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February 21, 2007

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04-269604
ACNH-P024(029)E

Addendum No. 2

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in CONTRA COSTA COUNTY IN LAFAYETTE AND ORINDA FROM THE CALDECOTT TUNNEL TO EL CURTOLA ROAD OVERCROSSING.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on March 7, 2007.

This addendum is being issued to revise the Project Plans, the Notice to Contractors and Special Provisions, the Proposal and Contract, and the Federal Minimum Wages with Modification Number 1 dated 2-16-07.

Project Plan Sheets 2, 3, 4, 5, 6, 7, 8, 10, 19, 21, 24, 25, 26, 44, 56, 57, 58, 60, 61, 63, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 144, 148, 150, 151, 154, 159, 160, 161, 162, 166, 167, 168, 169, 170, 171, 173, 174 and 190 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheets 210A, 210B, 210C, 235A, 235B, 235C, 235D, 235E, 235F, 235G, 235H, 235I, 235J are added. Half-sized copies of the added sheets are attached for addition to the project plans.

In the Notice to Contractors and Special Provisions, in the "STANDARD PLANS LIST," Standard Plans A77L5 is added.

In the Special Provisions, "AMENDMENTS TO JULY 1999 STANDARD SPECIFICATIONS," Section 7.12B(4)(a), "General," and Section 7-1.12B(4)(b), "Liability Limits/Additional Insureds," are revised as attached.

In the Special Provisions, Section 2-1.01, "GENERAL," the sixth paragraph is revised as follows:

"Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, Division Of Construction - Duty Senior, Mail Station: 3 - B, 111 Grand Avenue, P. O. Box 23660, Oakland, CA 94623-0660, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening."

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In the Special Provisions, Section 2-1.01, "GENERAL," the following paragraphs are added after the sixth paragraph:

"In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

The Contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of title 49, part 26, Code of Federal Regulations (49 CFR 26) in the award and administration of USDOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts."

In the Special Provisions, Section 5-1.16, "AREAS FOR CONTRACTOR'S USE," the following paragraphs are added after the fourth paragraph:

"Temporary stockpiles of debris shall be removed and disposed within fourteen (14) days in accordance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way" and these special provisions.

The establishment of batch plants, stock pile sites, and other facilities developed by the Contractor for his operations shall not be placed in any areas from Station AR 67+00 to AE 172+00 and/or within 500 meters radially of any of the following sites: residential homes/houses, apartments, hotels, and businesses.

The State Park and Ride facilities located within the project limits will not be available for the Contractor's use."

In the Special Provisions, Section 5-1.19, "SOUND CONTROL REQUIREMENTS," the second paragraph is revised as follows:

"The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBa (Lmax) at a distance of 15 m, except for the following work:

- A. Cold Plane AC Pavement.
- B. Grind Existing Concrete Pavement.
- C. Crack and Sealing Existing Concrete Pavement.
- D. Remove Concrete.
- E. Remove Edge Drain.
- F. Detector Loops Installation."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraphs are added after the first paragraph:

"The first order of work shall be to place the order for the electrical equipment. The Engineer shall be furnished a statement from the vendor that the order for the traffic signal equipment has been received and accepted by the vendor.

It is permitted to test one solenoid valve at a time due to overlapping the existing and new solenoid valve locations at the East side of Caldecott tunnel. Temporary terminated existing solenoid valve system during the test, and re-connect the system back to normal if needed during the troubleshooting period. Remove existing solenoid valve power permanently once the new tested solenoid valve system is in operation."

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In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the twenty second paragraph is revised as follows:

"Attention is directed to "Progress Schedule (Critical Path Method)," of these special provisions. A detailed schedule showing the specific equipment to be used during the work, the location of work, and lanes to be closed, during the work shall be submitted to the Engineer for approval, at least 14 days prior to the start of any work on Route 24. Updates to the schedule and equipment changes shall be submitted on a daily basis to the Engineer before 9:00 a.m. each working day, and shall be approved by the Engineer."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraph is added after the twenty second paragraph:

"Attention is directed to "Street Sweeping," of these special provisions. The Contractor is responsible to monitor the roadway condition at all times, even when not actively working, and have equipment on-site to remove any debris or loose material on the roadway within 1 hour of direction by the Engineer. Failure to comply with the above specifications shall result in immediate suspension of the work."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraph is added after the last paragraph:

"At the end of each working day if a difference in excess of 0.045-meter exists between the elevation of the existing pavement and the elevation of excavations within 2.4 m of the traveled way, material shall be placed and compacted against the vertical cuts adjacent to the traveled way. During excavation operations, native material may be used for this purpose; however, once placing of the structural section commences, structural material shall be used. The material shall be placed to the level of the elevation of the top of existing pavement and tapered at a slope of 1:4 (vertical:horizontal) or flatter to the bottom of the excavation. Full compensation for placing the material on a 1:4 slope, regardless of the number of times the material is required, and subsequent removing or reshaping of the material to the lines and grades shown on the plans shall be considered as included in the contract price paid for the materials involved and no additional compensation will be allowed therefor. No payment will be made for material placed in excess of that required for the structural section."

In the Special Provisions, Section 10-1.02, "WATER POLLUTION CONTROL," the following paragraph is added after the fourth paragraph:

"Temporary storage of PCC pavement grooving and grinding residues and liquids at locations outside of the state Right of Way shall conform to the requirements in Section 7-1.13, "Disposal of Material Outside of the Right of Way," of the Standard Specifications and these special provisions. Temporary storage of PCC pavement grooving and grinding residues and liquids at locations outside of the state Right of Way shall not be allowed until the following information/documents is submitted to the Engineer:

(1) Industrial State permits and Regional Water Quality Control Board (RWQCB) authorization allowing temporary storage of PCC pavement grooving and grinding residues and liquids at locations outside of the state Right of Way.

(2) An offsite Storm Water Pollution Prevention Plan (SWPPP) specific to the location where temporary storage occurs that is approved by the local RWQCB. The Contractor shall be solely responsible for the preparation and implementation of the SWPPP. The approved offsite SWPPP shall be submitted to the Engineer prior to any temporary storage of PCC pavement grooving and grinding residues and liquids.

(3) Written approval by the local Environmental Health agency."

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In the Special Provisions, Section 10-1.03, "STEET SWEEPING," is revised as attached.

In the Special Provisions, Section 10-1.07, "COOPERATION," the second paragraph is revised as follows:

"It is anticipated that work by other contractors (Contract No EA 04-0A8104) to Replace gore signs in Contra Costa County on Route 24, at PM R0.4/R2.1 (KP 0.6/3.4), (Contract No. EA 04-2S2201) construct soil nail wall at Fish Ranch Road in CC county on Rte 24, at 0.3 PM, and (Contract No. EA 04-3S5404) Insert pipe liner on existing 36-inch RCP beneath the westbound lanes of Rte 24, in CC County, PM 5.6 Westbound. may be in progress adjacent to or within the limits of this project during progress of the work on this contract."

In the Special Provisions, Section 10-1.08, "PROGRESS SCHEDULE (CRITICAL PATH METHOD)," is revised as attached.

In the Special Provisions, Section 10-1.14, "MAINTAINING TRAFFIC," the following paragraphs are added after the fourth paragraph:

"Contractor shall inform the Engineer and place warning signage on the shoulders, 72 hours in advance of shoulder closure affecting bicycle traffic on the westbound or eastbound shoulders of Route 24 from Fish Ranch Road to Camino Pablo.

Prior to performing any closure work that may impact the traffic for the Caldecott Tunnel, the Contractor shall meet with Caltrans Caldecott Tunnel Superintendent to discuss tunnel protocol and closure scheduling. On a nightly basis, the Contractor will coordinate and communicate with the Tunnel Supervisor on duty all closures that may impact traffic flow to and from the Tunnel.

During the annual Shakespeare Festival, which is scheduled to occur from May 23 through October 21 of each year, the following requirements will apply seven days a week:

- a) No construction activities are permitted to be performed from Station AR7 52+00 to Station AR 61+00 until 11:30 P.M.
- b) On-ramp closure at Gateway Blvd to westbound Route 24 will not be permitted until 11:30 P.M.
- c) Off-ramp closure at Gateway Blvd. from westbound Route 24 will not be permitted until 9:00 P.M."

In the Special Provisions, Section 10-1.14, "MAINTAINING TRAFFIC," the following paragraph is added after the seventh paragraph:

"Construction activities at St. Stephens Drive Overcrossing will only be permitted during the hours from 7:00 P.M. to 5:00 A.M., Monday through Friday. Weekend construction will not be permitted at this location. A lane of through traffic shall be maintained during construction working hours."

In the Special Provisions, Section 10-1.14, "MAINTAINING TRAFFIC," Lane Closure Charts No. 1, 2, 4, 17 are revised as attached and Lane Closure Charts No. 1A, 1B, 2A, 2B are added as attached.

In the Special Provisions, Section 10-1.165, "TEMPORARY PAVEMENT DELINEATION," is added as attached.

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In the Special Provisions, Section 10-1.17, "PORTABLE CHANGEABLE MESSAGE SIGN," the first paragraph is revised as follows:

"Portable changeable message signs, 5 each, shall be furnished, placed, operated, and maintained at those locations shown on the plans or where designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions. These portable changeable message signs shall be available on a full-time basis for use by the Engineer."

In the Special Provisions, Section 10-1.21, "EXISTING HIGHWAY FACILITIES," subsection, "ADJUST INLET AND MANHOLE COVER TO GRADE," is revised as follows:

"ADJUST MANHOLE COVER TO GRADE

Existing concrete manhole covers shall be adjusted as shown on the plans and as directed by the Engineer.

Portland cement concrete shall be minor concrete or may be produced from commercial quality concrete containing not less than 590 pounds of cement per cubic yard.

Adjustment of manhole cover shall be performed prior to paving and shall be limited to the area to be paved or surfaced during the working day in which the adjustment is performed. The top of the cover shall be protected from the asphalt concrete during paving operations by means of heavy plywood covers, steel plate covers or by other methods approved by the Engineer. Excess paving material shall be removed prior to rolling.

Where manholes are located in areas to be paved or surfaced, no individual structure shall be constructed to final grade until the paving or surfacing has been completed immediately adjacent to the structure.

Adjust manhole covers will be measured by the unit as determined from the actual count of the adjust inlets and manhole covers.

The contract unit price paid for adjust manhole cover shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in adjusting manhole cover as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 10-1.21, "EXISTING HIGHWAY FACILITIES," the following subsection, "MODIFY INLET TO MANHOLE," is added after subsection "ADJUST FRAME AND GRATE TO GRADE."

"MODIFY INLET TO MANHOLE

Existing concrete drainage inlets shall be modified to manhole as shown on the plans.

Portland cement concrete shall be minor concrete or may be produced from commercial quality concrete containing not less than 350 kilograms of cement per cubic meter.

Modify inlets to manholes shall be performed prior to paving and shall be limited to the area to be paved or surfaced during the working day in which the adjustment is performed. The top of the manhole or cover shall be protected from the asphalt concrete during paving operations by means of heavy plywood covers, steel plate covers or by other methods approved by the Engineer. Excess paving material shall be removed prior to rolling.

Where inlets modify to manholes are located in areas to be paved or surfaced, no individual structure shall be constructed to final grade until the paving or surfacing has been completed immediately adjacent to the structure."

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In the Special Provisions, Section 10-1.24, "SHOULDER BACKING," the second paragraph is revised as follows:

"Material for shoulder backing shall be imported material. Imported material shall not be derived from material processed from reclaimed concrete, lean concrete base, cement treated base, or a combination of any of these materials. Imported material shall conform to the following grading and quality requirements:"

In the Special Provisions, Section 10-1.24, "SHOULDER BACKING," the third paragraph and corresponding Grading and Quality Requirements table is deleted.

In the Special Provisions, Section 10-1.24, "SHOULDER BACKING," the seventh and eighth paragraphs are deleted.

In the Special Provisions, Section 10-1.32, "SEAL RANDOM CRACKS IN EXISTING SURFACING," the first paragraph is revised as follows:

"Cracks in existing asphalt concrete surfacing of traffic lanes and shoulders shall be prepared and filled with crack sealant and covered with sand as shown on the plans and in conformance with these special provisions."

In the Special Provisions, Section 10-1.32, "SEAL RANDOM CRACKS IN EXISTING SURFACING," subsection, "APPLICATION," the second paragraph is revised as follows:

"Crack sealant material shall be spread with a nozzle or device approved for use by the Engineer and be placed within the specified temperature range."

In the Special Provisions, Section 10-1.32, "SEAL RANDOM CRACKS IN EXISTING SURFACING," subsection, "MEASUREMENT AND PAYMENT," the fourth, fifth, sixth, seventh, eighth, ninth and tenth paragraphs are deleted.

In the Special Provisions, Section 10-1.33, "ASPHALT CONCRETE," the following paragraphs are added after the last paragraph:

"Immediately prior to placing binder, pavement reinforcing fabric, and asphalt concrete surfacing, the pavement shall be cleaned of loose and extraneous materials such as, but not limited to, vegetation, sand, dirt, gravel and water.

Before placing the pavement reinforcing fabric, a binder of paving asphalt Grade PG 70-10 shall be applied uniformly to the surface to receive the pavement reinforcing fabric at a rate of not less than 1.15 L per square meter of surface covered. When pavement reinforcing fabric is placed in areas of conform tapers, the binder shall be spread at the approximate rate of 1.4 L per square meter of surface covered. The exact rate of application of asphalt binder will be determined by the Engineer.

Pavement reinforcing fabric shall not be placed in areas of conform tapers when the thickness of the overlying asphalt concrete will be less than 40 mm.

Asphalt concrete surfacing shall be placed over the pavement reinforcing fabric in the same work shift that the fabric is placed.

Pavement reinforcing fabric shall not be exposed to public traffic, Contractor's equipment or elements that will damage the fabric prior to placement of asphalt concrete surfacing.

Asphaltic emulsion shall not be substituted for paving asphalt binder for pavement reinforcing fabric.

Full compensation for cleaning pavement immediately in advance of placing binder, pavement reinforcing fabric, and asphalt concrete surfacing shall be considered as included in the contract price paid per square meter for pavement reinforcing fabric and no separate payment will be made therefor."

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In the Special Provisions, Section 10-1.35, "RUBBERIZED ASPHALT CONCRETE (TYPE G)," subsection, "GENERAL," subparagraph "B." Item No. 2, is revised as follows:

"2. From Figure 3 select the theoretical asphalt-rubber binder content that has 5 percent voids."

