



Paul R. LePage
GOVERNOR

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0016

David Bernhardt
COMMISSIONER

September, 23, 2014
Subject: Bridge Replacement
State Project No: 020451.00
Location: Hersey & Moro Pltn
Amendment No. 1

Dear Sir/Ms:

Make the following change to the Bid Documents:

In the Bid Book **INSERT** the attached "SPECIAL PROVISION, SECTION 712.061, Structural Precast Concrete Units" 5 pages dated June 13, 2014.

Consider this change and information prior to submitting your bid on **October 1, 2014**.

Sincerely,

A handwritten signature in black ink that reads "George M. A. Macdougall".

George M. A. Macdougall P.E.
Contracts & Specifications Engineer



PRINTED ON RECYCLED PAPER

Special Provision
Section 712
(Miscellaneous Highway Material)

712.061 Structural Precast Concrete Units Structural precast concrete units shall conform to the dimensions shown on the Plans, the requirements of this Specification and with the reviewed Working Drawings.

Materials Materials for concrete shall conform to the requirements of Standard Specification Section 502.03, Materials. Cement shall be Type I, Type II, or Type III. Coarse aggregate for concrete shall conform to Class A, AA or Latex. The maximum water cement ratio shall be 0.40. For the purpose of calculating water cement ratios, one U.S. gallon of water shall be considered to weigh 8.34 pounds. Concrete shall contain a minimum of 3 gallons per cubic yard of calcium nitrite solution. The minimum 28 day compressive strength shall be 5,000 psi, unless otherwise stated in the Contract.

Material for reinforcing shall meet the requirements of Standard Specification Section 709.01 - Reinforcing Steel or Section 709.02 - Welded Steel Wire Fabric.

Only one mat of steel is required for concrete member thicknesses of seven inches or less; two mats of steel, one at each face, are required for concrete member thicknesses greater than seven inches.

Grout, concrete patching material, and geotextiles shall be one of the products listed on the Department's Qualified Products List (QPL).

Quality Control and Quality Assurance Quality Control (QC) is the responsibility of the Contractor. The Quality Control Inspector (QCI) shall inspect all aspects of the work.

The Contractor shall generate a nonconformance report (NCR) for materials and/or workmanship that is nonconforming. The NCR shall describe the nonconformance and the proposed corrective action. Copies of the NCR shall be provided to the Department's Quality Assurance Inspector (QAI) and the Fabrication Engineer for review. Nonconforming material and/or workmanship shall be corrected or replaced.

In the event that an item fabricated under this Specification does not meet the Contract requirements but is deemed suitable for use by the Department, it may be accepted in accordance with Section 106.8, Non-Conforming Work, of the Standard Specifications.

Acceptance is the prerogative of the Department. The Department will conduct Quality Assurance (QA) in accordance with Standard Specification Subsection 106.5. Testing deemed necessary by the Department that is in addition to the minimum testing requirements will be scheduled to minimize interference with the production schedule. The QAI will witness or review documentation, workmanship and testing to assure the Work is being performed in accordance with the Contract Documents.

The QAI has the authority to reject materials and products that do not meet the Contract requirements, including Work rejected due to denial of access or the lack of adequate notice of the beginning of production. The acceptance of material or workmanship by the QAI will not prevent subsequent rejection, if the Work is later found to be unacceptable.

The Contractor shall provide a private office at the fabrication plant for the QAI in accordance with the Facilities for Inspection requirements in Standard Specification Section 535.

Construction The precast units shall be manufactured at a facility that has had a minimum of five years of experience in producing similar type products. The plant shall meet the requirements of AASHTO M-157. Facilities that are certified by the Precast/Prestressed Concrete Institute (PCI) or the National Precast Concrete Association (NPCA) will be considered pre-qualified.

The Contractor shall notify the Department of the planned start of production date of the precast units a minimum of two weeks prior to beginning production for in-Maine work and a minimum of three weeks prior to beginning production for out-of-Maine work. If the production schedule changes, notify the Fabrication Engineer no less than three Working Days prior to the initial production start-up date. Any Work done without the QAI present will be rejected. Advise the Fabrication Engineer of the production schedule and any changes to it. If Work is suspended on a project, the Fabrication Engineer will require 72 hours of notice prior to the resumption of Work.

The Contractor shall calibrate all production equipment on the following schedule, unless there is reason to believe calibration should be performed sooner: Water gauges- every 90 days; admixture dispensers- every 90 days; concrete cylinder compression testing machine- annually; batch plant scales- every six months. Use proving rings, load cells and solid standard weights, as applicable. The calibration shall be performed by a testing laboratory acceptable to the Department, using calibration equipment the accuracy of which is traceable to a National Institute of Standards and Technology (NIST) standard. Provide calibration certifications to the QAI prior to beginning fabrication.

All precast members for a distinct system or Contract Pay Item, including end blocks, steps, caps, box culverts, arch sections, wall units, or other elements, shall be manufactured from the same material sources of aggregates, brand and type of cement and color pigment.

Gradations of coarse and fine aggregates shall be furnished to the QAI prior to beginning work and at least once per week thereafter.

Concrete mix designs shall be submitted for review and approval by the Department prior to use.

Reinforcing steel shall be fabricated, handled, and placed in accordance with Standard Specification Section 503, Reinforcing Steel, and the reviewed Working Drawings.

Forms shall be sufficiently rigid and accurate to maintain the member's dimensions. All forms shall be well built, substantial and unyielding, securely braced, strutted and tied to prevent motion and distortion while concrete is being placed in them. Corners within the forms shall be fitted with consistent width chamfer strips of 5/8 inch \pm 1/8 inch mitered at their intersections; all exposed corners shall be chamfered. Forms shall be treated with a bond breaking agent; they shall be clean and free of foreign material.

