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June 4, 2004

11-SD-15-M35.4/M38.7  
11-080914  
ACIM-015-4(192)21N  
CMSTPL-6211(034)

Addendum No. 9

Dear Contractor:

This addendum is being issued to the contract for Building Construction in SAN DIEGO COUNTY IN SAN DIEGO FROM CAMINO DEL NORTE UNDERCROSSING TO 0.5 KM NORTH OF RANCHO BERNARDO ROAD UNDERCROSSING.

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 June 10, 2004.

This addendum is being issued to revise the Project Plans, the Notice to Contractors and Special Provisions, and the Proposal and Contract.

Project Plan Sheets 2, 490 and 491 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheet 625A is added. A half-sized copy of the added sheet is attached for addition to the project plans.

In the Special Provisions, Section 10-1.52, "CONCRETE PAVEMENT," is revised as attached.

In the Proposal and Contract, the Engineer's Estimate Items 281, 282, 283 and 284 are added, and Items 113 and 280 are deleted as attached.

Addendum No. 9  
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11-SD-15-M35.4/M38.7  
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ACIM-015-4(192)21N  
CMSTPL-6211(034)

To Proposal and Contract book holders:

Replace pages 8 and 15A and add page 15B of the Engineer's Estimate in the Proposal with the attached revised pages 8 and 15A and added page 15B of the Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

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 UPS 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](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  
Office Engineer

Attachments

## **10-1.52 CONCRETE PAVEMENT**

### **GENERAL**

Portland cement concrete pavement shall be designated as concrete pavement (undoweled transverse joints) or concrete pavement (doweled transverse joints) and shall be constructed in conformance with the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions, and as shown on the plans. Requirements that refer to concrete pavement shall be understood to apply to concrete pavement (undoweled transverse joints) and concrete pavement (doweled transverse joints).

Insert method for forming joints in pavement shall not be used.

### **PREPAVING CONFERENCE**

Supervisory personnel of the Contractor and subcontractors who are to be involved in the placement of concrete pavement shall meet with the Engineer at a prepping conference, at a mutually agreed time, to discuss methods of accomplishing the paving work.

The Contractor shall provide a facility for the prepping conference within 5 km of the construction site or at a nearby location agreed to by the Engineer. Attendance at the prepping conference is mandatory for the Contractor's project superintendent, paving construction foreman, subcontractor's workers, including foremen and personnel performing saw cutting, joint sealing, concrete plant manager, and concrete plant operator. Conference attendees shall sign an attendance sheet provided by the Engineer. Production and placement shall not begin nor proceed unless the above-mentioned personnel have attended the mandatory prepping conference.

### **JUST-IN-TIME TRAINING**

Attending a 4-hour Just-In-Time Training (JITT) shall be mandatory, and consist of a formal joint training class on portland cement concrete and paving techniques. Construction operations for portland cement concrete pavement shall not begin until the Contractor's and the Engineer's personnel have completed the mandatory JITT. The Contractor's personnel included in the list of participants for the prepping conference as well as the Engineer's representatives shall attend JITT. JITT shall be in addition to the prepping conference.

The JITT class will be conducted for not less than 4 hours on concrete pavement and paving techniques. The training class may be an extension of the prepping conference and shall be conducted at a project field location convenient for both the Contractor and the Engineer. The JITT class shall be completed at least 15 days, not including Saturdays, Sundays or holidays, prior to the start of portland cement concrete paving operations. The class shall be held during normal working hours.

The JITT instructor shall be experienced in the construction methods, materials, and test methods associated with construction of concrete pavement and paving techniques. The instructor shall not be an employee of the Contractor or a member of the Engineer's field staff. A copy of the course syllabus, handouts, and presentation material shall be submitted to the Engineer at least 7 days before the day of the training. The Contractor and the Engineer shall mutually agree to course instructor, the course content, and training site. The instructor shall issue a certificate of completion to the participants upon completion of the class. The certificate of completion shall include the course title, date and location of the class, the name of the participant, instructor's name, location and telephone number.

The Contractor's or Engineer's personnel involved with portland cement concrete paving operations will not be required to attend JITT if they have completed equivalent training within the previous 12 months of the date of the JITT for this project. The Contractor shall provide a certificate of class completion as described above for each staff member to be excluded from the JITT class. The Engineer will provide the final determination for exclusion of staff member's participation. Attendees of the JITT shall complete, and submit to the Engineer, an evaluation of the training. The Engineer will provide the course evaluation form.

Just-In-Time Training shall not relieve the Contractor of responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications.

