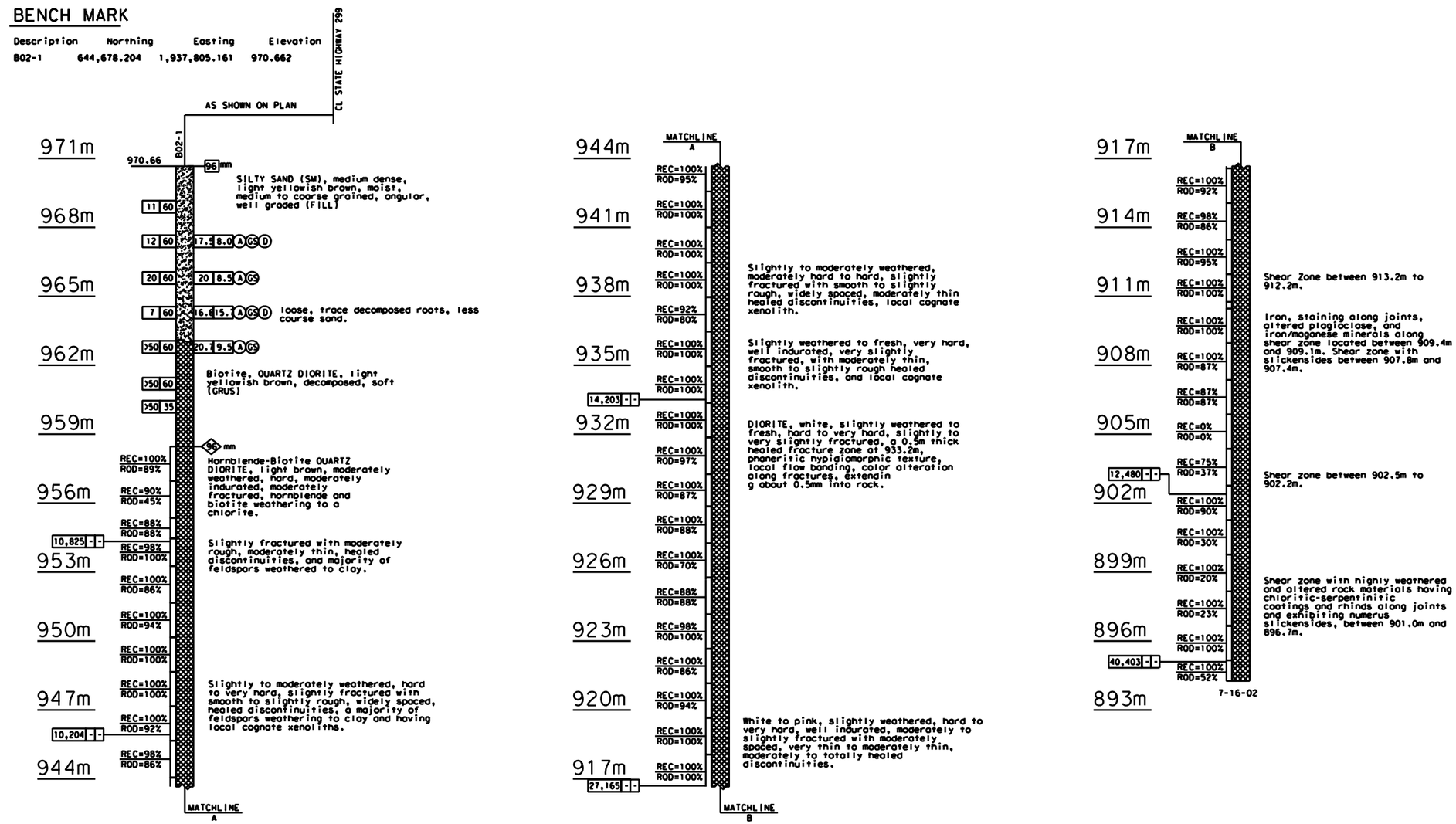
JOB No. 502001.021 LOCATION: BUCKHORN GRADE



PLAN
HORIZ. 1:1000

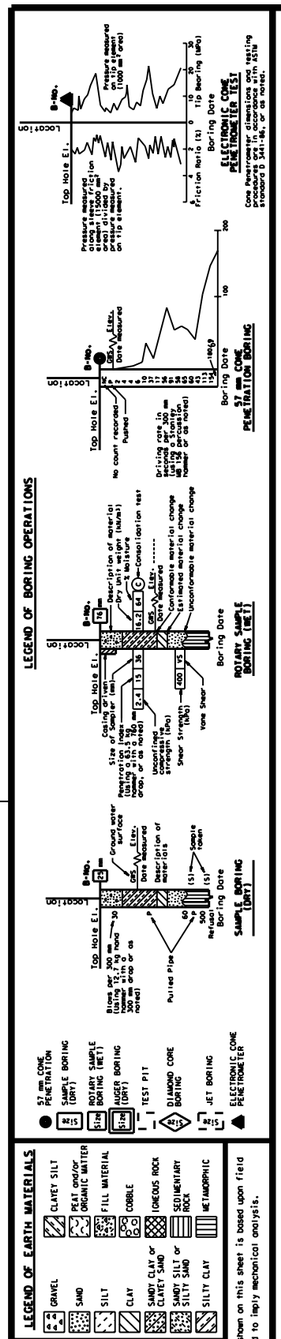
BENCH MARK

Description	Northing	Easting	Elevation
B02-1	644,678.204	1,937,805.161	970.662



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DESIGN OVERSIGHT	DRAWN BY M. JURING	D. LINDSAY	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
SIGN OFF DATE	CHECKED BY J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS	PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 9-26-02

SHEET 1 OF 1

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FILE => $REQUEST

LOTB-02-1.dgn 1/7/2011 2:10:04 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

Caltrans Metric

CERTIFIED ENGINEER GEOLOGIST 9/26/02

PLANS APPROVAL DATE

REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

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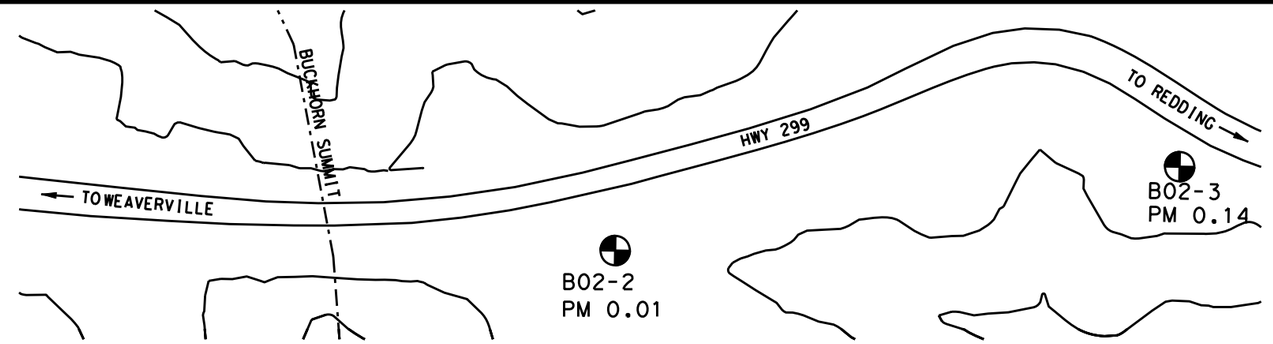
Redding, CA 96002 FAX (530)221-0135