In the Special Provisions, Section 10-1.35, "RUBBERIZED ASPHALT CONCRETE (TYPE G)," subsection, "GENERAL," the fourth paragraph is revised as follows:

"The asphalt-rubber binder content of the rubberized asphalt concrete (Type G) will be determined by extraction tests in conformance with the requirements in California Test 362, or will be determined in conformance with the requirements in California Test 382."

In the Special Provisions, Section 10-1.36, "RUBBERIZED ASPHALT CONCRETE (TYPE O)," is deleted.

In the Special Provisions, Section 10-1.335, "ASPHALT CONCRETE (OPEN GRADED)," is added.

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "REMOVING EXISTING PAVEMENT AND BASE MATERIALS," the following paragraph is added after the third paragraph:

"Concrete pavement shall be removed by non-impacting methods. Each pavement panel shall be removed in one or more pieces without disturbance or damage to the underlying base."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "TEMPORARY ROADWAY STRUCTURAL SECTION," the first paragraph is revised as follows:

"Asphalt concrete and aggregate base, equal to the quantity of pavement removed during the work shift, shall be provided on site for construction of a temporary roadway structural section where existing pavement is to be replaced. The quantity and location of standby material shall be included in the Contractor's contingency plan in conformance with the requirements of these special provisions. Temporary roadway structural section shall be maintained and capable of supporting traffic loads during the entire time the temporary roadway is in service without raveling or rutting and be later removed as the first order of work when replace concrete pavement (Rapid Strength Concrete) operations resume. The temporary roadway structural section shall consist of 90-mm thick asphalt concrete over aggregate base. RSC not conforming to these special provisions for RSC may be used for temporary roadway structural section with the Engineer's approval."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "RAPID STRENGTH CONCRETE," subsection, "General," the fourth sentence in the eleventh paragraph is revised as follows:

"Modulus of rupture shall be determined by averaging results from 3 beam specimens tested in conformance with the requirements in California Test 524."

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In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "RAPID STRENGTH CONCRETE," subsection, "General," the last paragraph is revised as follows:

"Modulus of rupture at early age may be estimated using the correlation established during trial slab placement or by using results from beam specimens cured under atmospheric conditions and at a temperature within 3°C of the pavement. Modulus of rupture at other ages will be determined using beams fabricated, cured and tested in conformance with the requirements in California Test 524, except beams shall cured using the sand pit option. The Contractor through a laboratory certified by the Department's IAP, shall perform the testing to determine modulus of rupture values of the RSC pavement. The modulus of rupture, as determined above, will be the basis for accepting or rejecting the RSC pavement for modulus of rupture requirements."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "RAPID STRENGTH CONCRETE," subsection, "Pay Factor Adjustment for Low Modulus of Rupture," the "Percentage Pay Table" in the first paragraph is revised as follows:

"Percentage Pay Table

Modulus of Rupture (MPa) at opening to traffic (Early Age)	7-Day Modulus of Rupture (MPa)		
	Greater than or equal to 4.2	Less than 4.2 and greater than or equal to 3.8	Less than 3.8 and greater than or equal to 3.4
Greater than or equal to 2.8	100%	95%	90%
Less than 2.8 and greater than or equal to 2.4	95%	95%	90%
Less than 2.4 and greater than or equal to 2.1	80%*	80%*	80%*

*Any replacement panels that develops one or more transverse cracks within 21 days after placement shall be removed and replaced at the Contractor's expense with replace concrete pavement (Rapid Strength Concrete) conforming to the requirements of these special provisions. A transverse crack is defined as a crack running from one longitudinal edge of the panel to the other."

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In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "RAPID STRENGTH CONCRETE," subsection, "Pay Factor Adjustment for Low Modulus of Rupture," the "Percentage Pay Table" in the second paragraph is revised as follows:

"Percentage Pay Table"

Modulus of Rupture (MPa) at opening to traffic (Early Age)	7-Day Modulus of Rupture (MPa)		
	Greater than or equal to 4.2	Less than 4.2 and greater than or equal to 3.8	Less than 3.8 and greater than or equal to 3.4
Greater than or equal to 2.3	100%	95%	90%
Less than 2.3 and greater than or equal to 2.0	95%	95%	90%
Less than 2.0 and greater than or equal to 1.8	80%*	80%*	80%*

*Any replacement panels that develops one or more transverse cracks within 21 days after placement shall be removed and replaced at the Contractor's expense with replace concrete pavement (Rapid Strength Concrete) conforming to the requirements of these special provisions. A transverse crack is defined as a crack running from one longitudinal edge of the panel to the other."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "RAPID STRENGTH CONCRETE," subsection, "Spreading, Compacting and Shaping," the following paragraph is added after the first paragraph:

"Pavement to be placed adjacent to an existing asphalt concrete shoulder shall be formed. The existing asphalt concrete shall be sawcut and the asphalt concrete and underlying base shall be excavated to a depth and width to allow placement of side forms. Excavation of Asphalt Concrete surfacing and underlying base shall be performed without damage to any facility that is to remain in place. Excavated areas shall be backfilled, after removal of side forms, with Asphalt Concrete conforming to the requirements of 39-7.01, "Miscellaneous" of the Standard Specifications. The Contractor shall, at least 48 hours prior to the saw cutting operation, submit to the Engineer for approval, details of how the side forms are to be placed, and the shoulder to be repaired, around the area of excavation."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Quality Control Plan," the fifth paragraph is revised as follows:

"The QCP shall include the names of quality control personnel to be used and an outline of sampling, and testing to be performed during and after construction of replacement pavement. At the time of submission of the QCP, Contractor provided laboratories, testing equipment, and sampling and testing personnel shall conform to the certification requirements of the Department's Independent Assurance Program, IA Program, for the sampling and testing for which they will be responsible. The QCP shall identify current IA Program accreditation for the laboratory, testing equipment and IA qualified sampling and testing personnel. For test methods associated with these special provisions, IA accreditation includes a list the equipment to be used including date of last calibration, the names and IA qualifications of sampling and testing personnel, and the location of the laboratory and testing equipment during and after RSC construction operations."

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In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Quality Control Inspection, Sampling and Testing," is revised as follows:

"The Contractor shall provide an IA accredited testing laboratory with adequate equipment and IA qualified personnel for the performance of all sampling and quality control tests. Testing laboratories, testing equipment, and sampling and testing personnel shall conform to the certification requirements of the Department's Independent Assurance Program. This IA accredited laboratory shall be located at a location approved by the Engineer and so that prompt testing requirements will be achieved. All sampling and testing equipment shall be maintained in proper working condition. Sampling shall be performed in conformance with the requirements of California Test 125. The Contractor shall submit to the Engineer a list the equipment to be used including date of last calibration, the names and IA qualifications of sampling and testing personnel, and the location of the laboratory and testing equipment during and after RSC construction operations.

The Contractor shall provide a minimum of two working days notice to the Engineer prior to any sampling and testing. Testing shall be performed by the Contractor and witnessed by the Engineer. At the Engineer's request, the Contractor shall produce samples and test specimens for the Engineer to test.

The Engineer shall be given unrestricted access to the Contractor's quality control inspectors, samplers, testers and laboratories. During all phases of RSC production and placement, the Contractor shall provide results of all testing to the Engineer within 15 minutes of completion of testing. The Contractor shall record all inspection, sampling and testing on forms approved by the Engineer. The Contractor shall provide written results of all inspection and testing to the Engineer within 48 hours of completion of each shift of paving and within 24 hours for all 7-day strength tests.

The QCP shall include a list the equipment to be used including date of last calibration, the names and certifications of sampling and testing personnel, and the location of the laboratory and testing equipment during and after paving operations."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Trial Slab and Process Control Testing," the first sentence in the fifth paragraph is revised as follows:

"During trial slab construction and within 20 minutes of RSC delivery, beams shall be fabricated in conformance with the requirements in California Test 524."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Trial Slab and Process Control Testing," the sixth paragraph is revised as follows:

"Materials resulting from construction of trial slabs and test specimens shall become the property of the Contractor and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications."

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Process Control and Quality Control Testing," the fourth paragraph is deleted

In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "QUALITY CONTROL PROGRAM," subsection, "Process Control and Quality Control Testing," the second sentence in the sixth paragraph is revised as follows:

"Beams fabricated for the 7-day test shall be cured in conformance with California Test 524 as modified in these special provisions."

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In the Special Provisions, Section 10-1.38, "REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)," subsection, "MEASUREMENT AND PAYMENT," the following paragraph is added after the third paragraph:

"Full compensation for all required Quality Control Inspection, Sampling and Testing, Process Control testing, testing to determine modulus of rupture and all other contractor required testing as described in these special provisions, including testing laboratories, testing personnel, testing equipment, and ancillary testing supplies, shall be considered as included in the contract prices paid for the item involving RSC and no additional compensation will be made therefor."

In the Special Provisions, Section 10-1.40, "GRIND EXISTING CONCRETE PAVEMENT," the first paragraph is revised as follows:

"This work shall consist of grinding existing portland cement concrete pavement and conforms as shown on the plans, as specified in Section 42-2, "Grinding," of the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 10-1.43, "STRUCTURE APPROACH SLABS (TYPE R)," is revised as attached.

In the Special Provisions, Section 10-3.01, "DESCRIPTION," the first paragraph is revised as follows:

"Modifying traffic signals, lighting, highway advisory radio system, modify pop-up control electrical system and traffic operations system shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions."

In the Special Provisions, Section 10-3.02.5, "CODES AND STANDARDS," is added as follows:

"10-3.02.5 CODES AND STANDARDS

All work performed and material installed or furnished on this contract shall conform to Section 86-1.02, "Regulations and Code," and the following codes and standards subject to the modifications and additional requirements in these special provisions:

1. California Administrative Code, Title 24, Part 3 Basic Electrical Regulations.
2. National Fire Protection Association Standards.
3. REA Standard, "Fully Color-Coded, Polyethylene-Insulated, Polyethylene-Jacketed Telephone Cable," shall apply to telephone communication conductors and cables.
4. IPCEA No. A-61-402, NEMA WC-5, "Thermoplastic-Insulated Wire and cable for the Transmission and Distribution of Electrical Energy," shall apply to high voltage cable and 600-volt class conductors.
5. All local ordinances."

In the Special Provisions, Section 10-3.03, "MAINTAINING AND PROTECTING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS," the following paragraphs are added after the first paragraph:

"Protecting existing and temporary electrical systems. --Protection of existing electrical systems and facilities shall consist of providing temporary support and protection for the equipment, utilities, and other facilities within the scope of this contract, and shall conform to the provision in Section 7-1.11, "Preservation of Property," of the Standard Specifications.

Full compensation for conforming to the above requirements shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed therefore."

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In the Special Provisions, Section 10-3.08, "CONDUIT," the following paragraph is added after the third paragraph:

"When a standard coupling cannot be used for joining Type 1 conduit, a UL listed threaded union coupling conforming to the provisions in Section 86-2.05C, "Installation," of the Standard Specifications, or a concrete-tight split coupling, or concrete-tight set screw coupling shall be used."

In the Special Provisions, Section 10-3.08, "CONDUIT," the following paragraph is added after the sixth paragraph:

"At those locations where conduit is required to be installed under pavement and existing underground facilities require special precautions in conformance with the provisions in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" in conformance with the provisions in Section 86-2.05C, "Installation," of the Standard Specifications."

In the Special Provisions, Section 10-3.23.5, "SEALANTS AND COMPOUNDS," is added as follows:

"10-3.23.5 SEALANTS AND COMPOUNDS

Pulling Compound. --All pulls totaling more than 20 meters, involving cables larger than #1/0, or incorporating bends totaling more than 180° shall have the conduit pre lubricated before pulling.

The pulling compound to be used shall be of the non-petroleum type. The pulling compound may be factory prepared, or field mixed according to the manufacturer's specifications. The pulling compound shall be one of the ready-to-use types listed below, or the manufacturer's equivalent for field mixing:

American Cable Colloid Co. - Sli X-300
Cable Associates, Inc. - Gel-Lube 7/5
Generam Machine Products Co. - No. 7437-PC
Ideal Industries, Inc. - Aqua-Gel II or CW
Mac Products, Inc. - MacLube No. CA-51
Minerallac Electric Co. - Minerallac H-2B
Plymouth Rubber Co. - No. 45 Cable Pulling Lubricant
Polywater Corp. - "A", "G", "J", or "WJ".

In the Special Provisions, Section 10-3.27, "PAYMENT," the following paragraph is added after the first paragraph:

"The contract lump sum price paid for modify pop-up control electrical system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modify pop-up control electrical system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 12-15, "MECHANICAL," is added as attached.

In the Proposal and Contract, the Engineer's Estimate Items 6, 11, 25, 29, 34, 35, 50, 62, 63 are revised, Items 112, 113, 114, 115, 116, 117, 118, 119 are added and Items 52 and 111 are deleted as attached.

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To Proposal and Contract book holders:

Replace pages 3, 4, 5, 6, and 8 of the Engineer's Estimate in the Proposal with the attached revised pages 3, 4, 5, 6, 8 and added page 8A of the Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the NOTICE TO CONTRACTORS section of the Notice to Contractors and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This office is sending this addendum by DHL overnight mail to Proposal and Contract book holders to ensure that each receives it. A copy of this addendum and the modified wage rates are available for the contractor's use on the Internet Site:

http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Division of Engineering Services - Office Engineer

Attachments

7-1.12B(4)(a) General

The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

1. Premises, operations, and mobile equipment
2. Products and completed operations
3. Broad form property damage (including completed operations)
4. Explosion, collapse, and underground hazards
5. Personal injury
6. Contractual liability

7-1.12B(4)(b) Liability Limits/Additional Insureds

The limits of liability shall be at least the amounts shown in the following table:

Total Bid	For Each Occurrence ¹	Aggregate for Products/Completed Operation	General Aggregate ²	Umbrella or Excess Liability ³
≤\$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
>\$1,000,000				
≤\$5,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
>\$5,000,000				
≤\$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
>\$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

1. Combined single limit for bodily injury and property damage.
2. This limit shall apply separately to the Contractor's work under this contract.
3. The umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The Contractor shall not require certified Small Business subcontractors to carry Liability Insurance that exceeds the limits in the table above. Notwithstanding the limits specified herein, at the option of the Contractor, the liability insurance limits for certified Small Business subcontractors of any tier may be less than those limits specified in the table. For Small Business subcontracts, "Total Bid" shall be interpreted as the amount of subcontracted work to a certified Small Business.

The State, including its officers, directors, agents (excluding agents who are design professionals), and employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds does not extend to liability:

1. Arising from any defective or substandard condition of the roadway which existed at or before the time the Contractor started work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing roadway facilities and the claim arises from the Contractor's failure to maintain;
2. For claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor that occurred during the course of the work; or
3. To the extent prohibited by Insurance Code Section 11580.04.

Additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO), or other form designated by the Department.