## **TEST STRIP**

At the beginning of paving operations for concrete pavement (doweled transverse joints), the Contractor shall construct an initial test strip of concrete pavement from 200 meters to 300 meters in length. The paving width for the test strip shall be the same as that intended by the contractor for production work. The Contractor shall use the same equipment used to construct the test strip for the remainder of the paving operations, except as specified in this section. The Contractor shall not perform further paving until the test strip is evaluated in conformance with the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications regarding surface straight edge requirements, and "Profile Index" in this section; for dowel and tie bar alignment verification; concrete quality (except modulus of rupture); and pavement thickness. Additional test strips will be required when a test strip fails to conform to the specifications for concrete pavement as determined by the Engineer, in conformance with the evaluation of the test strip, as specified herein:

- A. Portion of a test strip fails to conform to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications for straight edge requirements, or
- B. Portion of the test strip fails to conform to profile requirements, or
- C. The Contractor proposes different paving equipment, including a batch plant, paver, dowel inserter, tie bar inserter, tining, or curing equipment, or
- D. The dowel bar tolerances are not met, or
- E. The pavement thickness deficiency is greater than 15 mm after grinding, or
- F. A change in concrete mix design has occurred.

The Contractor shall perform coring of the test strips, as directed by the Engineer, as part of the dowel alignment and placement; tie bar placement tolerance verification; and pavement thickness verification. The Engineer will select at a minimum of six dowel bars and six selected tie bars that will be cored for each test strip. Specific core drilling locations as directed by the Engineer. After removal of cores, voids in concrete pavement shall be cleaned and filled with hydraulic cement grout conforming to the provisions in "Core Drilling for Dowel Placement Alignment Assurance Testing" in this section.

Before mechanical dowel inserters are used, the Contractor shall first demonstrate that the insertion equipment will not leave surface irregularities such as depressions, dips, or high areas adjacent to the dowel bar insertion point, or voids or segregation around dowel bars.

Prior to placement of the test strip, the Contractor shall submit a written procedure to locate transverse weakened plane joints that will coincide with the center of the dowel bars being placed. This procedure shall be submitted prior to the prepaving conference, and shall describe the control of inadvertent covering of paint markings after applying curing compound, excessive paint spray producing too large a paint dot marking for the accuracy required, misalignment by transferring marking spots, and inadequate staking of joints.

Construction of concrete pavement shall not proceed until the Engineer has completed an evaluation of the test strip. The Engineer shall be allowed three days, not including Saturdays, Sundays and legal holidays, to evaluate the test strip. If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the Engineer not completing the evaluation of the test strip within the time specified, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications. Test strips failing to conform to the specifications for concrete pavement shall be removed. Additional test strips shall be constructed until the Contractor constructs a test strip that conforms to the specifications for concrete pavement. Additional test strips shall conform to the requirements in this section, except the test strip shall be 200 meters in length.

Prior to constructing additional test strips, the Contractor shall change methods or equipment to construct a test strip that conforms to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications, "Profile Index" of this section, and dowel bar alignment verification, without grinding or other corrective work.

The Engineer may waive the initial test strip if the Contractor proposes to use a batch plant mixer and paving equipment with the same personnel that were satisfactorily used on a Department project within the preceding 12 months. The personnel shall be individuals listed in the prepaving conference used on a preceding Department project.

Materials resulting from the construction and removal of rejected test strips 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.

## **MATERIALS**

### **Concrete**

Attention is directed to Section 90, "Portland Cement Concrete," of the Standard Specifications, regarding mix proportions for concrete being determined by the Contractor.

Primary aggregate gradings shall conform to the gradation requirements of Section 90-3, "Aggregate Gradings," of the Standard Specifications. When combined in the proportions determined by the Contractor, the percent passing the 9.5 mm sieve and retained on the 2.36 mm sieve shall not be less than 16 percent of the total aggregate.

The cementitious material content shall not exceed 400 kg/m<sup>3</sup>.

### **Tie Bars**

Tie bars shall be deformed reinforcing steel bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 300 or 420; ASTM Designation: A 616/A 616M, Grade 350 or 400; or ASTM Designation: A 706/A 706M. Tie bars shall be epoxy-coated in conformance with the requirements in ASTM Designation: A 934/A 934M or A 775/A 775M and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the epoxy-coating thickness after curing shall be between 175 to 400 micrometers (7 and 16 mils). Fabrication, sampling and jobsite handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement", of the Standard Specifications, except the two samples shall be 750 mm long. Epoxy-coated tie bars shall not be bent.

### **Epoxy (Drill and Bond)**

Epoxy for bonding tie bars to portland cement concrete shall be a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C 881, Type V, Grade 3 (Non-Sagging), Class A, B or C. The class used shall be dependent on the internal temperature of the hardened concrete at the time the epoxy is to be applied. Class A shall be used when the internal temperature is below 4.5°C, but not lower than recommended by the manufacturer. Class B shall be used when the internal temperature is from 4.5°C to 15.5°C. Class C shall be used when the internal temperature is above 15.5°C, but not higher than recommended by the manufacturer. A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished with the epoxy. A copy of the manufacturer's recommended installation procedure shall be provided to the Engineer at least 7 days prior to the start of work.