JOB No. 502001.021 LOCATION: BUCKHORN GRADE

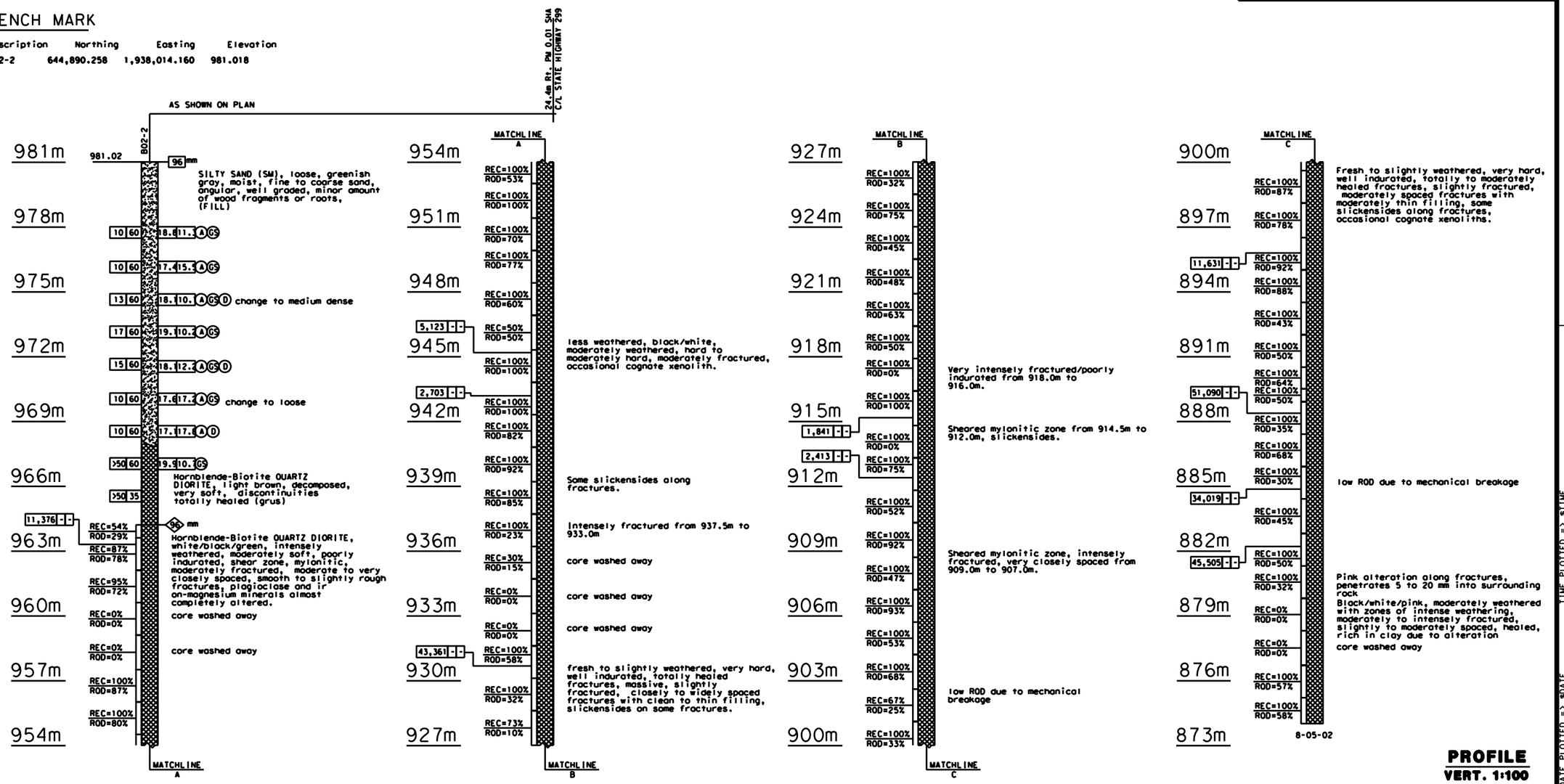
PLAN
HORIZ. 1:1000



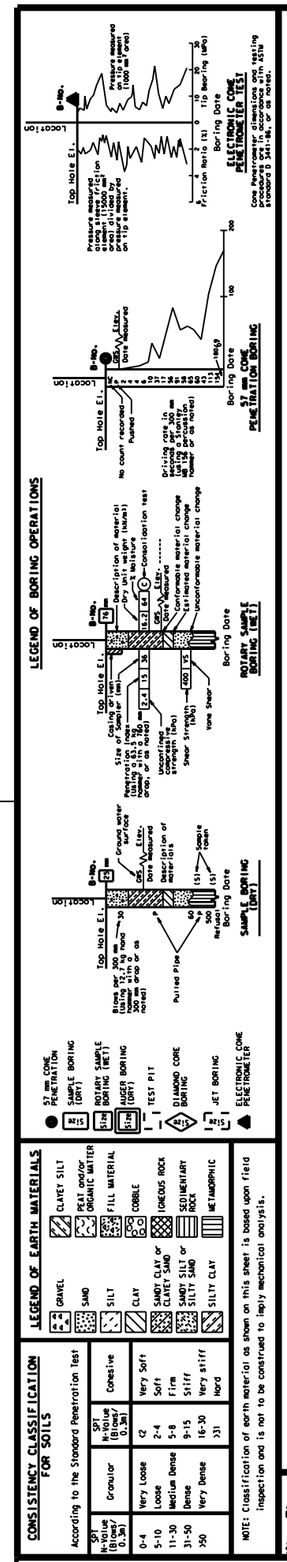
BENCH MARK

Description	Northing	Easting	Elevation
B02-2	644,890.258	1,938,014.160	981.018

PROFILE
VERT. 1:100



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY	M. JURING	D. LINDSAY
SIGN OFF DATE	CHECKED BY	J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER

BRIDGE NO.

KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 9-26-02

SHEET 1 OF 1

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

FILE => $REQUEST

LOTB-02-2.dgn 1/7/2011 2:16:45 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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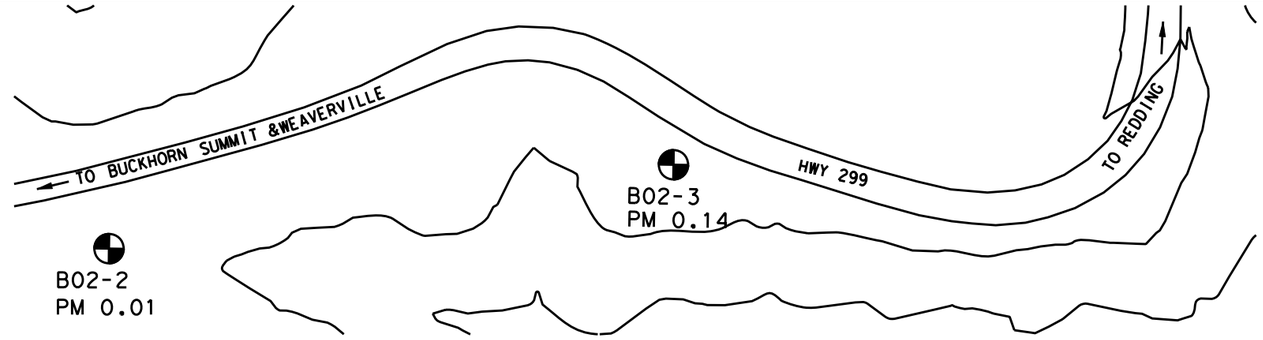
Redding, CA 96002 FAX (530)221-0135