10-1.03 STREET SWEEPING

Street sweeping shall be conducted during the Contractor's operations that generate trash, sediment particulate matter and debris as described in the approved Storm Water Pollution Prevention Plan in accordance with "Water Pollution Control" of these special provisions, and as directed by the Engineer.

Street sweeping shall be one of the water pollution control practices for trash, particulate matter and debris and sediment control. The Storm Water Pollution Prevention Plan shall include the use of street sweeping. Street sweeping shall be performed in accordance with Section 4, SC—7 in the Construction Site Best Management Practices Manual of the Caltrans Storm Water Quality Handbooks.

The number of street sweepers shall be as designated in the approved Storm Water Pollution Prevention Plan. The Contractor shall maintain at least 1 sweeper on the project site at all times during the period that sweeping work is required. Sweepers shall use one of the following technologies:

- a. Mechanical sweeper followed by a vacuum-assisted sweeper, or
- b. Vacuum-assisted dry (waterless) sweeper, or
- c. Regenerative-air sweeper

Street sweeping shall commence immediately after all the Contractor's operations that generate trash and debris, including but not limited to cracking/sealing/grinding/planning/demolition of concrete pavements, approach slabs, concrete barriers, soil disturbing activities, and offsite tracking of materials are observed and shall continue until completion of the project, or as directed by the Engineer. Street sweeping shall be performed so that dust is minimized. The Contractor shall perform maintenance and repair on the sweeper to ensure its effective performance. If dust generation is excessive or sediment pickup is ineffective as determined by the Engineer, the use of water or a vacuum will be required.

At the option of the Contractor, collected material may be temporarily stockpiled in accordance with the approved Storm Water Pollution Prevention Plan. Collected material shall be disposed of at least once per week.

Material collected during street sweeping operations shall be disposed of in conformance with Section 7—1.13, "Disposal of Material Outside The Highway Right Of Way," of the Standard Specifications.

MEASUREMENT AND PAYMENT

The contract lump sum price paid for street sweeping shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in street sweeping, including disposal of collected material, as shown on the plans, as specified in the Standard Specifications, these special provisions, and as directed by the Engineer.

10-1.08 PROGRESS SCHEDULE (CRITICAL PATH METHOD)

Progress schedules will be required for this contract. Progress schedules shall utilize the Critical Path Method (CPM). Attention is directed to "Cooperation," and "Obstructions" of these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7, "Legal Relations and Responsibility," of the Standard Specifications. All schedules are required to reflect a reasonable plan to execute the contract scope of work. The Contractor shall be solely responsible for the content of the schedules and the execution of all contract requirements.

The provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications shall not apply.

DEFINITIONS

The following definitions apply to this section "Progress Schedule (Critical Path Method)":

- A. Activity: Any task, or portion of a project, which takes time to complete.
- B. Bar Chart (Gantt Chart): A graphic display of scheduled-related information, activities or other project elements are listed down the left side of the chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars.
- C. Baseline Schedule: The initial CPM schedule representing the Contractor's original work plan, as accepted by the Engineer.
- D. Contract Completion Date: The current extended date for completion of the contract shown on the weekly statement of working days furnished by the Engineer in accordance with Section 8-1.06, "Time of Completion," of the Standard Specifications.
- E. Controlling Operation: The activity considered at the time by the Engineer, within that series of activities defined as the critical path, which if delayed or prolonged, will delay the time of completion of the contract.
- F. Critical Path: The series of activities, which determines the earliest completion of the contract (Forecast Completion Date). This is the longest path of activities having the least amount of float.
- G. Critical Path Method: A mathematical calculation to determine the earliest completion of the contract represented by a graphic representation of the sequence of activities that shows the interrelationships and interdependencies of the elements composing a project.
- H. Data date: The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned."
- I. Delay: The time period during which some part of the construction project has been extended beyond what was originally planned due to unanticipated circumstances. A delay occurs when the respective activity or group of activities, requiring additional time, impacts the completion of the successor construction activity and also extend the scheduled contract completion date. Concurrent Delay: Two or more delays occurring simultaneously or overlapping. Each delay when analyzed separately impacts the contract completion date.
- J. Early Completion Time: The difference in time between the current contract completion date and the Contractor's scheduled early forecast completion date as shown on the accepted baseline schedule, or schedule updates and revisions.
- K. Float: The amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any activity or group of activities in the network.
- L. Hammock Activity: An activity added to the network to span an existing group of activities for summarizing purposes.
- M. Milestone: A marker in a network, which is typically used to mark a point in time or denote the beginning or end of a sequence of activities. A milestone has zero duration, but will otherwise function in the network as if it were an activity.
- N. Narrative Report: A document submitted with each schedule that discusses topics related to project progress and scheduling.
- O. Near Critical Path: A path having 30 days or less of total float.
- P. Revision: A change in the future portion of the schedule that modifies logic, adds or deletes activities, or alters activities, sequences, or durations.
- Q. Scheduled Completion Date: The completion date of the last scheduled work activity identified on the critical path.
- R. State Owned Float Activity: The activity documenting time saved on the critical path by actions of the State. It is the last activity prior to the scheduled completion date.

- S. Tabular Listing: A report showing schedule activities, their relationships, durations, scheduled and actual dates, and float.
- T. Time Impact Analysis: A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.
- U. Time Scaled Logic Diagram: A schematic display of the logical relationships of project activities, drawn from left to right to reflect project chronology with the positioning and length of the activity representing its duration.
- V. Total Float: The amount of time that an activity may be delayed without affecting the total project duration of the critical path.
- W. Update Schedule: The modification of the CPM progress schedule through a regular review to incorporate actual progress to date by activity and to reflect the current plan to complete the project.

PRECONSTRUCTION SCHEDULING CONFERENCE

The Engineer will schedule and conduct a Preconstruction Scheduling Conference with the Contractor's Project Manager and Construction Scheduler within 1 week after the bidder has received the contract for execution. At this meeting, the requirements of this section of the special provisions will be reviewed with the Contractor. The Contractor shall be prepared to discuss its schedule methodology, proposed sequence of operations, the activity identification system for labeling all work activities, the schedule file numbering system, and any deviations it proposes to make from the Stage Construction Plans.

The Contractor shall propose to the Engineer for approval a set of logical project codes, filters, and layouts, to group and organize the work activities. The Engineer may submit a scheduling shell project displaying an activity code dictionary consisting of fields populated with the Caltrans scheduling codes, filters, layouts, reports formats, and a resource dictionary to be incorporated into the schedule. Periodically, the Engineer may request the Contractor to utilize additional filters, layouts, or activity codes to further group or summarize work activities.

The Engineer and the Contractor shall review the requirements for all submittals applicable to the contract and discuss their respective preparation and review durations.

GENERAL SCHEDULE ITEMS

The Engineer's review and acceptance of schedules shall not waive any contract requirements and shall not relieve the Contractor of any obligation there under or responsibility for submitting complete and accurate information. Schedules that are rejected shall be corrected by the Contractor and resubmitted to the Engineer within 5 days of notification by the Engineer, at which time a new review will begin.

The Contractor shall be responsible for assuring that all work sequences are logical and the network shows a coordinated plan for complete performance of the work. Failure of the Contractor to include any element of work required for the performance of the contract in the network shall not relieve the Contractor from completing all work within the time limit specified for completion of the contract. If the Contractor fails to define any element of work, activity or logic, the Contractor shall correct such errors on the next schedule update and shall include an explanation in the schedule narrative. Any impacts as a result of this error or omission shall be mitigated by the Contractor at their own expense.

The following items are applicable to all schedules:

- A. The schedule shall identify all project characteristics, salient features, or interfaces, including those with outside entities that could affect time of completion.
- B. Schedule activities shall identify project start date, scheduled completion date, and project milestones
- C. Activity descriptions are not to be revised when the scope of the activity is changed. The existing activity shall be deleted and a new activity shall be added.
- D. The schedule shall be constructed using the Precedence Diagramming Method (PDM) technique.
- E. Scheduled activities shall show the identification of Work performed by the Contractor, subcontractors and suppliers
- F. All activities shall be assigned a new and unique Activity Identification Number.
- G. After acceptance of the Baseline Schedule, the original duration field shall not be modified. Any changes in duration shall be indicated utilizing the remaining duration field.
- H. All construction activities shall have durations of not more than 20 days, unless otherwise accepted by the Engineer. All activities should be of appropriate duration to progress the Work. The Engineer may request contractor to provide an additional detail of activities, including shop drawings or fabrication activities, in order to properly monitor the progress of Work.
- I. All activities, with the exception of the first and last activities, shall have a minimum of one predecessor and of one successor.
- J. Negative lags shall not be used.

- K. Contractor shall use retained logic when establishing schedule calculation.
- L. Once the Baseline Schedule is accepted, there shall be no modifications to the Project Calendar.
- M. The Contractor shall provide to the Engineer two copies of all schedules on electronic medium, together with printed copies of the network diagrams or bar charts and tabular reports described under "Project Schedule Reports", and the Schedule Narrative Report.
- N. Use of additional logic ties to represent resource sequencing should be kept to a minimum.
- O. Activities and milestones representing the interface with neighboring contractors, agencies, or other outside entities and as stated by these Special Provisions, shall be reflected in the schedule.
- P. Submittals, reviews, deferred submittal review periods, and outside agency submittal review periods shall be included in the schedule with sufficient duration being assigned to each activity. The Contractor shall be responsible for all impacts resulting from any re-submittal, the effects of partial or incomplete submittal.
- Q. All Construction Staging shall be identified on the schedule by the use of activity coding.
- R. Testing and settlement periods, utility notification and relocations, major traffic stage switches, and any other activity affecting the Work shall be identified on the project schedule.
- S. The baseline schedule shall be resource loaded.

INTERIM BASELINE SCHEDULE

Within 2 weeks after approval of the contract or at the pre-construction conference, whichever is later, the Contractor shall submit to the Engineer an Interim Baseline Project Schedule which will serve as the progress schedule for the first 120 days of the project, or until the Baseline Schedule is accepted, whichever is sooner. The Interim Baseline Schedule shall utilize the critical path method of scheduling and be performed on the same software as the Baseline Schedule. The Interim Baseline Schedule shall depict how the Contractor plans to perform the work for the first 120 days of the contract. Additionally, the Interim Baseline Schedule shall show all required submittals working drawings, and review periods, and shall provide for all permits, and other non-work activities necessary to begin the work. Beyond the first 120 days of the project, the Contractor shall depict the remainder of the project in a summary form, reflecting the duration of the contract, grouped by major project component. The summary schedule portion is for information purposes only and is to be used as a reference until the Baseline Schedule is accepted. The Interim Baseline Schedule submittal shall include the data files used to generate the schedule on electronic medium.

The Engineer shall be allowed 2 weeks to review the schedule and to provide comments, including the Contractor's application of the supplied activity codes. All comments are to be implemented into the Baseline Schedule. Re-submittal of the Interim Baseline Schedule is not required. Late review of the Interim Baseline Schedule shall not restrain the submittal of the Baseline Schedule. No contract payments shall be made to the Contractor until an Interim Baseline Schedule is submitted in accordance with the above requirements.

BASELINE SCHEDULE

Within 6 weeks of Notice to Proceed, Contractor shall submit to the Engineer a Baseline Project Schedule in accordance with the Contract Provisions. The Baseline Schedule shall have a data date of the day prior to the first working day of the contract. The Notice to Proceed Milestone shall be the date on which Notice to Proceed was specified in the Contract. The schedule shall not include any actual start dates, actual finish dates, or constraint dates (except for Contract Milestone dates, NTP, and Project Completion) and activities scheduled to start or finish between the data date and the run date shall reflect dates that can be attained. The NTP activity may have a start-no-earlier-than constraint and the Project Completion Activity may have a finish-no-later-than constraint. The Baseline Schedule shall meet interim milestone dates, contract milestone dates, stage construction requirements, internal time constraints, show logical sequence of activities, and must not extend beyond the number of days originally provided for in the contract.

All task activities shall be assigned to a project calendar. Each calendar shall identify a workweek, and holidays. Different calendars shall be used for work activities that occur on different work schedules. Activities for the preparation and the review of submittals; offsite fabrication, and material/equipment deliveries are to be assigned to the same calendar unless accepted by the Engineer. All non-activity periods for environmental work restrictions shall be identified with the appropriate calendars. The Baseline Schedule shall depict how the Contractor plans to complete the whole work involved, and shall show all activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum, as determined by the Engineer.

The Contractor shall require each subcontractor to submit in writing a statement certifying that the subcontractor, major fabricators and suppliers have concurred with the Contractor's CPM baseline schedule including major update schedules, and that the subcontractor's related schedule has been incorporated accurately, including the duration of activities, labor and equipment loading.

State owned float shall be considered a resource for the exclusive use of the State. The Engineer may accrue State owned float by the early completion of review of any type of required submittal when it saves time on the critical path. The Contractor shall document State owned float by updating the State owned float activity on the next schedule update. State owned float shall be the second to last activity in the schedule of which the successor is the Scheduled Completion Date. No other activity shall be scheduled to occur during the Stated Owned Float Activity. The Contractor shall include a log of the action on the State owned float activity and include a discussion of the actions in the narrative report. The Engineer may use State owned float to mitigate past or future State delays by offsetting potential time extensions.

If the Contractor submits an early completion Baseline schedule that shows contract completion in less than 85 percent of the working days specified in these special provisions, the Baseline schedule shall be supplemented with resource allocations for every task activity to a level of detail that facilitates report generation based on labor craft and equipment class. The Contractor shall also submit to the Engineer time-scaled resource histograms of the labor crafts and equipment to be utilized on the contract. The resource allocations shall be shown to a level of detail that facilitates report generation based on labor crafts and equipment classes for the Contractor and subcontractors. Contractor shall optimize and level labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not duplicated in concurrent activities. The Engineer may review the Baseline schedule activity resource allocations using Means Productivity Standards or equivalent to determine if the schedule is practicable.