Recess inserts one inch, unless noted otherwise in the Contract. The QAI is not responsible for verifying the location of inserts or other hardware installed for the convenience of the Contractor.

Curing The units shall be cured by one of the following methods:

1. Curing by Moisture Retention: Cure the concrete in accordance with the latest edition of the Precast/Prestressed Concrete Institute Manual for Quality Control for Plants and Production of Structural Precast Concrete Products (MNL 116), Section 4.20. Moist cure the concrete until it has reached design strength.

Do not use membrane-forming curing compounds without the approval of the Fabrication Engineer. If membrane-forming curing compounds are authorized, follow the requirements of MNL 116 and the curing compound manufacturer's published recommendations.

2. Accelerated Curing of Concrete: Cure the concrete in accordance with MNL 116, Section 4.19, except as modified herein.

After initial set, the temperature gain of the concrete shall not exceed 40°F per hour. Initial set shall be determined in accordance with ASTM C403, Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance; a strength gain of 500 psi indicates initial set. The maximum allowable concrete temperature shall be 160°F. Concrete temperature shall be measured during curing with recording thermometers. In order to qualify for accelerated cure, the concrete temperature shall attain a minimum temperature of 120°F; that temperature shall be maintained for a minimum of 8 hours and the concrete shall achieve a minimum of 80 percent of design strength.

The accelerated curing cycle shall be considered complete when the method of supplying heat is stopped and/or the concrete temperature drops below 120°F. Two cylinders shall be tested immediately upon completion of the accelerated cure cycle. Products that have not achieved all of the above criteria shall be moist cured until the concrete has achieved design strength.

If the precast units have achieved 80 percent of design strength during the accelerated curing cycle, no further curing will be required.

The forms shall remain in place until the concrete attains a minimum compressive strength of 3,000 psi.

Concrete Testing Acceptance of structural precast units, for each day's production, will be determined by the Department, based on compliance with this specification and satisfactory concrete testing results. Process control test cylinders shall be made and tested in accordance with the following standards:

AASHTO T 22 (ASTM C39) Test Method for Compressive Strength of Cylindrical Concrete Specimens

AASHTO T23 (ASTM C31) Practice for Making and Curing Concrete Test Specimens in Field

AASHTO T141 (ASTM C172) Practice for Sampling Freshly Mixed Concrete

AASHTO T152 (ASTM C231) Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

AASHTO T196 (ASTM C173) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C1064 Test Method for Temperature of Freshly mixed Portland Cement Concrete

ASTM C1611 Standard Test Method for Slump Flow of Self-Consolidating Concrete

Tested concrete shall conform to the following:

- a. Temperature shall be from 40° F to 85° F.
- b. Air content shall be 5.5% to 7.5%; concrete with higher air content may be used, at the Contractor's option, provided extra cylinders are made to demonstrate that stripping strength and design strength are achieved.
- c. Slump flow shall be homogenous with no sign of segregation.
- d. Visual stability index (VSI) of SCC shall not exceed 1; if a mortar paste halo is present it shall not exceed an average of 0.25 inch.

The Contractor shall cast a minimum of 8 concrete test cylinders for each continuous concrete placement, for QC purposes: 2 cylinders shall be standard cured in accordance with AASHTO T23 (ASTM C31) to be tested for 28 day strength; and a minimum of 6 cylinders shall be field cured under the same conditions as the units and tested for stripping and design strength. Unit identification, entrained air content, water-cement ratio, slump flow and temperature of the sampled concrete shall be recorded at the time of cylinder casting. The Contractor shall perform all testing in the presence of the QAI. The QAI will designate the loads to be tested.

At least once per week, the Contractor shall make 2 concrete cylinders (6 cylinders when the Contract includes permeability requirements) for use by the Department; cylinders shall be standard cured in accordance with AASHTO T23 (ASTM C31).

If the Contractor fails to make enough cylinders to demonstrate that the product meets the Contract requirements, the product will be considered unacceptable.

The compressive strength of the concrete will be determined by averaging the compressive strength of two test cylinders made from the same sample. For the purpose of determining design strength, the average of two cylinders shall meet or exceed the design strength, and the difference in strength between the two shall be no more than 10 percent of the higher strength cylinder.

Perform compressive strength testing to determine transfer and design strength in the presence of the QAI. Cylinder tests not witnessed by the QAI will not be acceptable.

All QC Inspectors performing concrete testing shall hold a current ACI Field Testing Technician Grade I Certification, or other equivalent certification.

Surface Finish and Repairs Exposed surfaces shall be finished and repaired in conformance with the referenced specification. If the finish is not specified, then surfaces shall have a uniform appearance; only minor repairs to remove and blend fins, patch minor spalls, tie holes and handling device recesses and to repair small, entrapped air pockets, shall be permitted.

Tolerances Dimensional tolerances shall be in conformance with the applicable referenced specification or the established industry standards for the product being produced.

Documentation The producer of the structural precast units shall keep accurate records of aggregate gradations, concrete batching, testing, curing, and inspection activities, verifying that forms, reinforcing and unit dimensions conform to these requirements. Copies of reports shall be furnished to the Department.

Marking The date of manufacture, production lot number and type of unit shall be clearly and indelibly inscribed by the Contractor on a rear or unexposed portion of each unit.

Handling, Storage and Shipping The Contractor shall handle, store, and ship units in such a manner as to prevent chipping, cracking, fractures, and excessive bending stresses. Damaged units shall be repaired or replaced.