### **Dowels**

Dowels shall be smooth, round, epoxy-coated steel conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 300 or 420, the details shown on the plans and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications. Epoxy coating of dowels shall conform to the provisions in ASTM Designation: A 884/A 884M, Class A, Type 1 or Type 2, except that the bend test shall not apply. Fabrication, sampling and jobsite handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the two samples shall be 460 mm long.

Dowels shall be plain, smooth, round bars. Dowels shall be free from burrs or other deformations detrimental to free movement of the bars in the concrete.

### **Bond Breaker**

Dowels shall be lubricated with a bond breaker over the entire bar. A bond breaker application of petroleum paraffin based lubricant or white-pigmented curing compound shall be used to coat the dowels completely prior to placement. Oil and asphalt based bond breakers shall not be used. Paraffin based lubricant shall be Dayton Superior DSC BB-Coat or Valvoline Tectyl 506 or an approved equal. Paraffin based lubricant shall be factory applied. White pigmented curing compound shall conform to the requirements of ASTM Designation: C 309, Type 2, Class A, and shall contain 22 percent minimum nonvolatile vehicles consisting of at least 50 percent paraffin wax. Curing compound shall be applied in two separate applications, the last application not more than 8 hours prior to placement of the dowel bars. Each application of curing compound shall be applied at the approximate rate of one liter per 3.7 m<sup>2</sup>.

### **Load Transfer Assemblies (Dowel Basket)**

Load transfer assemblies shall be manufactured with a minimum welded wire gage number of 3/0 (9.2 mm). Assemblies shall be either U-frame or A-frame shape. J-frame shapes shall not be used. Assemblies shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of assemblies shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the assembly. Assemblies shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Concrete fasteners shall be used for anchoring dowel bar assemblies to lean concrete base or asphalt concrete base. Concrete fasteners shall be driven fasteners (concrete nails), used specifically for fastening to hardened concrete, conforming to the requirements of ASTM Designation: F 1667. Shank diameter shall be a minimum of 4 mm with a minimum shank length of 64 mm. Clips shall be commercial quality manufactured for use with dowel assemblies.

The surface of concrete fasteners, and clips shall be either zinc electroplated or galvanized with a minimum coating thickness of 0.005-mm.

### **Tie Bar Assemblies**

Tie bar assemblies shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of assemblies shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the assembly. Assemblies shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

### **Silicone Joint Sealant**

Low modulus silicone joint sealant shall be furnished in a one-part silicone formulation. Acid cure sealant shall not be used. The compound shall be compatible with the surface to which it is applied and shall conform to the following requirements:

Property	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 25° ± 1°C and 45% to 55% R.H. <sup>e</sup>	ASTM D 412 (Die C)	310 kPa max.
Flow at 25° ± 1°C	ASTM C 639 <sup>a</sup>	Shall not flow from channel
Extrusion Rate at 25° ± 1°C	ASTM C 603 <sup>b</sup>	75-250 g/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at -18°C, Shore A, cured 7 days at 25° ± 1°C	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5000 hours	ASTM C 793	No chalking, cracking or bond loss
Tack free at 25° ± 1°C and 45% to 55% R.H. <sup>e</sup>	ASTM C 679	Less than 75 minutes
Elongation, 7 day cure at 25° ± 1°C and 45% to 55% R.H. <sup>e</sup>	ASTM D 412 (Die C)	500 percent min.
Set to Touch, at 25° ± 1°C and 45% to 55% R.H. <sup>e</sup>	ASTM D 1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquettes, air cured 7 days at 25° ± 1°C	AASHTO T 132 <sup>c</sup>	345 kPa min.
Movement Capability and Adhesion, 100% extension at -18°C after, air cured 7 days at 25° ± 1°C, and followed by 7 days in water at 25° ± 1°C	ASTM C 719 <sup>d</sup>	No adhesive or cohesive failure after 5 cycles

Notes:

- a. ASTM Designation: C 639 Modified (15 percent slope channel A).
- b. ASTM Designation: C 603, through 3-mm opening at 345 kPa.
- c. Mold briquettes in conformance with AASHTO Designation: T 132, sawed in half and bonded with a 1.5 mm maximum thickness of sealant and tested in conformance with AASHTO Designation: T 132. Briquettes shall be dried to constant mass at 100 ± 5° C.
- d. Movement Capability and Adhesion: Prepare 305 mm x 25 mm x 75 mm concrete blocks in conformance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 50 mm of block leaving 12.5 mm on each end of specimen unsealed. The depth of sealant shall be 9.5 mm and the width 12.5-mm.
- e. R.H. equals relative humidity.

The silicone joint sealant shall be formulated to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

A Certificate of Compliance for the silicone sealant shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate shall also be accompanied with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

### Backer Rods

Backer rod shall be Type 1, conforming to the requirements of ASTM Designation: D 5249. Backer rods shall have a diameter prior to placement at least 25 percent greater than the width of the sawcut and shall be expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Hot pour sealant that will melt the backer rod shall not be used. The Contractor shall submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

### **Joint Filler Material**

Joint filler material shall be preformed expansion joint filler for concrete (bituminous type), conforming to the requirements of ASTM Designation: D 994.