JOB No. 502001.021 LOCATION: BUCKHORN GRADE

Caltrans Metric

PLAN
HORIZ. 1:1000

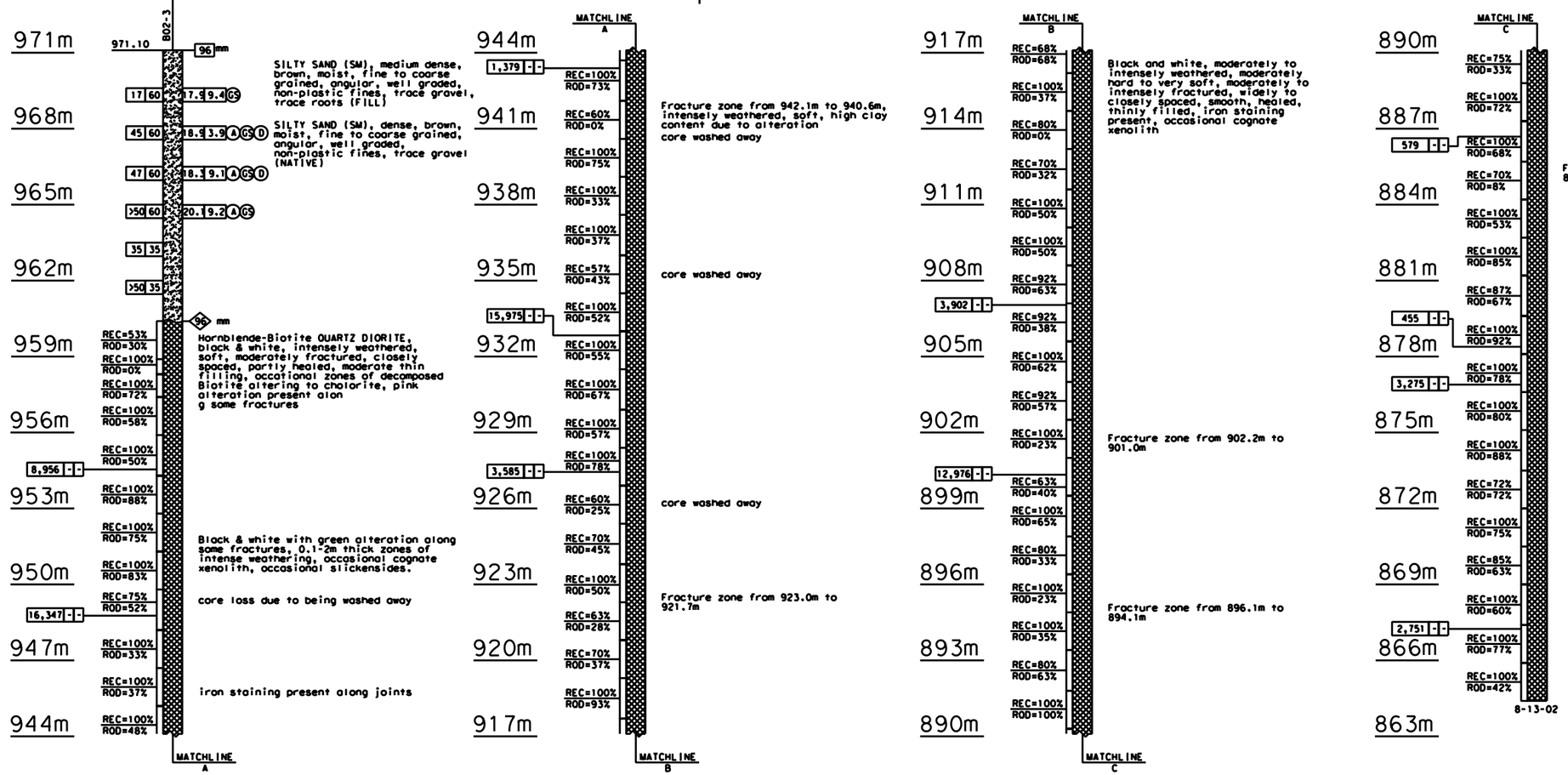


BENCH MARK

Description	Northing	Easting	Elevation
B02-3	645,053.676	1,938,114.492	971.1

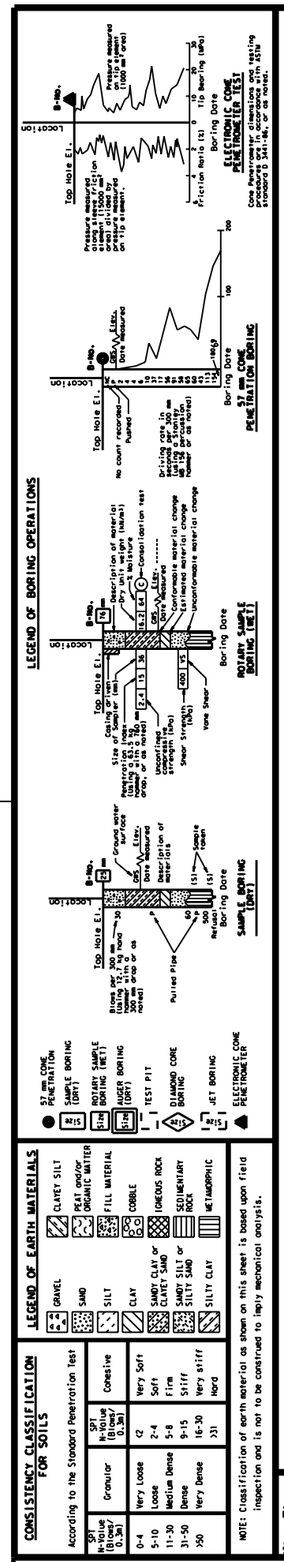
17.3m Rt. PM 0.14 SHA
CL STATE HIGHWAY 299

AS SHOWN ON PLAN



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY M. JURING	D. LINDSAY	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
SIGN OFF DATE	CHECKED BY J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS	PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 9-26-02

SHEET 1 OF 1

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USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

LOTB-02-3.dgn 1/7/2011 2:18:37 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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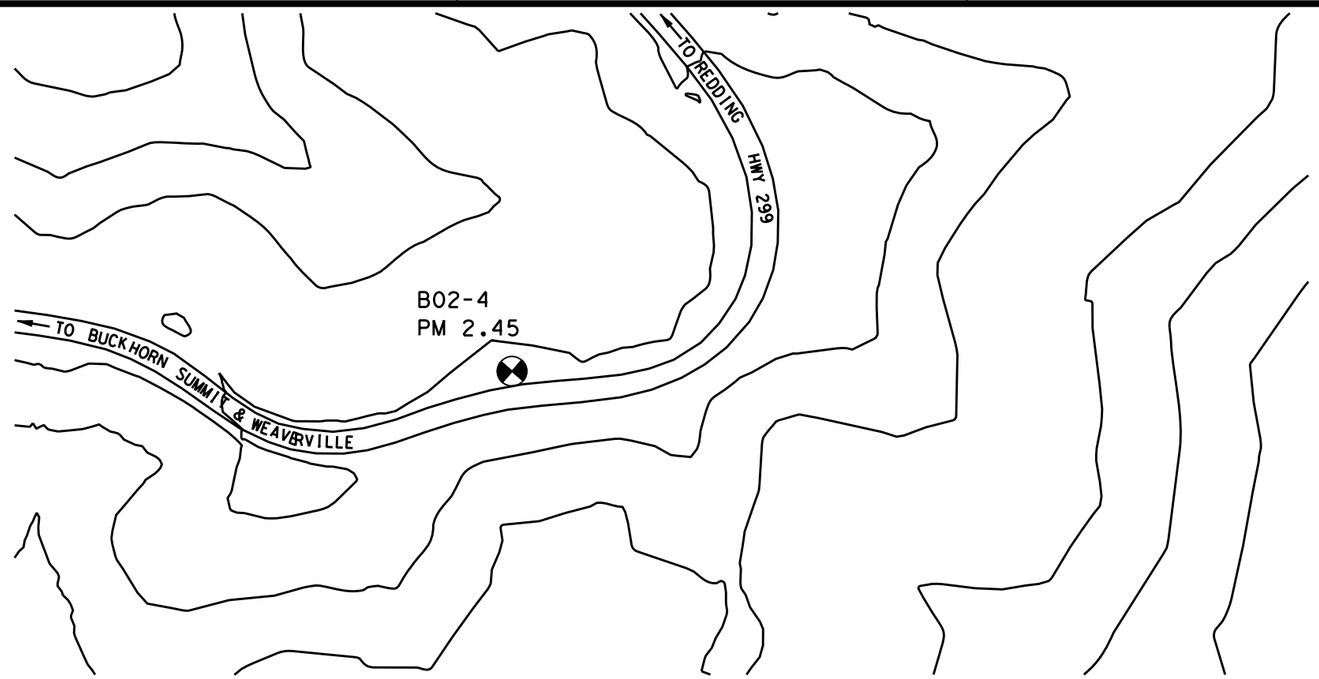
Redding, CA 96002 FAX (530)221-0135