The Baseline schedule submitted to the Engineer shall comply with all limits imposed by the contract, with all specified intermediate milestone and contract completion dates, and with all constraints, restraints or sequences included in the contract. The degree of detail shall include the general requirements as stated above including, but not limited to:

- A. All purchases, submittals, submittal reviews, manufacture, fabrication, tests, delivery, and installation activities for all major materials and equipment, including submittal of requests for audits of manufacturers and fabricators in conformance with "Manufacturing and Fabrication Qualification Audit for Materials" of these special provisions;
- B. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors, railroads, and utilities as shown on the plans or specified in the specifications;
- C. Identification of each utility relocation and interface as a separate activity, including activity description and responsibility coding that identifies the type of utility and the name of the utility company involved;
- D. Actual tests, submission of test reports, and approval of test results;
- E. All start-up, testing, training, and assistance required under the Contract;
- F. Punchlist and final clean-up;
- G. Identification of any manpower, material, or equipment restrictions, as well as any activity requiring unusual shift work, such as double shifts, 6 or 7-day weeks, specified overtime, or work at times other than regular days or hours. Any unusual shift periods will be specified in the Contract otherwise all activities shall be scheduled as a regular Working Day.
- H. Identification of each and every ramp closing and opening event as a separate one day activity, including designation by activity coding and description that it is a north-bound, south-bound, east-bound, west-bound, and entry or exit ramp activity;

In no event shall the baseline schedule exceed 750 construction activities, exclusive of submittals, review periods, and fabrication/delivery activities. The Engineer will be allowed 2 weeks to review and accept or reject the baseline project schedule submitted. Rejected schedules shall be resubmitted to the Engineer within 1 week, at which time a new 2 week review period by the Engineer will begin. The baseline schedule submittal is not complete until the scheduling equipment and software are provided.

EARLY AND LATE COMPLETION SCHEDULES

The Contractor may show early completion time on any schedule provided that the requirements of the contract are met. Early completion time shall be considered a resource for the exclusive use of the Contractor. The Contractor may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently or by completing activities earlier than planned. The Contractor may also submit for approval a cost reduction incentive proposal in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications that will reduce time of construction.

After approval of the Baseline Schedule, should Contractor show a scheduled completion date that is later than the contract completion the Contractor shall provide a detailed explanation for the scheduled completion date in the schedule narrative. During any period in which the schedule shows negative float, the Engineer may require a recovery schedule depicting how the Contractor intends to bring the project back to the approved project completion date. This recovery schedule is in addition to the updated schedule.

The Engineer may adjust contract working days for ordered changes that affect the scheduled completion date, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications. The Contractor shall prepare a time impact analysis to determine the effect of the change in conformance with the provisions in "Time Impact Analysis" specified herein, and shall include the impacts acceptable to the Engineer in the next update schedule.

SCHEDULE RESOURCE ALLOCATIONS / LOADING

The Baseline Schedule shall be supplemented with resource allocations for every major task activity to a level of detail that facilitates report generation based on jobhours for labor craft, equipment class, fabricators, and suppliers. The Contractor shall also submit to the Engineer time-scaled resource histograms of the labor crafts and major equipment to be utilized on the contract.

The Contractor shall optimize labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not over committed in concurrent activities.

The Baseline schedule submitted to the Engineer shall include:

- A. Separate resource graphs for the Contractor's labor, equipment and critical path labor, with an accompanying analysis of each.
- B. Equipment and labor shall be differentiated by a cost account code within the resource dictionary.

Added or changed activities to Updates, Revisions, and other schedules require, at a minimum, the same resource requirements as the baseline schedule.

PROJECT SCHEDULE TABULAR REPORT

A Tabular Schedule Report shall be produced for each schedule update on 8 ½ x 11 medium. This tabular report shall show the following information and is to be produced by the Scheduling Software:

- A. Activity number and description;
- B. Original, actual and remaining duration;
- C. Early start date (by calendar date);
- D. Early finish date (by calendar date);
- E. Actual start date (by calendar date);
- F. Actual finish date (by calendar date);
- G. Late start date (by calendar date);
- H. Late finish date (by calendar date);
- I. Identify activity calendar ID;
- J. Total Float; and
- K. Percent complete.

PROJECT SCHEDULE NARRATIVE

The Monthly Update Schedule submitted to the Engineer will be accompanied by a Schedule Narrative Report. The report shall describe the physical progress during the report period, plans for continuing the work during the forthcoming report period, actions planned to correct any negative float, and an explanation of potential delays or problems and their estimated impact on performance, milestone completion dates, forecast completion date, and the overall project completion date. In addition, alternatives for possible schedule recovery to mitigate any potential delay or cost increases shall be included for consideration by the Engineer.

The report shall follow the outline set forth below:

- A. Work completed during the period;
- B. Description of the current critical path;
- C. Description of current problem areas;
 - o Current and anticipated delays;
 - o Cause of the delay;
 - o Corrective action and schedule adjustments to correct the delay; and
 - o Impact of the delay on other activities, milestones, and completion dates;
- D. Changes in construction sequences;

- E. Pending items and status thereof;
 - o Permits;
 - o Change Orders;
 - o Time Extensions; and
 - o Non-Compliance Notices;
 - o Notice of Potential Claims
- F. Contract completion date(s) status;
- G. Ahead of schedule and number of days; and
- H. Behind schedule and number of days; and
- I. Response to Previous Schedule Comments
- J. Reconciliation to key contract dates including CCO's, weather days, and time extensions

PROJECT SCHEDULE NETWORK DIAGRAM (BAR CHART)

Network diagrams or bar charts shall be sorted and grouped in a format requested by the Engineer reflecting the breakdown per the activity codes. They shall show a continuous flow of information from left to right per the project sorting and grouping codes. The primary paths of criticality shall be clearly and graphically identified on the diagrams or charts. The network diagram or bar chart shall be prepared on E-size sheets (36 in x 48 in), shall have a title block in the lower right-hand corner, and a timeline on each page. The critical path shall be depicted in Red. Portions of the network diagram on which all activities are complete need not be reprinted and submitted in subsequent updates. However, the submitted schedule and the related reports shall constitute a clear record of progress of the work from award of contract to final completion.

MONTHLY UPDATE SCHEDULE

The Contractor shall submit a Monthly Updated Schedule and related reports to the Engineer once in each month within 1 week of the data date. The proposed update schedule prepared by the Contractor shall include all information available as of the 20th day of the month, or other data date as established by the Engineer.

On a date determined by the Engineer, the Contractor shall meet with the Engineer to review the monthly update schedule. At the monthly progress meeting, the Contractor and the Engineer shall review the updated schedule and shall discuss the content of the Narrative Report. The Engineer will be allowed 2 weeks after the meeting to review and accept or reject the update schedule submitted. Rejected schedules shall be resubmitted to the Engineer within 1 week, at which time a new 1 week review period by the Engineer will begin. All efforts shall be made between the Engineer and the Contractor to complete the review and the acceptance process prior to the next update schedule data date. To expedite the process, a second meeting between the Engineer and the Contractor may be held.

SUBMITTAL REQUIREMENTS

The Baseline and Monthly Schedule Updates shall include, at a minimum, the following reports in the quantities as shown:

- A. Contractor's Transmittal Letter;
- B. 2 copies of the Project Schedule Tabular Report (8.5 in x 11 in size);
- C. 2 copies of the Project Schedule Narrative Report;
- D. 1 set of the Project Schedule Network Diagrams (Bar Charts) (E-Size-color);
- E. 2 copies of the schedule on electronic medium, compressed into a single file, with access restriction removed, sent to the Engineer. This is to be submitted on CD-ROM;
- F. 1 copy of the schedule (as above) e-mailed to the Engineer.

WEEKLY SCHEDULE PROGRESS MEETINGS

The Engineer and the Contractor shall hold weekly scheduling meetings to discuss the near term schedule activities, to address any long-term schedule issues, address the weekly controlling operation, and to discuss any relevant technical issues. This weekly meeting can be a part of the Weekly Progress Meeting held with the Contractor.

The Contractor shall develop a rolling 4-weeks schedule identifying the previous week worked and a 3-week look ahead. It shall provide sufficient detail to include the actual and planned activities of the Contractor and all the subcontractors for offsite and construction activities, addressing all activities to be performed and to identify issues requiring engineering action or input.

Each activity in the 4 week rolling schedule should be identified by an associated CPM schedule activity ID numbering system as indicated in the Baseline schedule or the last accepted update schedule. This schedule should not be hand written.

SCHEDULE REVISIONS

If the Contractor desires to make a change to the accepted schedule, the Contractor shall request permission from the Engineer in writing, stating the reasons for the change, and proposed revisions to activities, logic and duration. A detailed list of all proposed schedule changes such as logic, duration, lead/lag, forecast completion date, additions and deletions shall be submitted with the revision schedule. The Contractor shall submit for acceptance an analysis showing the effect of the revisions on the entire project. The analysis shall include:

- A. An updated schedule not including the revisions. The schedule shall have a data date just prior to implementing the proposed revisions and includes a project completion date;
- B. A revised schedule that includes the proposed revisions. The schedule will have the same data date as the updated schedule and include a project completion date;
- C. The Contractor should add resources for all new activities, also adjust resources for those activities that their remaining duration were changed;
- D. A narrative explanation of the revisions and their impact to the schedule;
- E. Computer files of the updated schedule and the revised schedule sequentially numbered or renamed for archive (record) purposes.

The Engineer will provide a response within 2 weeks to Contractor's proposed schedule revisions. Within 3 weeks, the Contractor shall submit a revision schedule for acceptance. In addition, a revision schedule shall be submitted when requested by the Engineer, or when any of the following occurs:

- A. There is a significant change in the Contractor's operations that will affect the critical path;
- B. The current updated schedule indicates that the contract progress is 4 weeks or more behind the planned schedule, as determined by the Engineer; or
- C. The Engineer determines that an approved or anticipated change will impact the critical path, milestone or completion dates, contract progress, or work by other contractors.

The Engineer shall be allowed 2 weeks to review and accept or reject a schedule revision. Rejected schedule revisions shall be revised and resubmitted to the Engineer within 2 weeks, at which time a new 2 week review period by the Engineer will begin. Only upon acceptance of a change by the Engineer shall it be reflected in the next schedule update submitted by the Contractor. The revised schedule shall also include a narrative explanation of the revisions and their impact to the schedule.

TIME IMPACT ANALYSIS

When the Contractor requests a time adjustment due to contract change orders or delayed activities or if the Contractor or the Engineer considers that an approved or anticipated change will impact the critical path or contract progress, the Contractor shall submit to the Engineer a written Time Impact Analysis illustrating the impact of each change or delay to the current contract completion date or milestone completion date, utilizing the current accepted schedule. Each Time Impact Analysis shall include a schedule update (an accepted schedule with a data date within the previous month of the event) reflecting the "before conditions", and schedule revision reflecting the "after condition", both with the same data dates, demonstrating how the Contractor proposes to incorporate the change order or delay into the current schedule. The schedule revision shall include the sequence of activities and any revisions to the existing activities to demonstrate the impact of the delay, or change into the schedule. The Time Impact Analysis shall also include proposed mitigation measures or work arounds including but not limited to alternate work calendars, re-sequencing of other activities, or performing work activities out-of-sequence to minimize the impact of the change order or the delayed activities.

Each Time Impact Analysis shall demonstrate the estimated or actual time impact based on the events of delay, the estimated or actual date of the contract change order work performance, the status of construction at that point in time, and the event time computation of all activities affected by the change or delay. The event times used in the analysis shall be those included in the latest accepted update of the current schedule in effect at the time the change or delay was encountered.

Time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the critical path of activities from the time of actual delay, or from the time the contract change order work is performed. Mitigation measures shall be included in the analysis. The Time Impact Analysis shall also consider the use of State owned float as a mitigation measure. Time extensions will not be granted nor will delay damages be paid unless:

- A. The delay is beyond the control and without the fault or negligence of the Contractor and its subcontractors or suppliers, at any tier; and
- B. The delay extends the actual performance of the work beyond the currently accepted contract completion date.
- C. The delay impacts a fabrication or construction activity – delays to the Contractor's submittal or shop drawing process must impact a successor fabrication or construction activity. The Time Impact Analysis shall be based on the impact to fabrication or construction activities.

Time Impact Analyses shall be submitted within 3 weeks after the start of the activity initiating the delay occurs or after initiation of the contract change order. The schedule files will be submitted on electronic medium along with the Time Impact Analysis, which shall include a narrative description of the delay, its impact on contract completion or milestone dates and proposed mitigation measures. Mitigation measures utilized to minimize the impact of the change order or delay shall include but are not limited to work arounds, re-sequencing of work, alternate work calendars, increased resources, expedited procurement and use of State owned float.

A response to each Time Impact Analysis by the Engineer will be made within 3 weeks after receipt of the Time Impact Analysis. The Engineer's review shall utilize actual data unless it is appropriate to use estimated data and shall consider the effects of concurrent delays. Resolution of each Time Impact Analysis by the Engineer shall be completed after all effects of the disruption are documented, which may include mitigation measures. A copy of the Time Impact Analysis accepted by the Engineer shall be returned to the Contractor and the accepted schedule revisions illustrating the impact of the contract change orders or delays shall be incorporated into the project schedule during the first update after acceptance. The Engineer may, at his option, construct and utilize the project as-built schedule or other method to determine adjustments in contract time.

FINAL SCHEDULE UPDATE

Within 3 weeks after the acceptance of the contract by the Director, the Contractor shall submit a final update of the schedule with actual start and actual finish dates for all activities. This schedule submission shall be accompanied by a certification, signed by an officer of the company and the Contractor's Project Manager stating "To the best of my knowledge, the enclosed final update of the project schedule reflects the actual start and completion dates of the activities contained herein."

EQUIPMENT AND SOFTWARE

The Contractor shall provide for the State's exclusive possession and use a complete computer system specifically capable of creating, storing, updating and producing CPM schedules. Before delivery and setup of the computer system, the Contractor shall submit to the Engineer for approval a detailed list of all computer hardware and software the Contractor proposes to furnish. The minimum computer system to be furnished shall include the following:

- A. Complete computer system, including Microsoft ergonomic keyboard, wireless mouse, 21 inch flat panel color monitor, Intel Pentium Duo Core micro processor chip, or equivalent, or better;
- B. Computer operating system software, compatible with the selected processing unit, for Windows XP Professional or later, or equivalent;
- C. Minimum 2 GB of random access memory (RAM) and 512 MB Video Card
- D. A 400 gigabyte minimum hard disk drive, a CD-ROM Drive 24x, a CD-DVD Readable/Writable Drive, a Combo USB/SD/Card Reader, 100 MB Ethernet Card
- E. A color-ink-jet plotter with a minimum 36 Megabytes RAM, capable of 300 dots per inch color, 600 dots per inch monochrome, or equivalent. Capable of printing fully legible, time scaled charts, and network diagrams, in four colors, with a minimum size of 36 in by 48 in (E size) and is compatible with the selected system. Plotter paper and ink cartridges will be provided throughout the contract. HP Designjet 1055 CM, equivalent or later. Contractor shall provide all necessary maintenance, ink and supplies for the printer throughout the duration of the project.
- F. Microsoft Office Professional (latest version)
- G. Scheduler Analyzer Pro – a suite of programs to assist in schedule analysis, the latest version for Windows XP
- H. Caltrans Approved Antivirus and Encryption Software
- I. CPM software shall be the latest Primavera Project Planner Version 3.1

The Contractor shall furnish schedule software and all original software instruction manuals to the Engineer with submittal of the baseline schedule. The furnished schedule software shall become the property of the State and will not be returned to the Contractor. The State will compensate the Contractor in conformance with the provisions in Section 4 1.03, "Extra Work," of the Standard Specifications for replacement of software which is damaged, lost or stolen after delivery to the Engineer.