A Certificate of Compliance for the joint filler material shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate shall be accompanied with a certified test report of the results of the required tests performed on the joint filler material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of joint filler material prior to use on the project.

### **Hydraulic Cement Grout (non-shrink)**

Hydraulic cement grout (non-shrink) shall conform to the requirements in ASTM Designation: C 1107. At the Contractor's option, clean, uniform rounded aggregate filler may be used to extend the grout. The extension of grout shall not exceed 60 percent of the mass or the maximum recommended by the manufacturer, whichever is less. The moisture content of the aggregate filler shall not exceed 0.5 percent. Grading of the aggregate filler shall conform to the following:

Sieve Size	Percentage Passing
12.5 mm	100
9.5 mm	85-100
4.75 mm	10-30
2.36 mm	0-10
1.10 mm	0-5

### **SUBMITTALS**

If load transfer assemblies, or tie bar assemblies or chairs, are used, the Contractor shall submit working drawings in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall contain details and a materials list with name, address, and telephone number of the supplier of concrete nails, and clips. The Contractor shall submit the working drawings 14 days prior to constructing the initial test strip. The Engineer will have 14 days to approve the working drawings. Should the Engineer fail to complete the review of the working drawings within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the working drawings, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

### **PAVEMENT CONCRETE MIX PROPORTIONS**

The Contractor shall determine the mix proportions for pavement concrete to achieve a modulus of rupture of not less than 4.5 MPa at 42 days of age. Section 40-1.015, "Cement Content," of the Standard Specifications shall not apply. The laboratory used to develop the mix proportions shall meet the requirements of ASTM Designation: C 1077, and shall have current AASHTO accreditation for test methods AASHTO Designation: T 97 or ASTM Designation: C 78, and AASHTO Designation: T 126 or ASTM Designation: C 192.

The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be determined in conformance with the requirements in California Test 559. Trial mixtures shall be made no more than 24 months before field qualification. The maximum water to cementitious materials ratio or minimum cementitious material content shall be that determined from the trial mixtures curve to produce a minimum modulus of rupture of 4.5 MPa at 42 days age. The Contractor shall include overdesign as deemed necessary to produce concrete during paving operations that achieves a minimum modulus of rupture of 3.9 MPa at 28 days age for acceptance of portland cement concrete pavement in conformance with "Modulus of Rupture" in this Section.

At least 14 days prior to field qualification, the Contractor shall submit the proposed pavement concrete mix proportions with laboratory test reports. Laboratory test reports shall include modulus of rupture determined for each trial mixture at ages of 10, 21, 28 and 42 days in conformance with the applicable portions of California Test 559.

### **Field Qualification**

Field qualification of proposed mix proportions will be required prior to placement of paving concrete. The Contractor shall perform field qualification and submit certified test data to the Engineer. Field qualification data shall be based upon the proposed use of materials, mix proportions, mixing equipment, procedures and size of batch.

A concrete mix design will be field qualified when the test results of five beams from a single batch of concrete indicate the average modulus of rupture is at least 3.9 MPa with no single beam lower than 3.8 MPa at an age of the Contractor's choice but not later than 28 days. Beams shall be tested for modulus of rupture at a minimum of 7, 14, 28 and 42 days of age. Test specimens shall be fabricated and tested in conformance with the requirements in California Test 523.

The certified field qualification test data reports shall include the following:

- A. Date of mixing,
- B. Mixing equipment and procedures used,
- C. Volume of batch in cubic meters and the mass or volume,
- D. Type and source of ingredients used,
- E. Penetration and slump of the concrete,
- F. The air content of the concrete, and
- G. The age at time of testing and strength of concrete specimens tested.

Field qualification test data reports shall be signed by a certified representative in charge of the laboratory that performed the tests.

If the Contractor changes a source of supply or proportions, the Contractor shall submit a new proposed mix design and furnish samples from the new source, or sources, at least 60 days prior to their intended use. The new mix proportions shall be trial batched and field qualified, unless, the Engineer determines the change is not substantive. No extension of contract time will be allowed for the time required to perform the sampling, testing, preparing and qualifying new mix proportions for new aggregate sources proposed by the Contractor.

### **MODULUS OF RUPTURE**

Acceptance of portland cement concrete pavement for modulus of rupture will be determined on the basis of tests performed by the Engineer. Acceptance shall be on a lot basis. Each lot will not exceed 750 cubic meters. Sampling locations shall be determined by the Engineer in accordance with random sampling procedures. A minimum of six beam specimens shall be made from each sample. Beam specimens will be tested for modulus of rupture at 10, 21 and 28 days. The modulus of rupture for each lot shall be computed by averaging the results of two beams, representing that lot, tested at 28 days of age. The difference in modulus of rupture between each individual beam result shall not be more than 0.34 MPa.