JOB No. 502001.021 LOCATION: BUCKHORN GRADE

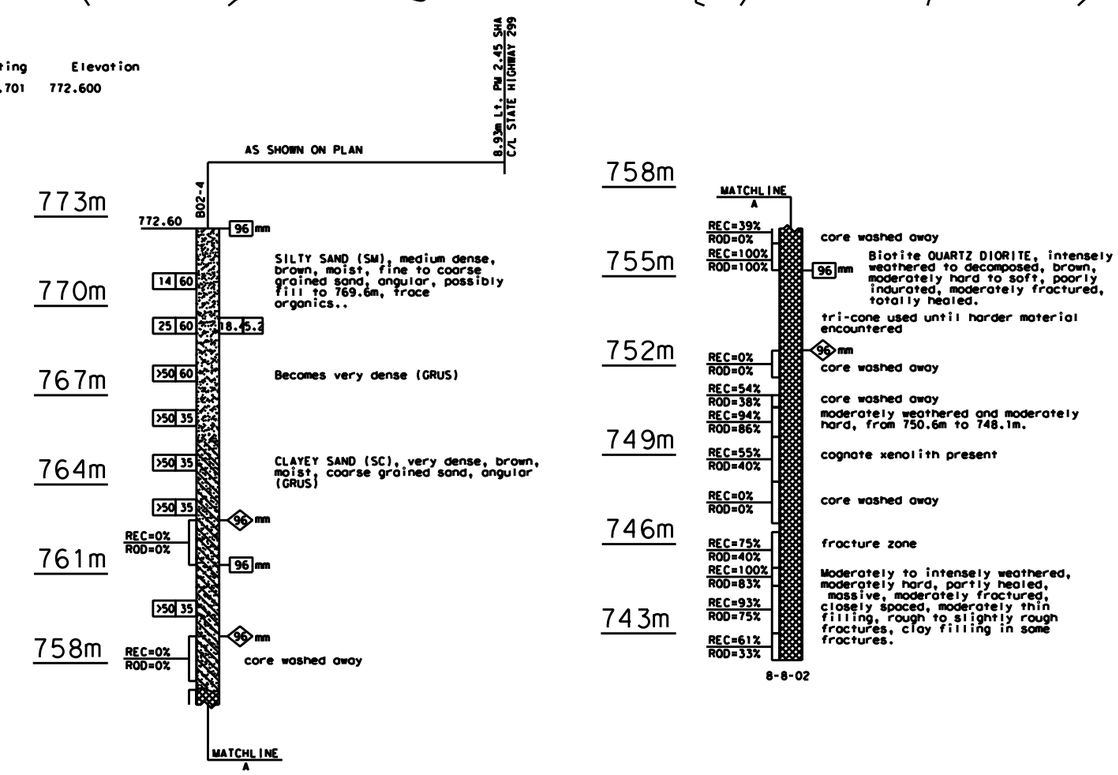
Caltrans Metric



PLAN
HORIZ. 1:1000

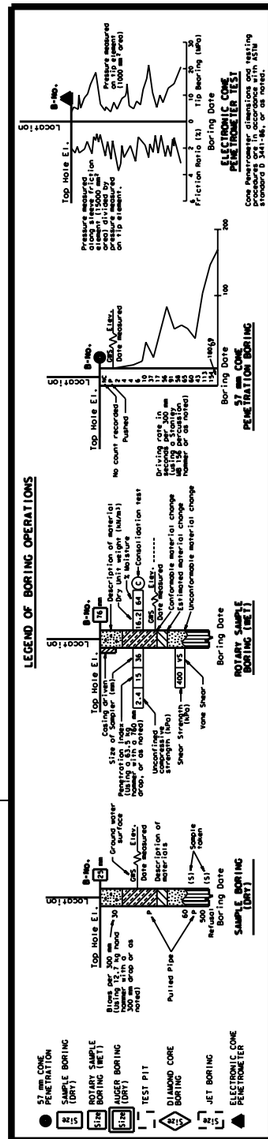
BENCH MARK

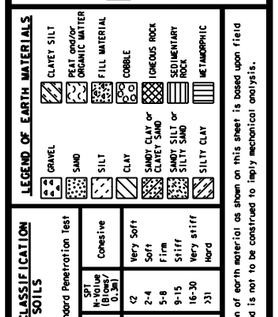
Description	Northing	Easting	Elevation
B02-4	646,356.959	1,940,150.701	772.600



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN





CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

SPT N-Value (Blows/0.3m)	Granular	SPT N-Value (Blows/0.3m)	Cohesive
0-4	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Firm
31-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very stiff
		>31	Hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY M. JURING	D. LINDSAY FIELD INVESTIGATION BY	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
SIGN OFF DATE	CHECKED BY J. BIANCHIN	DATE: SEE BORINGS	PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 9-26-02

SHEET 1 OF 1

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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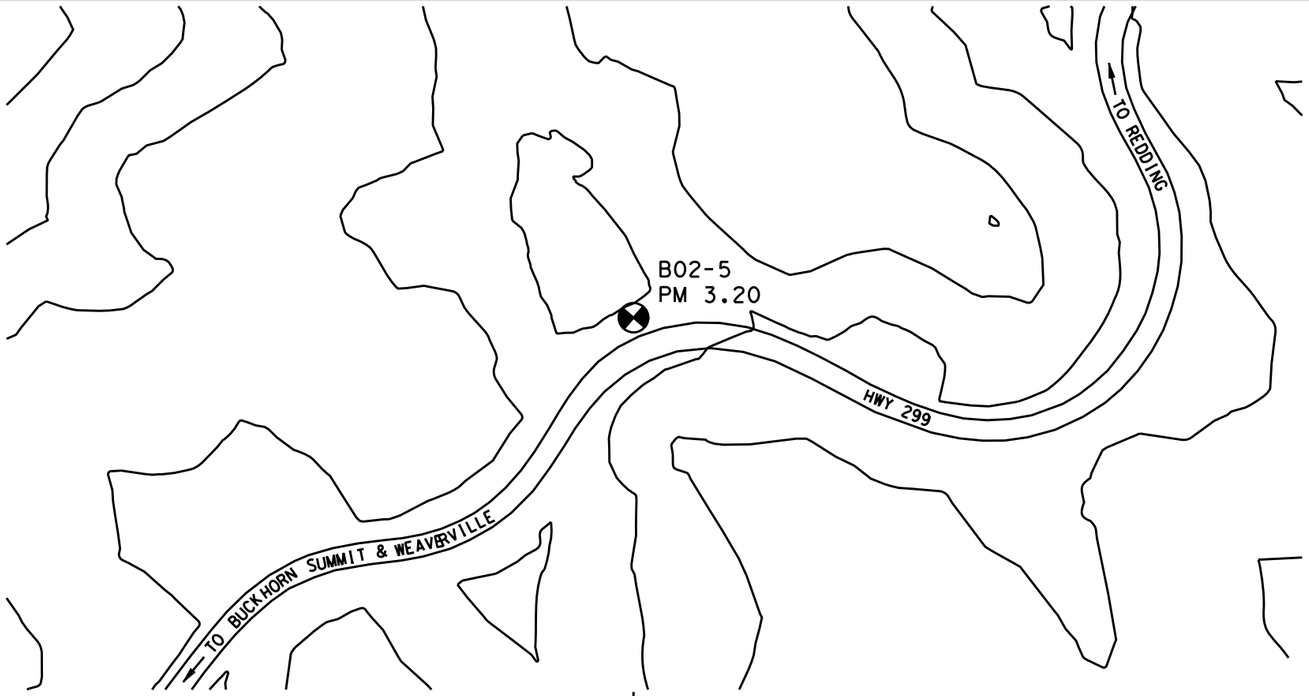
Redding, CA 96002 FAX (530)221-0135