The Contractor shall instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within 20 working days of contract approval, the Contractor shall provide a commercial 8 hour training session for 2 Department employees in the use of the software at a location acceptable to the Engineer. It is recommended that the Contractor also send at least 2 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software.

PAYMENT

Progress schedule (critical path) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path) shall include full compensation for all labor, materials (including computer hardware and software), tools, equipment, paper, plotter ink, and incidentals; and for doing all the work involved in preparing, furnishing, updating and revising CPM progress schedules. Also for maintaining and repairing the computer hardware and training the Engineer in the use of the computer hardware and software as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for progress schedule (critical path) will be made as follows:

- A. Interim baseline schedule accepted, then 10 percent payment for progress schedule (critical path) will be made.
- B. Baseline schedule accepted, then 10 percent (20 percent if no interim baseline is required) payment for progress schedule (critical path) will be made.
- C. Monthly update schedules accepted, then 75 percent payment for progress schedule (critical path) will be made equally for each update.
- D. Final schedule update accepted, then 5 percent payment for progress schedule (critical path) will be made.

The Department will retain an amount equal to 25 percent of the monthly pay estimate for each estimate period in which the Contractor fails to conform to the provisions of this section, including failure to submit an interim baseline (if required), baseline, revision or updated CPM, or TIA schedule conforming to the requirements of this section, as determined by the Engineer. Retentions for failure to submit acceptable CPM schedules shall be in addition~~at~~ to all other retentions provided for in the contract. The retention for failure to submit acceptable CPM schedules will be released for payment on the next monthly estimate for partial payment following the date that acceptable CPM schedules are submitted to the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of progress schedule (critical path). Adjustments in compensation for the project schedule will not be made for any increased or decreased work ordered by the Engineer in furnishing project schedules.

**Chart No. 1
Multilane Lane Requirements**

Location: Westbound On Route 24 - From Caldecott Tunnel (bore transitions) to El Curtola Overcrossing

FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Mondays through Thursdays	1	1	1	1	2	3																	3	2	2	2
Fridays	1	1	1	1	2	3																		3	3	2
Saturdays	2	1	1	1	1	2	2	3																3	3	2
Sundays	2	1	1	1	1	1	2	2	2	3													3	3	3	2
Day before designated legal holiday																										
Designated legal holidays																										

Legend:

- 1 One lane open in direction of travel
- 2 Two adjacent lanes open in direction of travel
- 3 Three adjacent lanes open in direction of travel
- No lane closure allowed

REMARKS:

1. Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel.
2. Bore transition limits are at Fish Ranch Rd. off-ramp.
3. Coordinate closures with Chart No. 3 (Fish Ranch off-ramp), and also with Chart 1B and 2B (Bores full closures).

**Chart No. 2
Multilane Lane Requirements**

Location: Eastbound On Route 24 - From Caldecott Tunnel (bore transitions) to El Curtola Overcrossing

FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	2	1	1	1	1	2	2																3	3	2
Fridays	2	1	1	1	1	2	2																3	3	3
Saturdays	2	1	1	1	1	1	2	2	3													3	3	3	3
Sundays	2	1	1	1	1	1	1	2	2	3	3											3	3	2	2
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

- 1 One lane open in direction of travel
- 2 Two adjacent lanes open in direction of travel
- 3 Three adjacent lanes open in direction of travel
- No lane closure allowed

REMARKS:

4. Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel.
5. Bore transition limits are 100 meter east of Fish Ranch Rd. off-ramp.
6. Coordinate closures with Chart number 37 (Fish Ranch off-ramp), and also with Chart 1B and 2B (Bores full closures).

**Chart No. 4
Ramp Lane Requirements**

Location: Westbound Route 24 - On the Gateway Blvd. on-ramp

FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																		X	X	X
Fridays	X	X	X	X	X																		X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	X
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

Ramp may be closed

No work that interferes with public traffic will be allowed

REMARKS: 1. SEE DETOUR NO. 2
2. "Attention is directed to "Maintaining Traffic" of these special provisions regarding to restrict closure hours from May 23 through October 21 of each year, seven days week for Shakespeare Festival requirements.

**Chart No. 17
Ramp Lane Requirements**

Location: Westbound Route 24 - On the Gateway Blvd. off-ramp

FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																		X	X	X
Fridays	X	X	X	X	X																		X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X									X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	X
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

Ramp may be closed

No work that interferes with public traffic will be allowed

REMARKS: 1. "Attention is directed to "Maintaining Traffic" of these special provisions regarding to restrict closure hours from May 23 through October 21 of each year, seven days week for Shakespeare Festival requirements.

**Chart No. 1A
Multilane Lane Requirements**

Location: Westbound On Route 24 – From Caldecott Tunnel(bore transitions) to El Curtola Overcrossing

FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	1	1	1	1	1																			2	1
Fridays	1	1	1	1	1																				
Saturdays																									
Sundays																								3	1
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

- 1 One lane open in direction of travel
- 2 Two adjacent lanes open in direction of travel
- 3 Three adjacent lanes open in direction of travel
- No lane closure allowed

REMARKS:

- 1) Use this chart only for lanes # 2 & # 3 for the following specific operations:
 - a) Bridge approach slab replacement
 - b) PCC Slab Replacement
- 2) Use Chart No. 1 for all other operations.
- 3) Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel
- 4) Bore transition limits are at Fish Ranch on-ramp
- 5) Coordinate closures with Chart No. 3 (Fish Ranch on-ramp), and with Chart No. 1B and 2B

**Chart No. 1B
Multilane Lane Requirements**

Location: Westbound On Rte 24 – Bore number 3 including bore transition limits to East of Fish Ranch on-ramp.

FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays																									
Fridays																									
Saturdays	X	X	X	X	X	X																			
Sundays	X	X	X	X	X	X	X	X																	
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

Bore number 3 full closure

No lane closure allowed

REMARKS:

- 1) Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel.
- 2) Only one bore can be closed at a time, with two bores open at all times.
- 3) Please coordinate with Chart number 2B.
- 4) Bore number 3 closure, please coordinate with Chart number 3 at the same time (Fish Ranch on-ramp).

**Chart No. 2A
Multilane Lane Requirements**

Location: Eastbound On Route 24 - From Caldecott Tunnel (bore transitions) to El Curtola Overcrossing

FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	1	1	1	1	1	1																			<u>2</u>
Fridays	1	1	1	1	1	1																			
Saturdays																									
Sundays																									<u>2</u>
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

- 1 One lane open in direction of travel
- 2 Two adjacent lanes open in direction of travel
- 3 Three adjacent lanes open in direction of travel
- No lane closure allowed

REMARKS:

- 1) Use this chart only for lanes # 2 & # 3 for the following specific operations:
 - a) Bridge approach slab replacement
 - b) PCC Slab Replacement
- 2) Use Chart No. 2 for all other operations.
- 3) Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel.
- 4) Bore transition limits are 100 meter east of Fish Ranch Rd. off-ramp.
- 5) Coordinate closures with Chart number 37 (Fish Ranch off-ramp), and also with Chart 1B and 2B (Bores full closures).

**Chart No. 2B
Multilane Lane Requirements**

Location: Eastbound On Rte 24- Bore number 1 or number 2 including bore transitions to east of Fish Ranch off-ramp (close one bore at a time)

FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X																					X
Fridays	X	X	X	X																					
Saturdays	X	X	X	X	X	X	X																		
Sundays	X	X	X	X	X	X	X	X																	X
Day before designated legal holiday																									
Designated legal holidays																									

Legend:

- Bore number 1 or number 2 full closure (close one bore at a time)
- No lane closure allowed
-
-

REMARKS:

1. Coordinate with Caldecott Tunnel Maintenance Crew when closing at or close to Caldecott Tunnel.
2. Only one bore can be closed at a time, with two bores open at all times.
3. Bore number 1 closure, please coordinate with Chart number 37 (Fish Ranch off-ramp).
4. Please coordinate with Chart number 1B.

10-1.165 TEMPORARY PAVEMENT DELINEATION

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the California MUTCD or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

GENERAL

Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Lane line or centerline pavement delineation shall be provided at all times for traveled ways open to public traffic. On multilane roadways (freeways and expressways) edgeline delineation shall be provided at all times for traveled ways open to public traffic.

The Contractor shall perform the work necessary to establish the alignment of temporary pavement delineation, including required lines or marks. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation.

Temporary pavement markers, including underlying adhesive, which are applied to the final layer of surfacing or existing pavement to remain in place or which conflicts with a subsequent or new traffic pattern for the area shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

TEMPORARY LANELINE AND CENTERLINE DELINEATION

Whenever lanelines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown on the plans, the minimum lane line and centerline delineation to be provided for that area shall be temporary pavement markers placed at longitudinal intervals of not more than 7.3 m. The temporary pavement markers shall be the same color as the lane line or centerline the pavement markers replace. Temporary pavement markers shall be temporary pavement markers listed for long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. The temporary pavement markers shall be placed in conformance with the manufacturer's instructions. Temporary pavement markers for long term day/night use (6 months or less) shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place the temporary pavement markers in areas where removal of the temporary pavement markers will be required. In areas in which asphalt concrete surfacing is to be placed, temporary 100-mm wide by 2.14 m long painted white traffic stripe shall be placed on center between temporary pavement markers for lanelines. Temporary pavement markers shall be removed and replaced between the various layers or lifts of pavement for construction of the roadway structural section, and as determined by the Engineer.

Full compensation for furnishing, placing, maintaining, and removing the temporary painted traffic stripes, pavement markers (including underlying adhesive, layout (dribble) lines to establish alignment of temporary pavement markers or used for temporary lane line and centerline delineation for those areas where temporary lane line and centerline delineation is not shown on the plans and for providing equivalent patterns of permanent traffic lines for those areas when required, shall be considered as included in the contract prices paid for the items of work that obliterated the lane line and centerline pavement delineation and no separate payment will be made therefor.

TEMPORARY EDGELINE DELINEATION

On multilane roadways (freeways and expressways), whenever edgelines are obliterated and temporary pavement delineation to replace those edgelines is not shown on the plans, the edgeline delineation to be provided for those areas adjacent to lanes open to public traffic shall be as follows:

- A. Temporary pavement delineation for right edgelines shall, at the option of the Contractor, consist of either a solid 100-mm wide painted traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or channelizers placed at longitudinal intervals not to exceed 30 m.
- B. Temporary pavement delineation for left edgelines shall, at the option of the Contractor, consist of either solid 100-mm wide painted traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 30 m or temporary pavement markers placed at longitudinal intervals of not more than 1.8 m. Temporary pavement markers used for temporary left edgeline delineation shall be one of the types of temporary pavement markers listed for long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

The removal of the 100-mm wide traffic stripe will not be required. The quantity of temporary traffic stripe (paint) used for this temporary edgeline delineation will not be included in the quantities of paint to be paid for.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the project site to maintain the cones or delineators during the hours of the day that the portable delineators are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in "Pavement Markers" of these special provisions, except epoxy adhesive shall not be used to place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (900 mm) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic as determined by the Engineer.

Full compensation for furnishing, placing, maintaining, and removing temporary edgeline delineation, including underlying adhesive, for those areas where temporary edgeline delineation is not shown on the plans shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor.

The quantity of channelizers used as temporary edgeline delineation will not be included in the quantity of channelizers to be paid for. Full compensation for furnishing, placing, maintaining and removing temporary edgeline delineation for those areas where temporary edgeline delineation is not shown on the plans shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor.

TEMPORARY TRAFFIC STRIPE (PAINT)

Temporary painted traffic stripe shall conform to the provisions in "Paint Traffic Stripes and Pavement Markings" of these special provisions, Section 84-3, "Painted Traffic Stripes And Pavement Markings," of the Standard Specifications, except for payment. At the option of the Contractor, either one or 2 coats shall be applied regardless of whether on new or existing pavement.

10-1.335 ASPHALT CONCRETE (OPEN GRADED)

GENERAL

Asphalt concrete shall be Type Open Graded and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

Open graded asphalt concrete may be placed when the atmospheric temperature is below 20°C, but above 7°C, provided the following requirements are met:

- A. The aggregate grading shall be 12.5-mm maximum.
- B. Open graded asphalt concrete shall not be placed in a windrow or stockpile. Open graded asphalt concrete shall be transferred directly from the hauling vehicle to the asphalt paver hopper.
- C. Open graded asphalt concrete shall be not less than 30 mm in compacted thickness.
- D. Immediately before adding the asphalt binder to the open graded asphalt concrete mixture, the temperature of the aggregate shall be not more than 165°C. Open graded asphalt concrete shall be spread at a temperature of not less than 115°C measured in the hopper in the asphalt paver.
- E. The compaction operation shall be such that the maximum distance between the asphalt paver and the initial breakdown rolling shall be no greater than 15 m.
- F. The Contractor shall cover loads of open graded asphalt concrete with tarpaulins. The tarpaulins shall completely cover exposed open graded asphalt concrete in the hauling vehicle until the open graded asphalt concrete has been completely transferred into the asphalt paver hopper.

The grade of asphalt binder to be mixed with aggregate for Type Open Graded asphalt concrete shall be PG 58-34 PM Grade conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications.

RECLAIMED ASPHALT PAVEMENT

The Contractor may produce asphalt concrete using reclaimed asphalt pavement (RAP). Asphalt concrete produced using RAP shall conform to the provisions for asphalt concrete in this section, "Asphalt Concrete," and these special provisions. The Contractor may substitute RAP for a portion of the virgin aggregate in asphalt concrete in an amount not exceeding 15 percent of the asphalt concrete dry aggregate mass.

RAP shall be processed from asphalt concrete removed from pavement surfaces. RAP shall be stored in stockpiles on smooth surfaces free of debris and organic material. RAP stockpiles shall consist only of homogeneous RAP. The Contractor may process and stockpile RAP throughout the project's life. Processing and stockpiling operations shall prevent material contamination and segregation.