The Contractor shall perform sampling and testing of beam specimens, at the Contractor's expense, to determine if concrete pavement has achieved 2.4 MPa, when requesting early use of concrete pavement, as allowed in Section 90-8.03, "Protecting Concrete Pavement" of the Standard Specifications.

Beam specimens shall be made and tested in conformance with the requirements in California Test 523.

### **INSTALLING TIE BARS**

Tie bars shall be installed at longitudinal contact joints and longitudinal weakened plane joints as shown on the plans. Consecutive width of new portland cement concrete pavement tied together with tie bars shall not exceed 15 meters. Tie bars shall not be used at a joint where portland cement concrete and asphalt concrete pavements abut.

Tie bars shall be installed at longitudinal joints by one of the following methods:

- A. Drilling and bonding tie bars with two-component, epoxy-resin that conforms to this section. Drilled holes shall be cleaned in conformance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Tie bars will be rotated 180° while being inserted into the epoxy filled holes. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured as specified by the manufacturer instructions. Tie bars that are improperly placed or bonded, as determined by the Engineer, will be rejected. If rejected, new holes shall be drilled and new tie bars shall be placed and securely bonded to the concrete. Rejected tie bars shall be cut flush with the joint face. Exposed ends of tie bars shall be epoxy coated. The center of the new holes shall be offset 75 mm horizontally from the center of the rejected hole to maintain the minimum clearance to the dowel bar. Work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
- B. Inserting tie bars into the plastic slipformed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been an insertion performed. Loose tie bars shall be replaced by drilling and bonding as described in A above, at the Contractor's expense.

- C. Using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.
- D. Using tie bar assemblies or chairs that conforms with the requirements of these special provisions.

### **DOWEL PLACEMENT**

Dowel bars shall be placed 150 mm from longitudinal joints and spaced at 300 mm, center to center.

Dowel bars shall be centered on the joint within a tolerance of  $\pm 50$  mm in the longitudinal direction directly over the contact joint or sawcut for the transverse weakened plane joints, -as shown on the plans. Prior to placement of the dowels, the Contractor shall submit to the Engineer a written procedure to identify the transverse weakened plane joint locations relative to the middle of the dowel bars and the procedure for consolidating concrete around the dowels. The Contractor's procedure for dowel bar alignment, and concrete consolidation shall be verified by coring in conformance with the requirements in "Core Drilling for Dowel Placement Alignment Assurance Testing" in this section.

Dowels shall be placed by using load transfer assemblies (dowel baskets) or by mechanical insertion. Dowels shall be oriented parallel with the pavement lane centerline and surface of the pavement at midpavement depth. Dowel alignment shall be within 9 mm per dowel bar length in both horizontal and vertical planes. Dowel bar vertical placement shall be within +7 mm and -15 mm for pavement thickness of 230 mm; and +12 mm and -15 mm for pavement thickness of 260 mm of the planned mid-pavement depth. Dowel bar horizontal placement shall be within 25 mm of the planned location.

When dowels are placed by mechanical insertion, the concrete over the dowel bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been any insertion performed. When load transfer assemblies (dowel baskets) are used, they shall be securely anchored firmly to the base to hold the dowel bars at the specified depth and alignment during concrete placement without displacement. A minimum of 8 alternating, equally spaced, concrete fasteners with clips shall be used to anchor each 3.6 m assembly (4 per lower runner wire). At least 10 concrete fasteners shall be used for assembly sections greater than 3.6 m and less than or equal to 4.9 m. Temporary spacer wires connecting load transfer assemblies shall be cut or removed after the assemblies are anchored into position prior to concrete placement. Paving shall be suspended when approved assemblies are not in place at least 60 m in advance of the concrete placement operation. The Engineer may waive this requirement upon written request by the Contractor, in areas, where access is restricted, or other construction limitations are encountered. Contractor shall demonstrate to the Engineer's satisfaction that load transfer assemblies are adequately anchored and do not shift during concrete placement. The contractor shall provide longer concrete nails than the minimum lengths shown on the plans for varying bases beneath the PCC when anchored load transfer assemblies demonstrate movement.

Approval of the initial placement of load transfer assemblies shall not constitute acceptance of the final position of the dowel bars.

### **CORE DRILLING FOR DOWEL PLACEMENT ALIGNMENT ASSURANCE TESTING**

Coring, to confirm dowel bar placement and position, shall be provided by the Contractor throughout the project, at locations determined by the Engineer. Each day's paving shall be cored within 2 days by performing one test for every 1670 square meters of doweled pavement or fraction thereof. One test shall consist of drilling two cores, one on each end of a dowel bar to expose both ends and allow measurement for proper alignment. If the cores indicate that dowel bars are not within the allowable tolerances or if air voids exist surrounding the dowel bars, additional cores will be required to determine the limits and severity of unacceptable work.

The holes shall be cored by methods that will not damage the concrete adjacent to the holes. Immediately after coring, the concrete cores shall be submitted to the Engineer for inspection, and the cores shall be identified by the Contractor with a location description.