JOB No. 502001.021 LOCATION: BUCKHORN GRADE

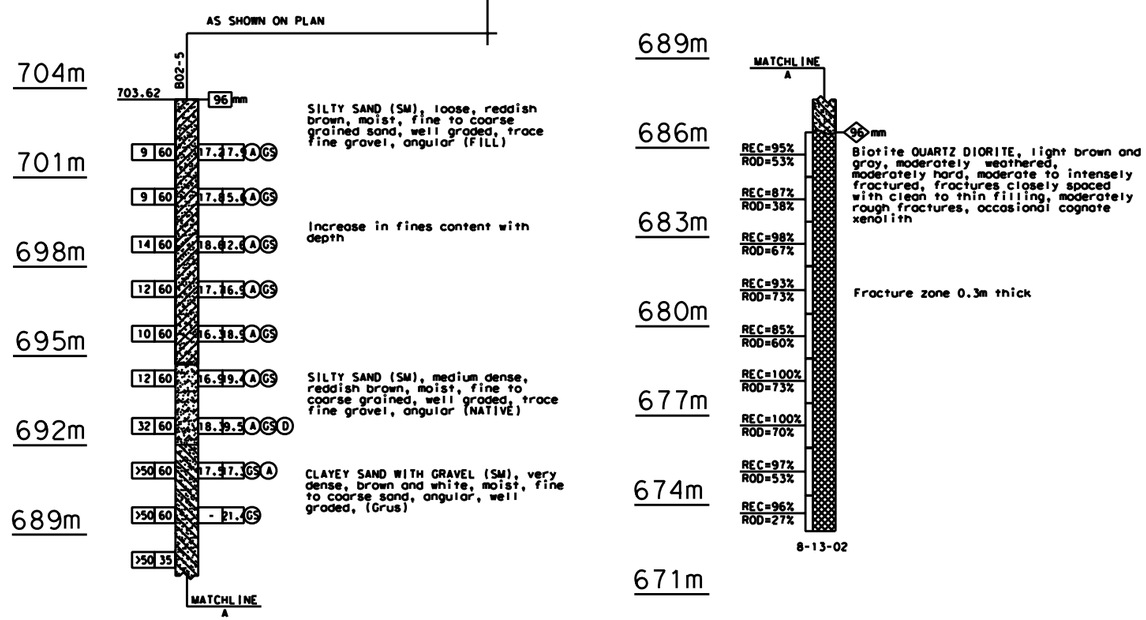
Caltrans Metric



PLAN
HORIZ. 1:1000

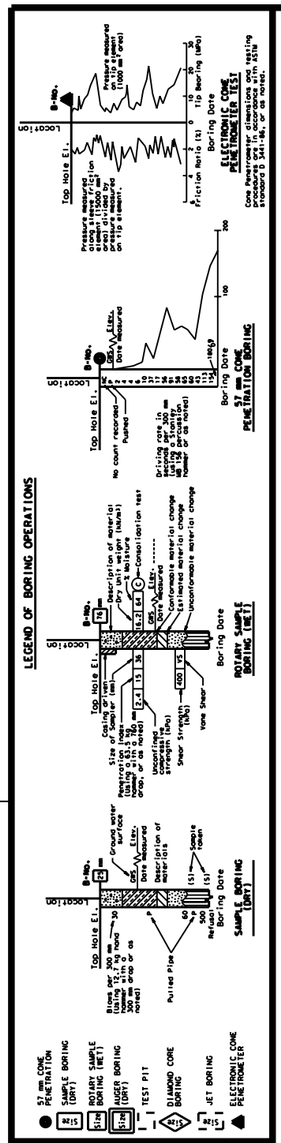
BENCH MARK

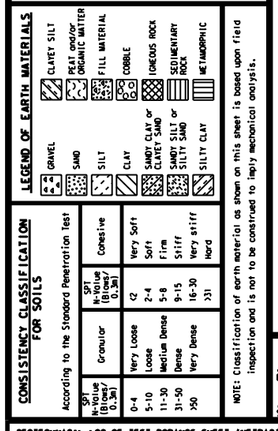
Description	Northing	Easting	Elevation
B02-5	647,069.223	1,940,536.737	703.617



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN





CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

SPT N-Value (Blows/0.3m)	Granular	SPT N-Value (Blows/0.3m)	Cohesive
0-4	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Firm
31-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very stiff
		>31	Hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY	M. JURING	D. LINDSAY
SIGN OFF DATE	CHECKED BY	J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY): 9-26-02

SHEET 1 OF 1

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

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USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

LOTB-02-5.dgn 1/7/2011 2:21:51 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

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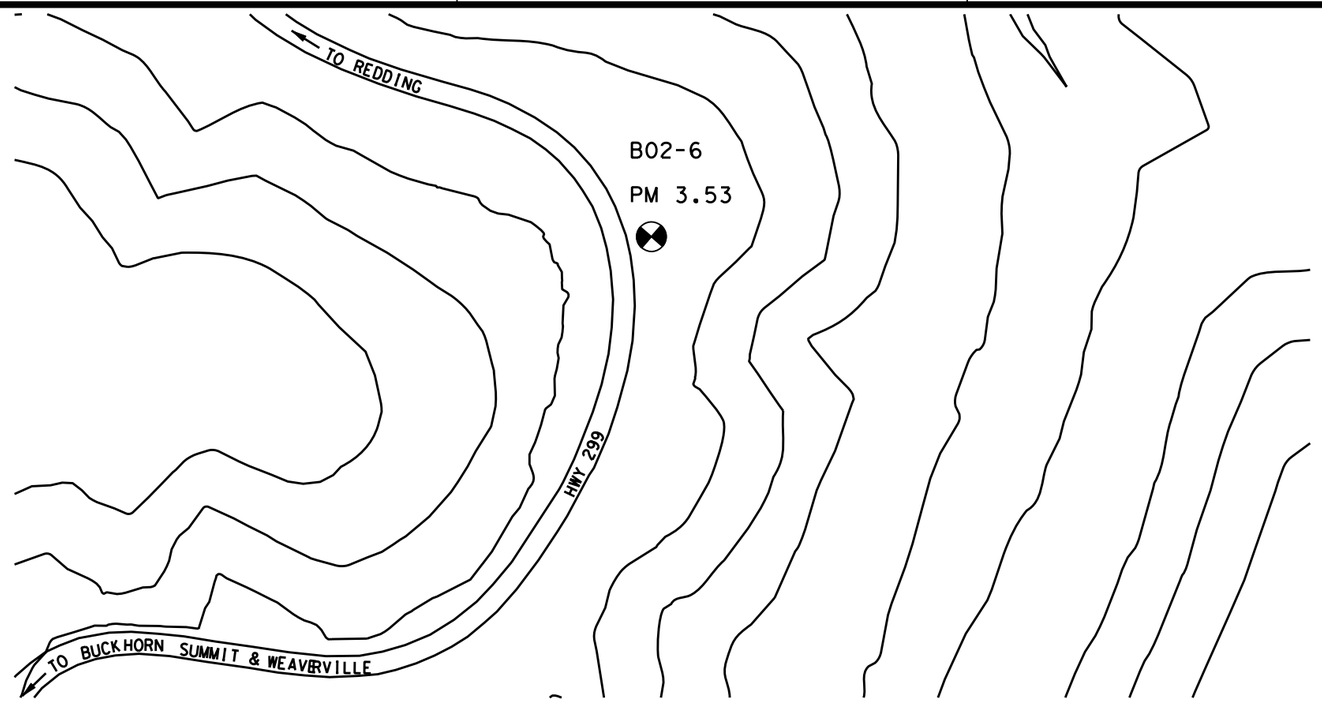
JOB No. 502001.021 LOCATION: BUCKHORN GRADE