The Contractor shall determine the amount of asphalt binder to be mixed with the combined virgin aggregate and RAP in conformance with the requirements in California Test 367 amended by Lab Procedure-9 (LP-9), "Asphalt Concrete Using Up To 15% Reclaimed Asphalt Pavement (RAP)." LP-9 is available at:

<http://www.dot.ca.gov/hq/esc/Translab/fpmlab.htm>

At least 21 days before starting production of asphalt concrete using RAP, the Contractor shall submit a proposed asphalt concrete mix design in writing to the Engineer. The mix design submittal shall consist of the following:

- A. RAP:
 1. Processed stockpile locations.
 2. LP-9 test results.
 3. Correlation factor for aggregate gradations from California Test 382 and LP-9.
 4. Three 32-kg samples of processed RAP representing the material to be used. The three samples shall be split from the sample the Contractor uses to determine the mix design. The Contractor shall obtain and split the samples in conformance with the requirements in California Test 125 and LP-9.
 5. The substitution rate for virgin aggregate and percent RAP.

B. Virgin aggregate and supplemental fine aggregate blend:

1. Percent passing values for each sieve size.
2. Aggregate quality tests results.
3. Each aggregate source to be used including producer, location, and California Mine Identification number.
4. Percentage of each aggregate stockpile, cold feed, and hot bin to be used.
5. Gradation of each aggregate stockpile, cold feed, and hot bin to be used.

C. Asphalt binder:

1. Source.
2. Material Safety Data Sheets.

D. Antistrip additives, if used:

1. Name of product.
2. Name of manufacturer.
3. Manufacturer's designation and proposed rate.
4. Location and method of addition.
5. Material Safety Data Sheets.

E. Asphalt concrete:

1. A completed mix design that reflects the percent of RAP to be used including the electronic worksheet identified in LP-9.
2. In graphical format, stability and air voids versus asphalt binder percentage of asphalt in conformance with the requirements in CTM 367.

Asphalt concrete production using RAP shall not begin until the Engineer approves the mix design. If the Engineer fails to review the mix design in 21 days, and if, in the opinion of the Engineer, work completion is delayed as a result of the failure to review, the Engineer will adjust payment and contract time in conformance with the requirements in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

If proposing a change in the RAP substitution rate, the Contractor shall notify the Engineer. If the substitution rate changes more than 5 percent by dry aggregate mass in the asphalt concrete mixture, the Contractor shall submit a new mix design.

The aggregate gradation for the asphalt concrete produced with RAP shall be calculated based on the mathematical combination of the virgin aggregate gradation during production and the daily RAP gradation. RAP shall be sampled and gradation shall be determined in conformance with the requirements in LP-9. RAP gradations shall be:

- A. Determined daily by the Contractor.
- B. Used for the mathematical combination of that day's asphalt concrete production.
- C. Reported to the Engineer.

The Contractor shall perform quality control testing of the RAP source each day asphalt concrete using RAP is produced. The Contractor shall perform quality control testing of the aggregates and the asphalt concrete mixture at least once for every 1000 tonnes of asphalt concrete using RAP produced, but not less than 2 tests per day.

Daily, the Contractor shall submit to the Engineer:

- A. Results for RAP gradation and the asphalt binder content in RAP determined in conformance with the requirements in LP-9. The Contractor shall sample RAP from the weighhopper or pugmill.
- B. Mathematical calculation of the gradation of the virgin aggregate and RAP aggregate blend.
- C. Correlation factor for RAP burn-off determined in conformance with the requirements in LP-9.

RAP proportioning shall conform to the provisions for aggregate proportioning specified in Section 39-3.03, "Proportioning," of the Standard Specifications and these special provisions. The Contractor's mixing equipment shall have a device that safely provides a sample representative of the virgin aggregate and RAP incorporated into the asphalt concrete. The Contractor shall sample in conformance with the requirements in California Test 125 and LP-9.

The temperature of asphalt concrete using RAP shall not exceed 165°C.

If batch mixing is used, RAP shall be kept separate from the virgin aggregate until both ingredients enter the weighhopper or pugmill. After introduction to the pugmill and before asphalt binder is added, the mixing time for the virgin aggregate and RAP shall not be less than 5 seconds. After asphalt binder is added, the mixing time shall not be less than 30 seconds.

If continuous mixing is used, the RAP shall be protected from direct contact with the burner flame with a device such as a shield, separator, or second drum.

PAINT BINDER (TACK COAT)

Paint binder (tack coat) shall be applied to existing surfaces to be surfaced and between layers of asphalt concrete, except when eliminated by the Engineer.

Paint binder (tack coat) shall be, at the option of the Contractor, either slow-setting asphaltic emulsion, rapid-setting asphaltic emulsion or paving asphalt. Slow-setting asphaltic emulsion and rapid-setting asphaltic emulsion shall conform to the provisions in Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," and the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications. When paving asphalt is used for paint binder, the grade will be determined by the Engineer. Paving asphalt shall conform to the provisions in Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," and the provisions in Section 92, "Asphalts," of the Standard Specifications.

Paint binder (tack coat) shall be applied in the liter per square meter range limits specified for the surfaces to receive asphalt concrete in the tables below. The exact application rate within the range will be determined by the Engineer.

Application Rates for Asphaltic Emulsion Paint Binder (Tack Coat) on Asphalt Concrete (except Open Graded) and on Portland Cement Concrete Pavement (PCCP)		
Type of surface to receive paint binder (tack coat)	Slow-Setting Asphaltic Emulsion L/m ² (Note A)	Rapid-Setting Asphaltic Emulsion L/m ² (Note B)
Dense, compact surfaces, between layers, and on PCCP	0.20 – 0.35	0.10 – 0.20
Open textured, or dry, aged surfaces	0.35 – 0.90	0.20 – 0.40

Note A: Slow-setting asphaltic emulsion is asphaltic emulsion diluted with additional water. Water shall be added and mixed with the asphaltic emulsion (containing up to 43 percent water) so the resulting mixture contains one part asphaltic emulsion and not more than one part added water. The water shall be added by the emulsion producer or at a facility that has the capability to mix or agitate the combined blend.

Note B: Undiluted rapid-setting asphaltic emulsion.

Application Rates for Paint Binder (Tack Coat) on Open Graded Asphalt Concrete	
Type of surface to receive paint binder (tack coat)	Paving Asphalt L/m ²
Dense, compact surfaces and between layers	0.05 – 0.15
Open textured, or dry, aged surfaces	0.15 – 0.30

10-1.43 STRUCTURE APPROACH SLABS (TYPE R)

Structure approach slabs (Type R) consist of removing portions of existing structures, existing pavement and base including reinforced concrete approach slabs, asphalt concrete surfacing, portland cement concrete pavement, and constructing new reinforced concrete approach slabs at structure approaches as shown on the plans and in conformance with these special provisions.

GENERAL

The thickness shown on the plans for structure approach slabs is the minimum thickness. The thickness will vary depending on the thickness of the pavement and base materials removed.

Where pavement subsealing has been performed under existing approach slabs, the full depth of subsealing material shall be removed. Where removal of cement treated base is required to construct the approach slab, the full depth of the cement treated base shall be removed.

At the option of the Contractor, the voids between the new structure approach slab and the base material remaining in place that are caused by removal of subsealing material or cement treated base shall be filled with either aggregate base (approach slab) or structure approach slab concrete. If the Contractor chooses to fill these voids with structure approach slab concrete, they shall be filled, at the Contractor's expense, at the time and in the same operation that the new concrete is placed.

The Contractor shall establish a grade line for new approach slabs that will provide a smooth profile grade. The profile grade will be subject to approval by the Engineer.

The Contractor shall schedule his work so that the pavement and base materials removed during a work period shall be replaced, in that same work period, with approach slab concrete that shall be cured for at least 4 hours prior to the time the lane is to be opened to public traffic as designated in "Maintaining Traffic" of these special provisions. In the event the existing pavement and base materials are removed and the Contractor is unable to construct, finish, and cure the new approach slab by the time the lane is to be opened to public traffic, the excavation shall be filled with a temporary roadway structural section as specified in this section, "Structure Approach Slabs (Type R)."

TEMPORARY ROADWAY STRUCTURAL SECTION

A standby quantity of asphalt concrete and aggregate base, equal to the quantity of pavement removed during the work shift, shall be provided at the job site for construction of a temporary roadway structural section where existing approaches to structures are being replaced. The temporary structural section shall be maintained and later removed as a first order of work when the Contractor is able to construct and cure the approach slab within the prescribed time limit. The temporary structural section shall consist of 90-mm-thick layer of asphalt concrete over aggregate base.

The aggregate base for the temporary structural section shall conform to the requirements specified under "Aggregate Base (Approach Slab)" of these special provisions.

The asphalt concrete for the temporary structural section shall be produced from commercial quality aggregates and asphalt binder. The grading of the aggregate shall conform to the 19-mm maximum medium grading in Section 39-2.02, "Aggregate," of the Standard Specifications, and the asphalt binder shall conform to the requirements of liquid asphalt SC-800 in Section 93, "Liquid Asphalts," of the Standard Specifications. The amount of asphalt binder to be mixed with the aggregate shall be approximately 0.3 percent less than the optimum bitumen content as determined by California Test 367.

Aggregate base and asphalt concrete for the temporary structural section shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material and a surfacing of uniform smoothness, texture, and density. The aggregate base and the asphalt concrete may each be spread and compacted in one layer. The finished surface of the asphalt concrete shall not vary more than 15 mm from the lower edge of a 3.6-m straightedge placed parallel with the centerline and shall match the elevation of the existing pavement and structure along the joints between the existing pavement and structure and the temporary surfacing.

The material from the removed temporary structural section shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, except that removed aggregate base may be stockpiled at the job site and reused for construction of another temporary structural section. When no longer required, standby material or stockpiled material for construction of temporary structural sections shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

REMOVING EXISTING PAVEMENT AND BASE MATERIALS

The outline of portland cement concrete to be removed shall be sawed full depth with a power-driven concrete saw.

The outlines of excavations in asphalt concrete shall be cut on a neat line to a minimum depth of 75 mm with a power-driven concrete saw or wheel-type rock cutting excavator before any asphalt concrete material is removed. These excavations shall be permanently or temporarily backfilled to conform to the grade of the adjacent pavement prior to opening the lane to public traffic. Surplus excavated material may be used as temporary backfill material.

Regardless of the type of equipment used to remove concrete within the sawed outline, the surface of the concrete to be removed shall not be impacted within 0.5-m of the pavement to remain in place. Removing existing pavement and base materials shall be performed without damage to the adjacent structure or pavement that is to remain in place. Damage to the structure or to the pavement that is to remain in place shall be repaired in conformance with the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications.

Materials removed shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The base material remaining in place, after removing the existing pavement and base materials to the required depth, shall be graded uniformly, watered, and compacted. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer.

Areas of the base material that are low as a result of over excavation shall be filled, at the Contractor's expense, with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

AGGREGATE BASE (APPROACH SLAB)

The aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be produced from commercial quality aggregates consisting of broken stone, crushed gravel or natural rough-surfaced gravel, and sand, or any combination thereof. The grading of the aggregate base shall conform to the 19-mm maximum grading specified in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

Aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material. The aggregate base shall be watered and compacted to the grade approved by the Engineer. Where the required thickness of aggregate base is 200 mm or less, the base may be spread and compacted in one layer. Where the required thickness of aggregate base is more than 200 mm, the base shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 200 mm. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer. Areas of the base material that are lower than the grade approved by the Engineer shall be filled with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

STRUCTURE APPROACH SLAB MATERIALS

Reinforced concrete approach slabs shall conform to the provisions for approach slabs in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Concrete for use in approach slabs shall contain not less than 400 kg of cementitious material per cubic meter.

Approach slab concrete that requires a minimum curing period of 4 hours shall be constructed using rapid strength concrete (RSC). RSC approach slabs shall be constructed using concrete conforming to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and a non-chloride Type C chemical admixture.

At the option of the Contractor, RSC approach slabs may be constructed using a fast setting hydraulic cement concrete conforming to the provisions in Section 90 "Portland Cement Concrete," of the Standard Specifications and the following:

- A. In lieu of the requirements specified in Section 90-2.01, "Cementitious Materials," of the Standard Specifications, the cements, either singularly or in combination, shall meet the definition of hydraulic cement in ASTM Designation: C 219 and the following requirements:

Test Description	Test Method	Requirement
Contraction in Air	California Test 527, w/c ratio = 0.39±0.010	0.053%, max.
Mortar Expansion in Water	ASTM Designation: C 1038	0.04%, max.
Soluble Chloride*	California Test 422	0.05%, max.
Soluble Sulfate*	California Test 417	0.30%, max.
Thermal Stability	California Test 553	90%, min.
Compressive Strength @ 3 days	ASTM Designation: C 109	17.2 MPa

*Test is to be done on a cube specimen fabricated in conformance with the requirements in ASTM Designation: C 109, cured at least 14 days, and then pulverized so that 100% passes the No. 50 sieve.

- B. In addition to the admixtures listed on the Department's current list of approved admixtures, citric acid or borax may be used if requested in writing by the cement manufacturer and a sample is submitted to the Engineer. Chemical and mineral admixtures, if used, shall be included when testing for requirements listed in the table above.

Supplementary cementitious materials will not be required in RSC approach slab concrete.

RSC approach slab concrete shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

- A. Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of $21\text{ }^{\circ}\text{F} \pm 1.5\text{ }^{\circ}\text{C}$ until the cylinders are tested.
- B. The 4-hour average strength of the 5 test cylinders shall not be less than 8.3 MPa. Not more than 2 test cylinders shall have a strength of less than 7.9 MPa.

Penetration requirements of Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications do not apply.

Steel components of abutment ties including plates, nuts, washers, and rods shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Steel angles, plates and bars at the concrete barrier joints shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Building paper shall be commercial quality No. 30 asphalt felt.

Polyvinyl chloride (PVC) conduit used to encase the abutment tie rod shall be commercial quality.

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads, and Board Fillers," of the Standard Specifications.

TRIAL SLAB

Prior to beginning work on RSC approach slabs, the Contractor shall successfully complete one or more trial slabs for each concrete mix design to be used in constructing the approach slabs. Trial slabs shall be constructed, finished, cured, and tested with the materials, tools, equipment, personnel, and methods to be used in completing the approach slabs. Trial slabs shall demonstrate that the Contractor is capable of producing approach slabs in conformance with the provisions in this section, within anticipated time periods including delivery, placement, finishing, and curing times, and under similar atmospheric and temperature conditions expected during construction operations. Multiple trial slabs for each approach slab concrete mix design may be required to envelop variable atmospheric and temperature conditions.

The minimum trial slab dimensions shall be 3 mx 6 mx 255 mm. Trial slabs shall be placed near the job site at a location mutually acceptable to the Engineer and the Contractor, except slabs shall not be placed on the roadway or within the project limits.

Trial slab concrete shall develop compressive strengths of at least 8.3 MPa after 4 hours and at least 17.2 MPa after 3 days when tested in conformance with the provisions in Section 90-9, "Compressive Strength," of the Standard Specifications.