After removal of cores, core hole voids in concrete pavement shall be cleaned and filled with hydraulic cement grout (non-shrink). After placement of hydraulic cement grout, the material while still plastic shall be finished and textured to match the adjacent pavement surface. The backfill material shall be the same level as the pavement surface.

Water for core drilling operations shall be from a local domestic water supply, and shall contain not more than 1000 parts per million of chlorides as CL, nor more than 1300 parts per million of sulfates as  $SO_4$ , nor shall it contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water from core drilling operations shall not be permitted to fall on public traffic, to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Dowel alignment shall be within the specified tolerances. If dowels are found to be installed improperly, the paving operations shall not continue until the Contractor has demonstrated to the Engineer that the problem which caused the improper dowel positioning has been corrected.

Dowels in rejected joints shall be replaced by the Contractor by saw cutting on each side of the rejected joint a minimum of 0.9-m, lifting out concrete to be removed, installing new dowels at the new transverse joints, installing dowel bars and preformed sponge rubber expansion joint filler along the longitudinal joints, placing concrete, and installing new joints. Preformed sponge rubber expansion joint filler shall conform to the requirements in ASTM Designation: D 1752. New dowel holes shall be drilled, not more than 3 mm greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowels to be installed at the contact joints. Dowels shall be placed, as shown on the plans, for the 2 new transverse contact joints. Original exposed tie bars, located within the slab replacement area, shall be cut flush with the lane or pavement edge and dowel bars shall be installed to replace the tie bars at an offset of 75 mm, horizontally from the tie bar location. Holes for dowels to be placed along the longitudinal joint shall be drilled, not more than 3 mm greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowels to be installed at the contact joints.

When requested by the Contractor and approved by the Engineer, dowel bars which are more than  $\pm 50$  mm but less than  $\pm 75$  mm from being centered directly over the sawcut for the transverse weakened plane joint, may remain in place, and the Contractor shall pay to the State the amount of \$32.30 per square meter for the quantity of concrete pavement panels represented by the cores indicating incorrect dowel alignment or improper concrete consolidation around dowels. The quantity of concrete pavement area used to determine the amount payment to the State will be calculated using the panel dimensions for panels adjacent to and inclusive of the joints with incorrect dowel alignment or improper concrete consolidation around dowels. The Department will reduce compensation from moneys due, or that may become due to the Contractor under the contract. This reduced compensation shall be in addition to other adjustments for pavement thickness deficiency in conformance with the provisions in Section 40-1.135, "Pavement Thickness," of the Standard Specifications and in addition to other adjustments for deficient Cleanness Value and coarse aggregate grading; and for deficient Sand Equivalent and fine aggregate grading in conformance with the provisions in Section 90-2.02, "Aggregate," of the Standard Specifications.

#### **LIQUID JOINT SEALANT INSTALLATION**

The joint sealant detail for transverse and longitudinal joints, as shown on the plans, shall apply only to weakened plane joints. Weakened plane joints shall be constructed by the sawing method. Should grinding or grooving be required over or adjacent to joints after sealant has been placed, the joint materials 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, and replaced at the Contractor's expense.

At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the plans. Longitudinal weakened plane joints shall be Type SSC.

Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, the joint walls shall be cleaned by the dry sand blast method and other means as necessary to remove from the joint objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, traces of sand, dust and loose material shall be removed from and near the joint for a distance along the pavement surfaces of at least 50 mm on each side of the joint by the use of a vacuum device. Surface moisture shall be removed at the joints by means of compressed air or moderate hot compressed air or other means approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used. Sandblasting equipment shall have a maximum nozzle diameter size of  $6 \pm 1$ -mm and a minimum pressure of 0.62-MPa.

Backer rods shall be installed when the temperature of the portland cement concrete pavement is above the dew point of the air and when the air temperature is 4°C or above. Backer rod shall be installed when the joints to be sealed have been properly patched, cleaned and dried, as determined by the Engineer. Methods of placing backer rod that leave a residue or film on joint walls shall not be used.

Immediately after placement of the backer rod, joint sealant shall be placed in the clean, dry, prepared joints as shown on the plans. The joint sealant shall be applied using a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Adequate pressure shall be applied to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant, the surface of the sealant shall be recessed as shown on the plans.

Failure of the joint material in either adhesion or cohesion will be cause for rejection of the joint. The finished surface of joint sealant shall conform to the dimensions and allowable tolerances shown on the plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the plans, as determined by the Engineer, shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

After each joint is sealed, surplus joint sealer on the pavement surface shall be removed. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

### **CONSTRUCTING TRANSVERSE CONTACT JOINTS**

A transverse contact (construction) joint shall be constructed, including dowel bars, at the end of each day's work or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

If sufficient concrete has not been mixed to form a slab to match the next weakened plane joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of excess concrete shall be at the Contractor's expense. Excess material shall become the property of the Contractor and 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.