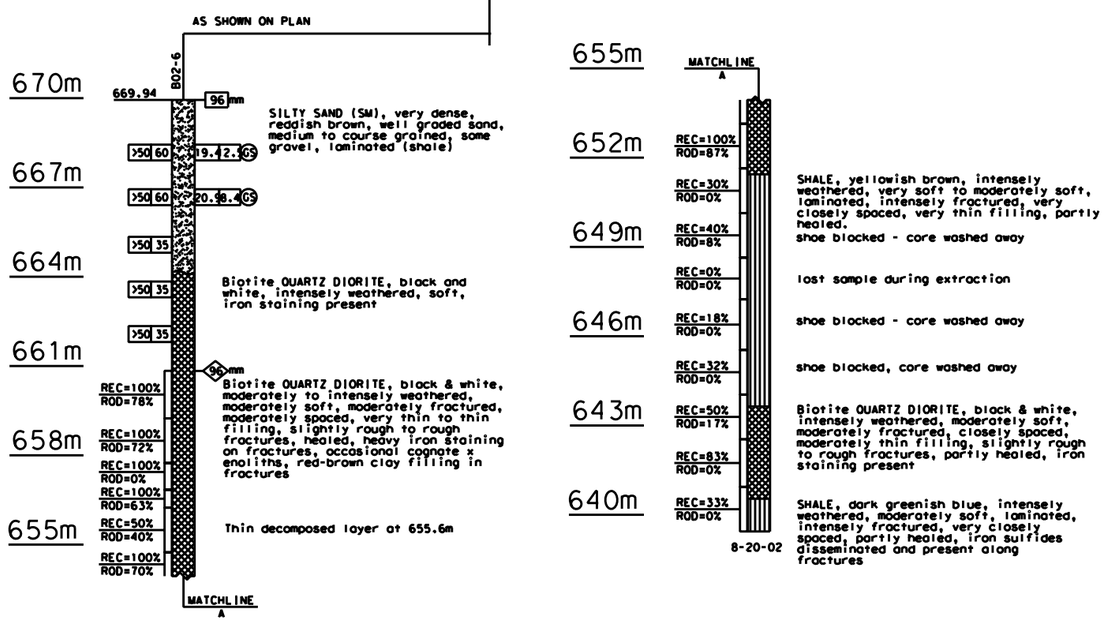
Caltrans Metric



PLAN
HORIZ. 1:1000

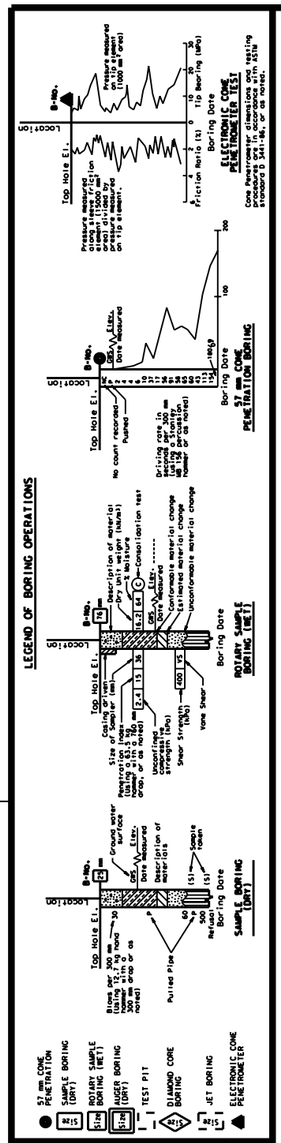
BENCH MARK

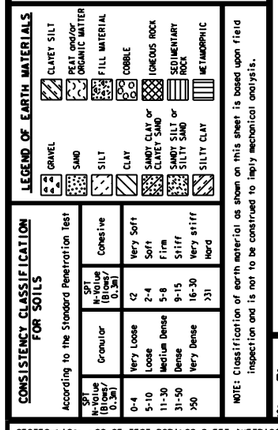
Description	Northing	Easting	Elevation
B02-6	647,336.070	1,940,917.039	669.939



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN





DESIGN OVERSIGHT	DRAWN BY	M. JURING	D. LINDSAY
SIGN OFF DATE	CHECKED BY	J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY): 9-26-02

SHEET 1 OF 1

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

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LOTB-02-6.dgn 1/7/2011 2:22:54 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

REGISTERED GEOLOGIST JAMES A. BIANCHIN No. EG No. 1644 Exp. 6-2005 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