Materials resulting from construction of trial slabs and test specimens shall become the property of the Contractor and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

At least 2 weeks prior to use in the trial slab, the Contractor shall submit mix designs for approach slab concrete that include the following:

- A. Compressive strength at 4 hours, 3 days, 7 days, and 28 days.
- B. Proposed aggregate grading.
- C. Mix proportions of hydraulic cement and mineral admixtures, if used, aggregate, and water.
- D. Types and amounts of chemical admixtures, if used.
- E. Initial and final set time of a 300 mm x 300 mm x 140 mm concrete block curing at $21 \pm 5\text{ }^{\circ}\text{C}$ ambient temperature.
- F. Range of ambient temperatures over which the mix design will achieve the required minimum compressive strengths.
- G. Source of materials.

STRUCTURE APPROACH SLAB CONSTRUCTION

At the option of the Contractor, RSC approach slabs may be proportioned and placed by volumetric continuous mixers.

Weighmaster Certificates

Weighmaster certificates for RSC for approach slabs, regardless of the proportioning method used, shall include all information necessary to trace the manufacturer and manufacturer's lot number for the cement being used. When proportioned into fabric containers, the weighmaster certificates for the cement shall contain date of proportioning, location of proportioning and actual net draft mass of the cement. When proportioned at the pour site from a storage silo, the weighmaster certificates shall contain date of proportioning, location of proportioning, and the net draft mass of the cement used in the load.

Volumetric Proportioning

When RSC for approach slabs is proportioned by volume, the method shall conform to requirements specified herein.

Aggregates shall be handled and stored in conformance with the provisions in Section 90-5.01, "Storage of Aggregates," of the Standard Specifications. Liquid admixtures shall be proportioned in conformance with the provisions in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications. Mineral admixtures shall be protected from exposure to moisture until used. Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the batch-mixer storage hopper or in the feed line.

Batch-mixer trucks shall be equipped to proportion cement, water, aggregate, and additives by volume. Aggregate feeders shall be connected directly to the drive on the cement vane feeder. The cement feed rate shall be tied directly to the feed rate for the aggregate and other ingredients. Any change in the ratio of cement to aggregate shall be accomplished by changing the gate opening for the aggregate feed. The drive shaft of the aggregate feeder shall be equipped with a revolution counter reading to the nearest full or partial revolution of the aggregate delivery belt.

Aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate delineated to the nearest quarter increment. Height of the gate opening shall be readily determinable. Cement shall be proportioned by a method that conforms to the accuracy requirements of these special provisions. Water shall be proportioned by a meter conforming to the provisions in Section 9-1.01, "Measurement and Payment," of the Standard Specifications and these special provisions.

Delivery rate of aggregate and cement per revolution of the aggregate feeder shall be calibrated at appropriate gate settings for each batch-mixer truck used on the project and for each aggregate source. Batch-mixer trucks shall be calibrated at 3 different aggregate gate settings that are commensurate with production needs. Two or more calibration runs shall be required at each of the different aggregate gate openings. The actual mass of material delivered for aggregate proportioning device calibrations shall be determined by a platform scale as specified in these special provisions.

Aggregate belt feeder shall deliver aggregate to the mixer with volumetric consistency so that deviation for any individual aggregate delivery rate check-run shall not exceed 1.0 percent of the mathematical average of all runs for the same gate opening and aggregate type. Each test run shall be at least 500 kg. Fine aggregate used for calibration shall not be reused for device calibration.

At the time of batching, aggregates shall be dried or drained sufficiently to result in stable moisture content, so that no visible separation of water from aggregate takes place during the proportioning process. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

If separate supplies of aggregate material of the same size group with different moisture content or specific gravity or surface characteristics affecting workability are available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting another supply.

Rotating and reciprocating equipment on batch-mixer trucks shall be covered with metal guards.

The cement proportioning system shall deliver cement to the mixer with a volumetric consistency so that the deviation for any individual delivery rate check-run shall not exceed 1.0 percent of the mathematical average of 3 runs of at least 500 kg each. Cement used for calibration shall not be reused for device calibration.

Water meter accuracy shall be such that, when operating between 50 percent and 100 percent of production capacity, the difference between the indicated mass of water delivered and the actual mass delivered shall not exceed 1.5 percent of the actual mass for each of two individual runs of 285 liters. The water meter shall be calibrated in conformance with the requirements of California Test 109 and shall be equipped with a resettable totalizer and display the operating rate.

Calibration tests for aggregate, cement, and water proportioning devices shall be conducted with a platform scale located at the calibration site. Weighing of test run calibration material shall be performed on a platform scale having a maximum

capacity not exceeding 2.5 tonnes with maximum graduations of 0.5 kg. The platform scale shall be error tested within 8 hours of calibration of batch-mixer truck proportioning devices. Error testing shall be performed with test masses conforming to California Test 109 and shall produce a witness scale that is within 2 graduations of the test mass load. The scale shall be available for use at the production site throughout the production period. Equipment needed for the calibration of proportioning systems shall remain available at the production site throughout the production period. A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished with each delivery of aggregate, cement, and admixtures used for calibration tests and shall be submitted to the Engineer with certified copies of the mass of each delivery. The Certificate of Compliance shall state that the source of materials used for the calibration tests is from the same source as to be used for the planned work. The Certificate of Compliance shall state that the material supplied conforms to the Standard Specifications and these Special Provisions and shall be signed by an authorized representative who shall have the authority to represent and act for the Contractor.

The batch-mixer truck shall be equipped so that an accuracy check can be made prior to the first operation for the project and at any other time as directed by the Engineer. Further calibration of proportioning devices shall be required every 30 days after production begins or when the source or type of any ingredient is changed. A spot calibration shall consist of calibration of the cement proportioning system only. A two run spot re-calibration of the cement proportioning system shall be performed each time 50 tonnes of cement has passed through the batch-mixer truck. Should the spot re-calibration of the cement proportioning system fall outside the limitations specified herein, a full calibration of the cement proportioning system shall be completed before the resumption of production.

Liquid admixtures shall be proportioned by a meter.

Cement storage shall be located immediately before the cement feeder and shall be equipped with a device that will automatically shut down the power to the cement feeder and aggregate belt feeder when the cement storage level is lowered to a point where less than 20 percent of the total volume is left in storage.

The Contractor shall furnish aggregate moisture determinations, made in conformance with the requirements of California Test 223, at least every 2 hours during proportioning and mixing operations. Moisture determinations shall be recorded and presented to the Engineer at the end of the production shift.

Each aggregate bin shall be equipped with a device that will automatically shut down the power to the cement feeder and the aggregate belt feeder when the aggregate discharge rate is less than 95 percent of the scheduled discharge rate of any bin.

Indicators specified herein shall be in working order prior to commencing proportioning and mixing operations and shall be visible when standing near the batch-mixer truck.

Identifying numbers of batch-mixer trucks shall be at least 75 mm in height, and be located on the front and rear of the vehicles.

Volumetric proportioned RSC for approach slabs shall be mixed in a mechanically operated mixer of adequate size and power for the type of RSC to be placed. Mixers may be of the auger type and shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers that have an accumulation of hard concrete or mortar shall be removed from service until cleaned. Other types of mixers may be used provided mixing quality will meet the requirements of these special provisions.

Charge or rate of feed to the mixer shall not exceed that which will permit complete mixing of the materials. Dead areas in the mixer, where material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments. The mixer shall be designed to provide sufficient mixing action and movement to produce properly mixed RSC. Mixing shall continue until a homogeneous mixture is produced at discharge from the mixer. There shall be no lumps or evidence of non-dispersed cement at discharge from the mixer. No water shall be added to the RSC after discharge from the mixer.

Equipment having components made of aluminum or magnesium alloys which may have contact with plastic concrete during mixing or transporting of RSC shall not be used.

Uniformity of concrete mixtures will be determined by differences in penetration measurement made in conformance with the requirements in California Test 533. Difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 15 mm. The Contractor shall furnish samples of freshly mixed concrete and provide facilities for obtaining the samples. Sampling facilities shall be safe, accessible, and clean, and shall produce a sample which is representative of production. Sample devices and sampling methods shall also conform to the requirements of California Test 125.

Ice shall not be used to cool RSC directly. When ice is used to cool water used in the mix, all of the ice shall be melted before entering the mixer.

Cement shall be proportioned and charged into the mixer by means that will result in no losses of cement due to wind, or due to accumulation on equipment, or other conditions which will vary the required quantity of cement.

Each mixer shall have a metal plate or plates, prominently attached, on which the following information is provided:

- A. Uses for which the equipment is designed.
- B. Manufacturer's guaranteed capacity of the mixer in terms of the volume of mixed concrete.
- C. Speed of rotation of the mixer.

Consistency and workability of mixed concrete when discharged at the delivery point shall be suitable for placement and consolidation.

Information generated by volumetric devices will not be used for payment calculations.

The device that controls the proportioning of cement, aggregate, and water shall produce a log of production data. The log of production data shall consist of a series of snapshots captured at 15-minute intervals throughout the period of daily production. Each snapshot of production data shall be a register of production activity at that time and not a summation of the data over the preceding 15 minutes. The amount of material represented by each snapshot shall be the amount produced in the period of time from 7.5 minutes before to 7.5 minutes after the capture time. The daily log shall be submitted to the Engineer, in electronic or printed media, at the end of each production shift or as requested by the Engineer, and shall include the following:

- A. Mass of cement per revolution count.
- B. Mass of each aggregate size per revolution count.
- C. Gate openings for each aggregate size being used.
- D. Mass of water added to the concrete per revolution count.
- E. Moisture content of each aggregate size being used.
- F. Individual volume of all other admixtures per revolution count.
- G. Time of day.
- H. Day of week.
- I. Production start and stop times.
- J. Batch-mixer truck identification.
- K. Name of supplier.
- L. Specific type, size, or designation of concrete being produced.
- M. Source of the individual aggregate sizes being used.
- N. Source, brand, and type of cement being used.
- O. Source, brand, and type of individual admixtures being used.
- P. Name and signature of operator.

Required report items may be input by hand into a pre-printed form or captured and printed by the proportioning device. Electronic media containing recorded production data shall be presented in a tab delimited format on a 90 mm diskette with a capacity of at least 1.4 megabytes. Each snapshot of the continuous production shall be followed by a line-feed carriage-return with allowances for sufficient fields to satisfy the amount of data required by these specifications. The reported data shall be in the above order and shall include data titles at least once per report.

Construction

Bar reinforcement or abutment tie rods in drilled holes shall be bonded in conformance with the provisions for drilling and bonding dowels in Section 83-2.02D(1), "General," of the Standard Specifications.

If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

The top surface of approach slabs shall be finished in conformance with the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. The finished top surface shall not vary more than 6 mm from the lower edge of a 3.6-m straightedge placed parallel with the centerline. Edges of slabs shall be edger finished.

The surface of the approach slab will not be profiled, and the Profile Index requirements do not apply.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. The minimum curing period as specified herein shall be considered to begin at the start of discharge of the last truckload of concrete to be used in the slab. Fogging of the surface with water after the curing compound has been applied will not be required. Should the film of curing compound be damaged from any cause before the approach slab is opened to public traffic, the damaged portion shall be repaired immediately with additional compound, at the Contractor's expense. Damage to the curing compound after the approach slab is opened to public traffic shall not be repaired.

If the ambient temperature is below 18 °C during the curing period, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket:

Temperature Range During Curing Period	R-value, minimum
13 °C to 18 °C	1
7 °C to 13 °C	2
4 °C to 7 °C	3

Tests to determine the coefficient of friction of the final textured surface will be made only if the Engineer determines by visual inspection that the final texturing may not have produced a surface having the specified coefficient of friction. Tests to determine the coefficient of friction will be made after the approach slab is opened to public traffic, but not later than 5 days after concrete placement.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type R) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for removing and disposing of portions of existing structures and pavement materials, and for furnishing and placing, Type AL joint seals, and pourable seals shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

The quantity of aggregate base (approach slab) to be paid for shall include the actual volume of aggregate base (approach slab) used to fill voids below the reinforced structure approach slab concrete, except for the volume of areas low as a result of over excavation. The volume to be paid for will be calculated on the basis of the constructed length, width, and thickness of the filled voids. Structure approach slab concrete used to fill voids lower than the approved grade of the base, except for the areas low as a result of over excavation, will be measured and paid for by the cubic meter as aggregate base (approach slab).

The contract price paid per cubic meter for aggregate base (approach slab) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing aggregate base (approach slab), complete in place, including excavation and removing and disposing of base and subsealing materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing, stockpiling, and disposing of standby material for construction of temporary structural sections; and for constructing, maintaining, removing, and disposing of temporary structural sections shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

Full compensation for drilling and bonding of bar reinforcement and abutment tie rods shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

Full compensation for constructing, testing, and removing trial slabs shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

SECTION 12-15. MECHANICAL

15.01 MECHANICAL WORK

GENERAL.—

Scope.-This work shall consist of modifying mechanical equipment in accordance with the details shown on the plans and these special provisions.

Mechanical work shall include furnishing all labor, materials, equipment and services required for removal of the existing pop-up pneumatic control system including all pipes, valves, traffic boxes and related items, and installation of a new and complete pneumatic control system for the existing traffic control pop-ups. Earthwork, foundations, sheet metal, painting, electrical, and such other work incidental and necessary to the proper installation and operation of the mechanical work shall be in accordance with the requirements specified for similar type work elsewhere in these special provisions.

System layouts are generally diagrammatic and location of equipment is approximate. Exact routing of pipes and location of equipment is to be governed by structural conditions and obstructions. Equipment requiring maintenance and inspection is to be readily accessible.

SUBMITTALS.—

Product data.-A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams and component layout shall be included where applicable.

Manufacturer's descriptive data shall be submitted for the following:

- Solenoid control valves
- Ball valves
- Pneumatic air filters
- Traffic rated boxes
- Check valves
- Unions
- Piping
- Fittings (Tee, elbows, etc.)
- Insulating unions

CLOSEOUT SUBMITTALS.—

Operation and maintenance manuals.-Prior to the completion of the contract, 3 identified copies of the operation and maintenance instructions with parts lists for the equipment specified herein shall be delivered to the Engineer at the jobsite. The instructions and parts lists shall be indexed and bound in a manual form and shall be complete and adequate for the equipment installed. Inadequate or incomplete material shall be returned. The Contractor shall resubmit adequate and complete manuals at no expense to the State.

Operation and maintenance manuals shall be submitted for the following equipment:

- Solenoid control valves
- Pneumatic air filters

QUALITY ASSURANCE.—

Codes and standards.-Mechanical work, including equipment, materials and installation, shall conform to the CBC,CMC, and to the California Code of Regulations, Title 8, Chapter 4, Division of Industrial Safety (DIS).