A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of dowel bars.

### **CONSTRUCTING LONGITUDINAL ISOLATION JOINTS**

Final alignment of perpendicular transverse weakened plane joints in pavement shall not be made to match the spacing or skew of the weakened plane joints in the existing parallel concrete pavement. Tie bars shall not be placed across longitudinal isolation joints. The edge of the existing pavement shall be saw cut a width 3 mm and to the full depth of the existing concrete pavement to produce a flat vertical face. Prior to placing concrete, joint filler material shall be placed as shown on the plans. The joint filler shall be secured to the face of the existing pavement joint face by a method that will hold the joint filler in place and prevent the new concrete from adhering to the existing concrete, during placement of concrete.

Sealant for longitudinal isolation joints shall be silicone and placed in conformance with the requirements for liquid joint sealant installation as specified above, except references to backer rods shall not apply.

### **PROFILE INDEX**

The pavement surface shall be profiled, by the Contractor not more than 10 days following concrete placement, in the presence of the Engineer, using a California Profilograph or equivalent in conformance with the requirements in California Test 526, except a blanking band of zero (null) shall be used to determine the Profile Index. Two profiles shall be made within each traffic lane, one meter from and parallel with each lane line.

Profiled pavement shall conform to the following Profile Index requirements:

- A. Pavement on tangent alignment and pavement on horizontal curves having a centerline radius of curve 600 m or more shall have a Profile Index of 64 mm or less for each 0.1-km.
- B. Pavement on horizontal curves having a centerline radius of curve 300 m or more but less than 600 m and pavement within the superelevation transition of those curves shall have a Profile Index of 128 mm or less for each 0.1-km.

Concrete shoulders shall be profiled. Two profiles shall be made within the shoulder, one meter from and parallel with each edge of the shoulder. Concrete shoulders profiled shall conform to the Profile Index requirements in this section.

Individual high points in excess of 7.5 mm, as determined by measurements of the profilogram in conformance with the requirements in California Test 526, except using a blanking band of zero (null), shall be reduced by grinding in conformance with the requirements in Section 40-1.10, "Final Finishing," of the Standard Specifications until the high points as indicated by reruns of the profilograph do not exceed 7.5 mm.

Pavement grinding shall not be performed before 10 days have elapsed after concrete placement, nor before the concrete has developed a modulus of rupture of at least 3.8 MPa.

### **MEASUREMENT AND PAYMENT**

Sealing longitudinal and transverse weakened plane joints, and longitudinal isolation joints in portland cement concrete pavement will be measured by the meter. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the sealed pavement joints will be measured and paid for as seal pavement joint, and the sealed longitudinal isolation joints shall be paid as seal longitudinal isolation joint.

The contract price paid per meter for seal pavement joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing backer rod, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per meter for seal longitudinal isolation joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing longitudinal isolation joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing joint filler material, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Concrete pavement (doweled transverse joints) will be measured by the cubic meter in conformance with the provisions in Section 40-1.13, "Measurement," of the Standard Specifications. No deduction will be made for the volume of epoxy-coated dowel bars, epoxy-coated tie bars and, when used, tie bar assemblies or chairs with fasteners and dowel assemblies with fasteners, in the concrete pavement. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the concrete will be measured and paid for as concrete pavement.

Concrete pavement (undoweled transverse joints) will be measured by the cubic meter in conformance with the provisions in Section 40-1.13, "Measurement," of the Standard Specifications. No deduction will be made for the volume of epoxy-coated tie bars and, when used, tie bar assemblies or chairs with fasteners, in the concrete pavement.

The contract price paid per cubic meter for concrete pavement (doweled transverse joints) and concrete pavement (undoweled transverse joints) shall include full compensation for furnishing all labor, materials (including cementitious material in the amount determined by the Contractor), tools, equipment, and incidentals, and for doing all the work involved in constructing the portland cement concrete pavement complete in place, including epoxy-coated tie bars and, when used, any tie bar assemblies or chairs submittal to the Engineer all test data for determination of mix proportions of concrete for concrete pavement and for providing the facility, Contractor personnel and all the work involved in arranging and holding the pre-paving conference, for constructing and repairing all joints; for performing all profile checks for Profile Index and furnishing final profilograms to the Engineer; for grooving and grinding required for final finishing; and for removing, and replacing pavement for deficient thickness, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per cubic meter for concrete pavement (doweled transverse joints) shall also include full compensation for furnishing and placing epoxy-coated dowel bars and, when used, dowel assemblies with fasteners.

Full compensation for drilling holes and bonding tie bars with epoxy resin shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for coring test strips for evaluation by the Engineer and for back-filling core holes with hydraulic cement grout when the test strip remains in place as part of the concrete pavement; and for constructing, coring and removing and disposing of test strips that are rejected shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Costs for providing JITT will be determined in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications, except no markups shall be added, and the Contractor will be paid for one half of the JITT cost. Costs for providing JITT shall include training materials, class site, and the JITT instructor including the JITT instructor's travel, lodging, meals and presentation materials. All costs incurred by the Contractor or Engineer for attending JITT shall be borne by the party incurring the costs.