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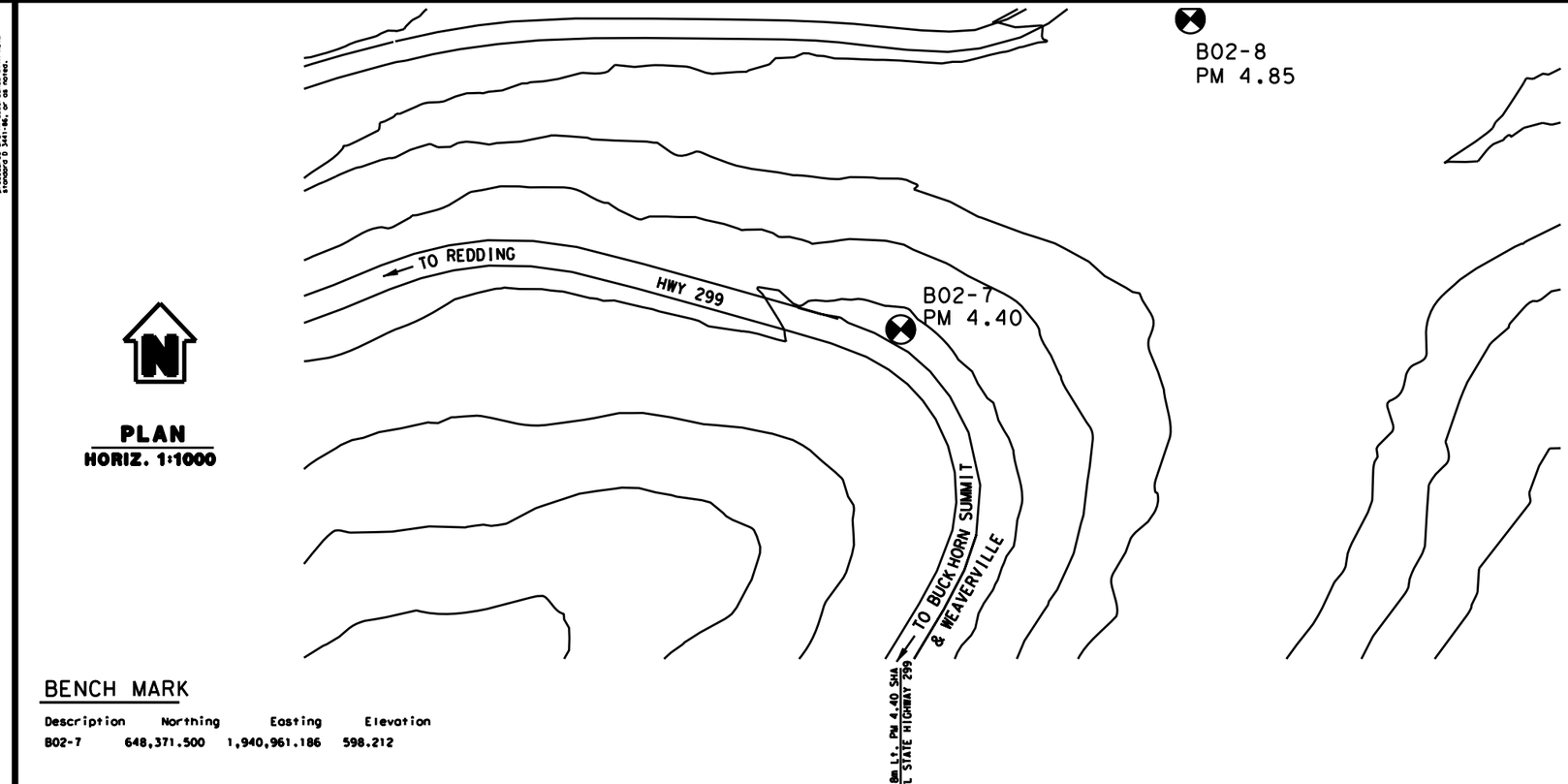
JOB No. 502001.021 LOCATION: BUCKHORN GRADE

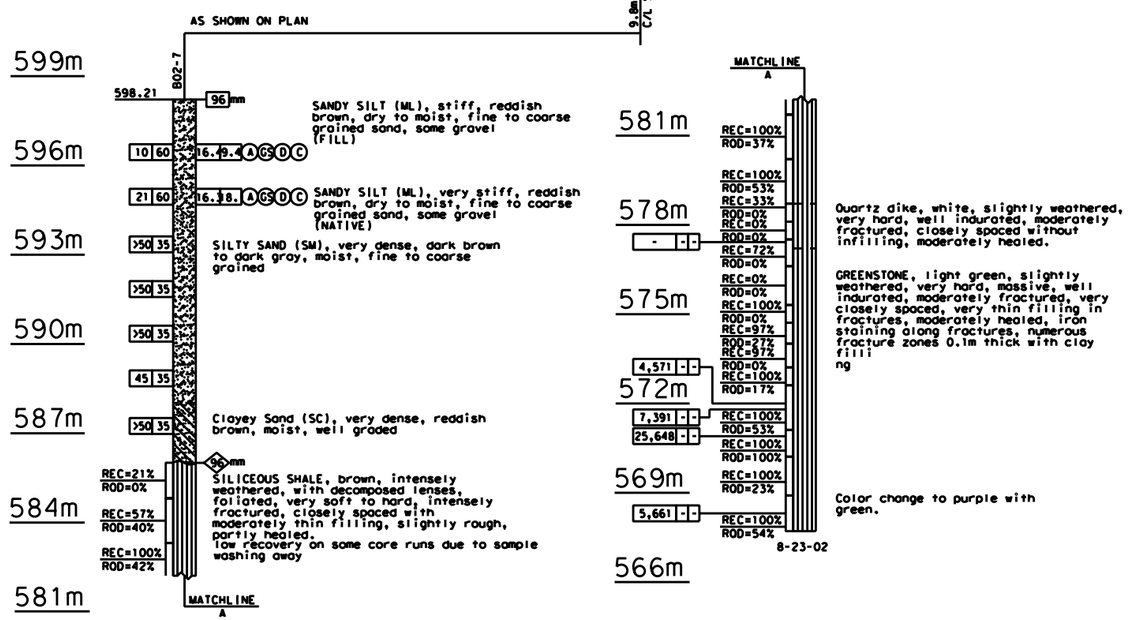
Caltrans Metric



PLAN
HORIZ. 1:1000

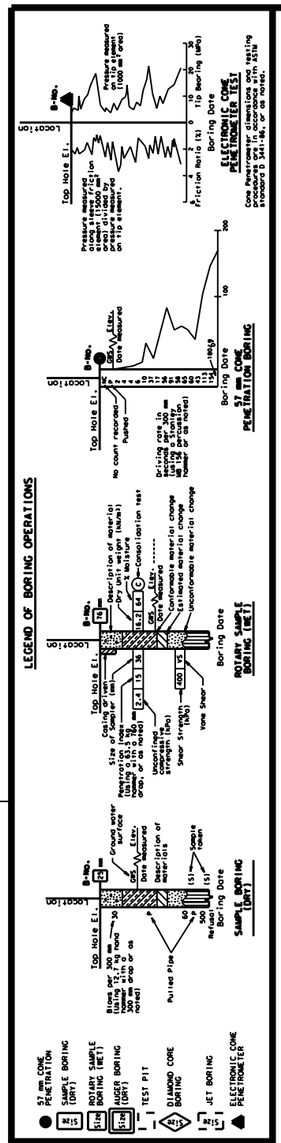
BENCH MARK

Description	Northing	Easting	Elevation
B02-7	648,371.500	1,940,961.186	598.212



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND OF EARTH MATERIALS

GRAVEL, SAND, SILT, CLAY, SANDY CLAY or CLAYEY SAND, SANDY SILT or SILTY SAND, SILTY CLAY, CLAYEY SILT, PEAT and/or ORGANIC MATTER, FILL MATERIAL, COBBLE, IGNEOUS ROCK, SEDIMENTARY ROCK, METAMORPHIC

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

SPT N-Value (Blows/ 0.3m)	Granular	SPT N-Value (Blows/ 0.3m)	Cohesive
0-4	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Firm
31-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very stiff
		>31	Hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY	M. JURING	D. LINDSAY
SIGN OFF DATE	CHECKED BY	J. BIANCHIN	FIELD INVESTIGATION BY: DATE: SEE BORINGS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER

BRIDGE NO.
KILOMETER POST

BUCKHORN GRADE
LOG OF TEST BORINGS

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 02-270310

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 9-26-02

SHEET 1 OF 1

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

LOTB-02-7.dgn 1/7/2011 2:24:10 PM

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
02	SHASTA	299	116.48	1	1

CERTIFIED ENGINEER GEOLOGIST 9/26/02

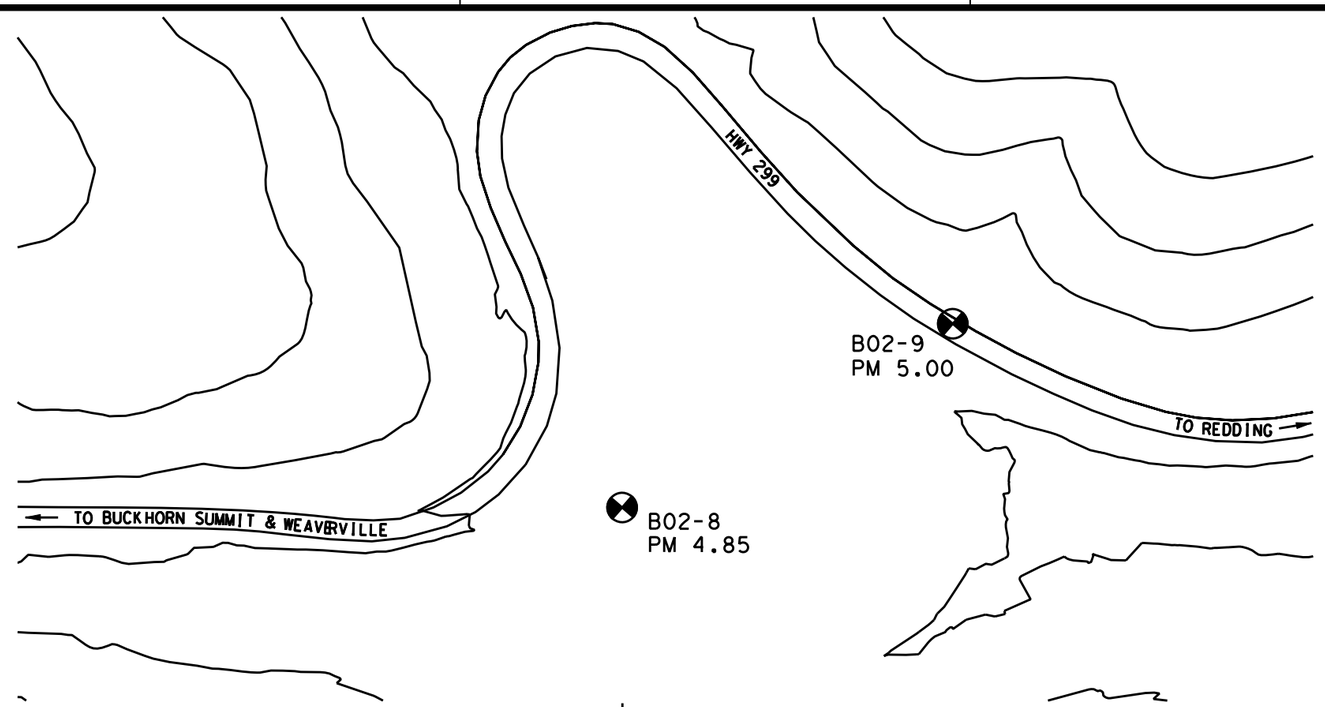
REGISTERED GEOLOGIST — JAMES A. BIANCHIN — No. EG No. 1644 — Exp. 6-2005 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.
480 Hemsted Drive (530)221-5424
Redding, CA 96002 FAX (530)221-0135

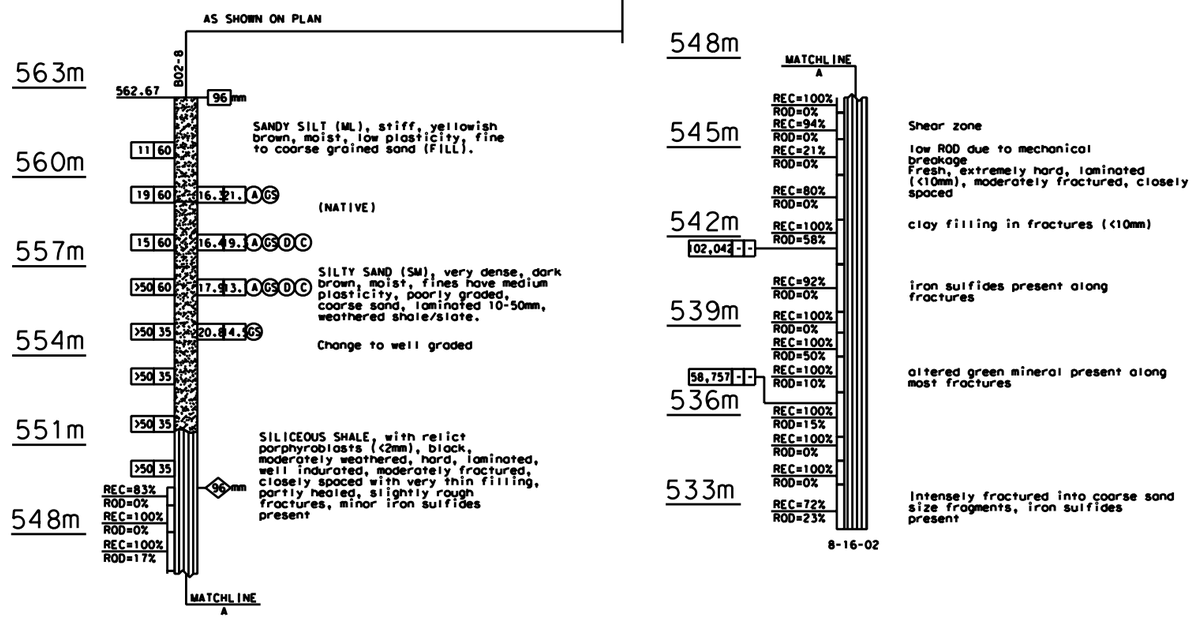
JOB No. 502001.021 LOCATION: BUCKHORN GRADE



PLAN
HORIZ. 1:1000

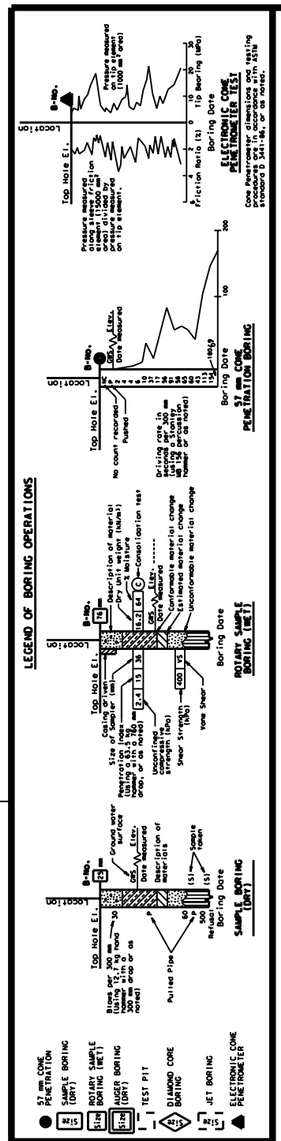
BENCH MARK

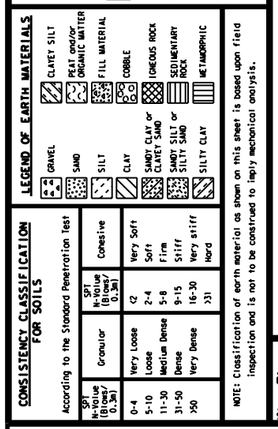
Description	Northing	Easting	Elevation
B02-8	648,479.123	1,941,061.623	562.667



PROFILE
VERT. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN





CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

SPT N-Value (Blows/0.3m)	Granular	SPT N-Value (Blows/0.3m)	Cohesive
0-4	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Firm
31-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very stiff
		>31	Hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DESIGN OVERSIGHT	DRAWN BY: M. JURING	D. LINDSAY	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
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PROJECT ENGINEER

BRIDGE NO.
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LOG OF TEST BORINGS

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DISREGARD PRINTS BEARING EARLIER REVISION DATES

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SHEET 1 OF 1

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

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