WARRANTY.-

Warranties and guarantees.-Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

15.02 PIPE, FITTINGS AND VALVES

PART 1.- GENERAL

Scope.-This work shall consist of furnishing and installing pipes, fittings and valves in accordance with the details shown on the plans and these special provisions. Pipe, fittings and valves shall include such plumbing and piping accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the piping systems.

The pipe sizes shown on the plans are nominal pipe size. No change in the pipe size shown on the plans shall be permitted without written permission from the Engineer.

The pipe and fitting classes and material descriptions shall be as specified herein. No change in class or description shall be permitted without written permission from the Engineer.

QUALITY ASSURANCE.—

Codes and standards.--Pipe, fittings and valves shall be installed in accordance with the requirements in the CPC, the manufacturer's recommendations and the requirements specified herein.

PART 2.- PRODUCTS

PIPE AND FITTINGS.—

A1.- Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with 1040 kPa galvanized malleable iron banded screwed fittings and galvanized steel couplings. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

H1.- Type K hard copper tubing conforming to ASTM Designation: B 88, with wrought copper or cast bronze solder joint pressure fittings, stop type couplings and threaded adapters.

Unions (for steel pipe).-

Unions (for steel pipe) shall be 1730 kPa, threaded malleable iron, ground joint, brass to iron seat, galvanized or black to match piping.

Unions (for copper or brass pipe).-

Unions (for copper or brass pipe) shall be 1040 kPa cast bronze, ground joint, bronze to bronze seat with silver brazing thread-less ends or 860 kPa cast brass, ground joint, brass to brass seat with threaded ends.

Insulating union.-

Insulating union or flange as applicable shall be suitable for the service on which used. Connections shall be constructed such that the 2 pipes being connected are completely insulated from each other with no metal-to-metal contact. Insulating couplings shall not be used. Insulating union shall be F. H. Maloney; Central Plastics; EPCO; or equal.

VALVES.--

Ball valve.-

Ball valve shall be two-piece, minimum 2760 kPa WOG, bronze body and chrome plated or brass ball with full size port. Valve shall be Nibco Scott, T-580; Watts, B-6000; Kitz, 56; or equal.

Check valve (40 mm and smaller).-

Check valve (40 mm and smaller) shall be silent spring loaded type, threaded bronze body, nylon or teflon disc, beryllium or stainless steel helical spring and shaft, Class 125 and same size as pipe in which installed. Check valve shall be Nibco/Scott, T-480; CPV, 36; Kitz, 26; or equal.

Solenoid Valve.-

Solenoid valve shall be 5-port, 2-position, double-solenoid, 240VAC, 15 mm ports, with manual override. Solenoid valve shall be Parker iSys B622BDH5702A, Festo Tiger 2000 series; or equal.

MISCELLANEOUS ITEMS.--

Valve box.-

Valve box shall be precast high density concrete with either cast iron or galvanized steel traffic rated cover marked "AIR" or as applicable. Size shall be as shown on the plans. Extension shall be provided as required. Valve box shall be Christy, B1730 H/20 Loading; Utility Vault 0230840; or equal.

Pneumatic Air Filter.-

Pneumatic air filter shall be cartridge-type, with 15 mm ports, machined aluminum head, max pressure rating of 1380 kPa minimum, with a sump capacity of at least 0.12 liter. Filter shall be Parker M Series MN15S, Sullair Model 20 SCF; or equal.

PART 3.- EXECUTION

INSTALLATION OF PIPES AND FITTINGS.--

Pipe and fittings.—For the compressed air and pneumatic systems shown on the plans, the pipe and fittings shall be either Class A1 or H2.

Piping installed underground shall be tested as specified in these special provisions before backfilling. Underground copper pipe shall have brazed joints.

Cutting pipe.—All pipe shall be cut straight and true and the ends shall be reamed to the full inside diameter of the pipe after cutting.

Damaged pipe.—Pipe that is cracked, bent or otherwise damaged shall be removed from the work.

Pipe joints and connections.—Joints in threaded steel pipe shall be made with teflon tape or a pipe joint compound that is nonhardening and noncorrosive, placed on the pipe and not in the fittings.

The use of thread cement or caulking on threaded joints will not be permitted. Threaded joints shall be made tight. Long screw or other packed joints will not be permitted. Any leaky joints shall be remade with new material.

Cleaning and closing pipe.—The interior of all pipes shall be cleaned before installation. All openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Union.—Unions shall be installed where shown and at each threaded or soldered connection to equipment and tanks. Unions shall be located so piping can be easily disconnected for removal of equipment.

Insulating union and insulating connection.—Insulating union and insulating connection shall be provided where shown and at the following locations:

In air service connections in ground at point where new metallic pipes connect to existing metallic pipes.

Flushing completed systems.—All completed systems shall be flushed and blown out.

FIELD QUALITY CONTROL.—

Testing.—The Contractor shall test piping at completion of roughing in, before backfilling, and at other times as directed by the Engineer.

The system shall be tested as a single unit, or in sections as approved by the Engineer. The Contractor shall furnish necessary materials, test pumps, instruments and labor and notify the Engineer at least 3 working days in advance of testing. After testing, the Contractor shall repair all leaks and retest to determine that leaks have been stopped.

The Contractor shall take precautions to prevent joints from drawing while pipes and appurtenances are being tested. The Contractor shall repair damage to pipes and appurtenances or to other structures resulting from or caused by tests.

General tests.-All piping shall be tested after assembly and prior to backfill and covering the pipe. Systems shall show no loss in pressure or visible leaks.

The Contractor shall test systems according to the following schedule for a period of not less than 4 hours:

Test Schedule		
Piping System	Test Pressure	Test Media
Air	860 kPa	Air

Operational tests.-After pressure testing, the pop-up barrier system shall be tested for proper operation. The air system shall be charged using the existing compressed air system, and the solenoid valves shall be energized. Each bank of barriers shall be operated no less than 10 times to demonstrate the proper operation of the system. Any items installed by the Contractor that do not work properly shall be adjusted, repaired or replaced as required to obtain a system that works as shown on the plans and described in these special provisions.

MEASUREMENT AND PAYMENT.--

The contract lump sum price paid for modify mechanical equipment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing the existing and installing a new pop-up pneumatic control system for the existing traffic control pop-ups, complete in place, including testing, excavation and backfill as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ENGINEER'S ESTIMATE
04-269604

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM	LUMP SUM	
2	070018	TIME-RELATED OVERHEAD	LS	LUMP SUM	LUMP SUM	
3	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	LUMP SUM	
4	074020	WATER POLLUTION CONTROL	LS	LUMP SUM	LUMP SUM	
5	074034	TEMPORARY COVER	M2	100		
6	074041	STREET SWEEPING	LS	LUMP SUM	LUMP SUM	
7	074042	TEMPORARY CONCRETE WASHOUT (PORTABLE)	LS	LUMP SUM	LUMP SUM	
8 (S)	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
9 (S)	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	LUMP SUM	
10 (S)	120165	CHANNELIZER (SURFACE MOUNTED)	EA	140		
11 (S)	128650	PORTABLE CHANGEABLE MESSAGE SIGN	EA	5		
12	129000	TEMPORARY RAILING (TYPE K)	M	7740		
13 (S)	129100	TEMPORARY CRASH CUSHION MODULE	EA	140		
14 (S)	150662	REMOVE METAL BEAM GUARD RAILING	M	2650		
15 (S)	039930	REMOVE DOUBLE METAL BEAM GUARD RAILING	M	57		
16 (S)	150704	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE	M	35 500		
17 (S)	150705	REMOVE YELLOW THERMOPLASTIC PAVEMENT MARKING	M2	5		
18 (S)	150714	REMOVE THERMOPLASTIC TRAFFIC STRIPE	M	54 000		
19 (S)	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	M2	700		
20 (S)	150722	REMOVE PAVEMENT MARKER	EA	35 000		

**ENGINEER'S ESTIMATE
04-269604**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	039931	REMOVE ASPHALT CONCRETE DITCH	M	510		
22	150771	REMOVE ASPHALT CONCRETE DIKE	M	7500		
23	039932	REMOVE EDGE DRAIN	M	27 800		
24 (S)	151266	SALVAGE DOUBLE THRIE BEAM BARRIER	M	300		
25	152430	ADJUST INLET	EA	210		
26	039933	ADJUST MANHOLE COVER TO GRADE	EA	6		
27	152469	ADJUST UTILITY COVER TO GRADE	EA	5		
28	152500	ADJUST METAL BEAM GUARD RAILING	M	46		
29 (S)	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	M2	126 000		
30	153214	REMOVE CONCRETE CURB	M	4200		
31	153221	REMOVE CONCRETE BARRIER	M	1760		
32 (S)	156590	REMOVE CRASH CUSHION (SAND FILLED)	EA	2		
33	160101	CLEARING AND GRUBBING	LS	LUMP SUM	LUMP SUM	
34	190101	ROADWAY EXCAVATION	M3	1830		
35	190105	ROADWAY EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	M3	500		
36	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
37	198007	IMPORTED MATERIAL (SHOULDER BACKING)	TONN	3110		
38	198050	EMBANKMENT	M3	75		
39	200002	ROADSIDE CLEARING	LS	LUMP SUM	LUMP SUM	
40	203021	FIBER ROLLS	M	1020		

**ENGINEER'S ESTIMATE
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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	208000	IRRIGATION SYSTEM	LS	LUMP SUM	LUMP SUM	
42	208304	WATER METER	EA	1		
43	208798	200 MM WELDED STEEL PIPE CONDUIT (6.35 MM THICK)	M	500		
44	250401	CLASS 4 AGGREGATE SUBBASE	M3	12		
45	260210	AGGREGATE BASE (APPROACH SLAB)	M3	98		
46	260301	CLASS 3 AGGREGATE BASE	M3	840		
47	374002	ASPHALTIC EMULSION (FOG SEAL COAT)	TONN	2		
48	374206	SEAL RANDOM CRACKS	LNKM	110		
49	390095	REPLACE ASPHALT CONCRETE SURFACING	M3	730		
50	390102	ASPHALT CONCRETE (TYPE A)	TONN	74 500		
51	390126	RUBBERIZED ASPHALT CONCRETE (TYPE G)	TONN	68 000		
52	BLANK					
53	391005	PAVING ASPHALT (BINDER-PAVEMENT REINFORCING FABRIC)	TONN	600		
54	393001	PAVEMENT REINFORCING FABRIC	M2	301 000		
55	394002	PLACE ASPHALT CONCRETE (MISCELLANEOUS AREA)	M2	5400		
56	394040	PLACE ASPHALT CONCRETE DIKE (TYPE A)	M	1190		
57	394044	PLACE ASPHALT CONCRETE DIKE (TYPE C)	M	410		
58	394048	PLACE ASPHALT CONCRETE DIKE (TYPE E)	M	4500		
59	394049	PLACE ASPHALT CONCRETE DIKE (TYPE F)	M	1670		
60	397001	ASPHALTIC EMULSION (PAINT BINDER)	TONN	500		

**ENGINEER'S ESTIMATE
04-269604**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61	401108	REPLACE CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)	M3	3800		
62	415101	CRACK EXISTING CONCRETE PAVEMENT	M2	160 000		
63 (S)	420201	GRIND EXISTING CONCRETE PAVEMENT	M2	31 000		
64	510087	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE R)	M3	933		
65	510526	MINOR CONCRETE (BACKFILL)	M3	1880		
66	510800	PAVING NOTCH EXTENSION	M3	23.5		
67	511118	CLEAN EXPANSION JOINT	M	688		
68 (S)	519117	JOINT SEAL (MR 30 MM)	M	59		
69 (S)	519120	JOINT SEAL (MR 15 MM)	M	292		
70 (S)	519142	JOINT SEAL (MR 40 MM)	M	338		
71	665733	450 MM SLOTTED CORRUGATED STEEL PIPE (2.01 MM THICK)	M	65		
72	700617	DRAINAGE INLET MARKER	EA	52		
73	731501	MINOR CONCRETE (CURB)	M3	510		
74	039934	MINOR CONCRETE (WEED BARRIER)	M3	170		
75	039935	MINOR CONCRETE (PAVING)	M3	320		
76 (S)	802585	1.2 M CHAIN LINK GATE (TYPE CL-1.8)	EA	2		
77	039936	CONCRETE BARRIER MARKER	EA	130		
78	820107	DELINEATOR (CLASS 1)	EA	760		
79	039937	HIGHWAY POST MARKER	EA	19		
80	820118	GUARD RAILING DELINEATOR	EA	280		

**ENGINEER'S ESTIMATE
04-269604**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101 (S)	850102	PAVEMENT MARKER (REFLECTIVE)	EA	11 200		
102 (S)	861502	MODIFY SIGNAL	LS	LUMP SUM	LUMP SUM	
103 (S)	861503	MODIFY LIGHTING	LS	LUMP SUM	LUMP SUM	
104 (S)	039939	TRAFFIC OPERATION SYSTEM	LS	LUMP SUM	LUMP SUM	
105 (S)	039940	CAMERA UNIT INCLUDING TESTING	EA	1		
106 (S)	039941	PAN AND TILT UNIT INCLUDING TEST	EA	1		
107 (S)	039942	EXTINGUISHABLE MESSAGE SIGN RADIO CONTROLLER ASSEMBLY	EA	1		
108 (S)	039943	EXTINGUISHABLE MESSAGE SIGN PANELS (LED)	EA	4		
109 (S)	039944	GENERAL PACKET RADIO SYSTEM WIRELESS MODEM ASSEMBLY	EA	2		
110 (S)	860520	HIGHWAY ADVISORY RADIO SYSTEM	EA	1		
111	(BLANK)					
112	152440	ADJUST MANHOLE TO GRADE	EA	5		
113	152439	ADJUST FRAME AND GRATE TO GRADE	EA	28		
114 (S)	152592	MODIFY MECHANICAL EQUIPMENT	LS	LUMP SUM	LUMP SUM	
115	152609	MODIFY INLET TO MANHOLE	EA	2		
116	390106	ASPHALT CONCRETE (OPEN GRADED)	TONN	44 600		
117	011472	ASPHALT CONCRETE (LEVELING)	TONN	820		
118 (S)	011473	MODIFY POP-UP CONTROL ELECTRICAL SYSTEM	LS	LUMP SUM	LUMP SUM	
119	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

ENGINEER'S ESTIMATE
04-269604

TOTAL BID (A): = _____

TOTAL BID (B):

\$ 12,100.00 X _____ = _____

(Cost Per Day) (Enter Working Days Bid)
(Not To Exceed 400 Days)

TOTAL BASIS FOR COMPARISON

OF BIDS: (A + B): _____