Full compensation for core drilling for dowel bar alignment and backfilling with hydraulic cement grout shall be considered as included in the contract price per cubic meter for concrete pavement (doweled transverse joints) and no additional compensation will be allowed therefor.

If the initial cores show the dowels are out of alignment and the Engineer orders additional dowel coring, full compensation for drilling the additional cores shall be considered as included in the contract price per cubic meter for concrete pavement (doweled transverse joints) and no additional compensation will be allowed therefor.

If the initial cores show that the dowels are within alignment tolerances and the Engineer orders more dowel coring than the one test for every 1670 square meters of doweled pavement, the additional cores will be paid for as extra work in conformance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

**ENGINEER'S ESTIMATE  
11-080914**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101 (S)	208799	250 MM WELDED STEEL PIPE CONDUIT (6.35 MM THICK)	M	150		
102 (S)	208910	EXTEND 250 MM CONDUIT	M	7		
103	260201	CLASS 2 AGGREGATE BASE	M3	64 300		
104	374002	ASPHALTIC EMULSION (FOG SEAL COAT)	TONN	13		
105	390155	ASPHALT CONCRETE (TYPE A)	TONN	27 600		
106	390171	ASPHALT CONCRETE BASE (TYPE A)	TONN	45 600		
107	394002	PLACE ASPHALT CONCRETE (MISCELLANEOUS AREA)	M2	100		
108	394040	PLACE ASPHALT CONCRETE DIKE (TYPE A)	M	360		
109	394044	PLACE ASPHALT CONCRETE DIKE (TYPE C)	M	90		
110	394046	PLACE ASPHALT CONCRETE DIKE (TYPE D)	M	3500		
111	394048	PLACE ASPHALT CONCRETE DIKE (TYPE E)	M	8300		
112	394049	PLACE ASPHALT CONCRETE DIKE (TYPE F)	M	350		
113	BLANK					
114	032154	CONCRETE PAVEMENT RAPID STRENGTH CONCRETE	M3	400		
115 (S)	404092	SEAL PAVEMENT JOINT	M	81 100		
116 (S)	404094	SEAL LONGITUDINAL ISOLATION JOINT	M	9500		
117	490570	FURNISH STEEL PILING (HP 360 X 174)	M	265		
118 (S)	490571	DRIVE STEEL PILE (HP 360 X 174)	EA	18		
119 (S)	490655	400 MM CAST-IN-DRILLED-HOLE CONCRETE PILING	M	34		
120 (S)	490657	600 MM CAST-IN-DRILLED-HOLE CONCRETE PILING	M	3040		

**ENGINEER'S ESTIMATE  
11-080914**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
261	731517	MINOR CONCRETE (GUTTER)	M	294		
262	033027	CONCRETE BARRIER (TYPE KA26A MODIFIED)	M	280		
263 (S)	839532	CABLE ANCHOR ASSEMBLY (BREAKAWAY, TYPE B)	EA	10		
264 (S)	839551	TERMINAL SECTION (TYPE B)	EA	10		
265 (S)	839553	END SECTION	EA	10		
266	192050	STRUCTURE EXCAVATION (TIEBACK WALL)	M3	5400		
267	192055	STRUCTURE EXCAVATION (SOIL NAIL WALL)	M3	3700		
268	193026	STRUCTURE BACKFILL (TIEBACK WALL)	M3	380		
269	193028	STRUCTURE BACKFILL (SOIL NAIL WALL)	M3	110		
270	197060	SOIL NAIL ASSEMBLY	M	18 000		
271	500050	TIEBACK ANCHOR	EA	327		
272	510050	STRUCTURAL CONCRETE	M3	1625		
273	520101	BAR REINFORCING STEEL	KG	248 000		
274	530100	SHOTCRETE	M3	1170		
275	049719	MINOR CONCRETE CHANNEL (TYPE A)	M2	877		
276	597601	PREPARE AND STAIN CONCRETE	M2	2370		
277	839568	TERMINAL ANCHOR ASSEMBLY (TYPE SFT)	EA	6		
278	BLANK					
279	033041	SHARED FIELD DATA MANAGEMENT SYSTEM	LS	LUMP SUM	LUMP SUM	
280	BLANK					

**ENGINEER'S ESTIMATE  
11-080914**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
281	033139	CONCRETE PAVEMENT (DOWELED TRANSVERSE JOINTS)	M3	18 500		
282	033135	CONCRETE PAVEMENT (UNDOWELED TRANSVERSE JOINTS)	M3	17 500		
283	074010	WATER POLLUTION CONTROL	LS	LUMP SUM	LUMP SUM	
284	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

**TOTAL BID: \_\_\_\_\_**

15B  
ADDED PER ADDENDUM NO. 9 DATED JUNE 4, 2004