



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

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID A. COLE  
COMMISSIONER

June 22, 2007  
Subject: T14-R6 WELS  
Project No. STP-1277(100)X  
Pin No. 12771.00  
**Amendment No. 2**

Dear Sir/Ms:

Please make the following changes to the Bid Documents:

Remove in its entirety "Special Provision, Section 308 Full Depth Recycling With Cement" dated 5/14/2007 and replace with the new attached "Special Provision, Section 308 Full Depth Recycling With Cement" dated June 21, 2007.

Consider these changes prior to submitting your bid on June 27, 2007.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Bickford".

Scott Bickford  
Contracts & Specifications Engineer



PRINTED ON RECYCLED PAPER

SPECIAL PROVISION  
SECTION 308  
FULL DEPTH RECYCLING WITH CEMENT

308.01 Description This work shall consist of pulverizing a portion of the existing roadway structure into a homogenous mass, stabilizing the material with cement and placing and compacting this material to the lines, grades, and dimensions shown on the plans or established by the Resident.

MATERIALS

308.02 Pulverized Material Pulverized material shall consist of the existing bituminous pavement and one inch of the underlying gravel, pulverized, and blended into a homogenous mass. Pulverized material will be processed to 100% passing a 50 mm [2 in] square mesh sieve.

308.021 New Aggregate and Additional Recycled Material New aggregate shall meet the requirements of Subsection 703.10 - Aggregate for Untreated Surface Course and Leveling Course. New aggregate if required will be measured and paid for under the appropriate item.

Recycled material, if required, shall consist of material from the project or from off-site stockpiles that has been processed before use to 100% passing a 50 mm [2 in] square mesh sieve. Recycled material shall be conditionally accepted at the source by the Resident. It shall be free of winter sand, granular fill, construction debris, and other materials not generally considered bituminous pavement.

308.022 Portland Cement The Portland Cement shall be Type I or II meeting the requirements of AASHTO M85.

308.023 Water Water shall be clean and free from deleterious concentrations of acids, alkalis, salts or other organic or chemical substances.

EQUIPMENT

308.03 Pulverizer The pulverizer shall be a self-propelled machine, specifically manufactured for full-depth recycling work and capable of reducing the required existing materials to a size that will pass a 50 mm [2 in] square mesh sieve. The machine shall be equipped with standard automatic depth controls and must maintain a consistent cutting depth and width. The machine also shall be equipped with a gauge to show depth of material being processed.

308.031 Cement Spreader Spreading of the Portland cement shall be done with a spreader truck designed to spread dry particulate (such as Portland Cement or Lime) or other approved means to insure a uniform distribution across the roadway and minimize fugitive dust (See also the *Health and Safety/Right to-Know* section of this Special Provision). **Pneumatic application, including through a slotted pipe, will not be permitted.** Other systems that have been developed include fog systems, vacuum

systems, etc. Slurry applications could also be accepted. MaineDOT reserves the right to accept or reject the method of spreading cement based on the concerns specified herein. The Contractor shall provide a method for verifying that the correct amount of cement is being applied.

Health and Safety/Right-to-Know Portland cement is considered a hazardous chemical under US OSHA Hazard Communication Rule 29 CFR 1910.120, therefore, all Contractors and Subcontractors are required to notify their workers of the potential health hazards associated with working with Portland cement.

In no area of the work site, where cement or cement-pavement-gravel combination is being applied, re-worked with reclaimer, rolled or graded, shall respirable dust be allowed to exceed the NIOSH [1974] established respirable dust standard (RDS) recommended exposure limit (REL) of 0.05 mg/m<sup>3</sup> (for up to a 10 hour workday during a 40 hour work week).

The Contractor shall notify the Resident before commencing any work that involves Portland cement application, reclaiming, rolling, or grading.

The Contractor shall designate a Hazardous Waste Operations "Competent Person" to provide direct on-site supervision plus health and safety monitoring for work in the Portland cement impacted sections of the project. The Competent Person shall have certified training and experience in field implementation of the aforementioned regulations.

Submittals The Contractor shall submit a site specific Health and Safety Plan (HASP) to the Resident at least two weeks in advance of any Portland cement related work on the project.

Health and Safety Monitoring In any area of the project where Portland cement is being worked, the Contractor's designated Competent Person shall monitor the worker breathing zone for respirable dust. In the event the OSHA respirable dust REL is exceeded, the Contractor's Competent Person shall direct operations to cease. Operations will not recommence until the situation is corrected and respirable air returns to acceptable levels. The Contractor shall provide all required health and safety monitoring equipment.

308.04 Placement Equipment Placement of the Full Depth recycled material to the required slope and grade shall be done with an approved highway grader or by another method approved by the Resident.

308.05 Rollers The full depth recycled material shall be rolled with a vibratory pad/tamping foot roller, a vibratory steel drum soil compactor and a Type II pneumatic tire roller. The pad/tamping foot roller drum shall have a minimum of 112 tamping feet 73 mm [3 in] in height, a minimum contact area per foot of 110 cm<sup>2</sup> [17 in<sup>2</sup>], and a minimum width of 2.15 m [84 in]. The vibratory steel drum roller shall have a minimum 2.15 meter [84 in] width single drum. The pneumatic tire roller shall meet the

requirements of Section 401.10 and the minimum allowable tire pressure shall be 586 kPa [85 psi].

308.06 Pulverizing The entire depth of existing pavement shall be pulverized together with approximately 25 mm [1 in] of the underlying gravel into a homogenous mass. All pulverizing shall be done with equipment that will provide a homogenous mass of pulverized material, processed in-place, which will pass a 50 mm [2 in] square mesh sieve.

#### MIX DESIGN

The Department will supply a mix design for the recycling work based on test results from pavement and soil analysis taken to the design depth. The Department will provide the following information prior to construction:

1. Percent of Portland cement to be used.
2. Optimum moisture content for proper compaction.
3. Additional aggregate (if required).

After a test strip has been completed or as the work progresses, it may be necessary for the Resident to make necessary adjustments to the mix design. Changes to compensation will be in accordance with the Mix Design Special Provision.

#### CONSTRUCTION

308.07 Weather Limitations When Portland cement is used, full depth recycled work shall be performed when;

- A. Cement stabilizing operations will be allowed between May 15<sup>th</sup> and September 15<sup>th</sup> inclusive in Zone 1 - Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais. Cement stabilizing will be allowed between May 1<sup>st</sup> and September 30<sup>th</sup> inclusive in Zone 2 - Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.
- B. The atmospheric temperature, as determined by an approved thermometer placed in the shade at the recycling location, is 10°C [50°F] and rising.
- C. When there is no standing water on the surface.
- D. During generally dry conditions, or when weather conditions are such that proper pulverizing, adding, mixing, and curing can be obtained using proper procedures, and when compaction can be accomplished as determined by the Resident.
- E. When the surface is not frozen and when overnight temperatures are expected to be above 0°C [32°F].
- F. Wind conditions as such that the spreading of cement on the roadway ahead of the recycling machine will not adversely affect the operation (cement will not be blown away).

308.08 Surface Tolerance The complete surface of the Full Depth Reclamation course shall be shaped and maintained to a tolerance, above or below the required cross sectional shape, of 10 mm [ $\frac{3}{8}$  inch].

308.09 Full Depth Recycling Procedure If required by the mix design, a uniform layer of crusher dust shall be spread over the full width of the roadway. New aggregate or recycled pavement meeting the requirements of Section 307.021 - New Aggregate, and Recycled Material shall be added as necessary to restore cross-slope and/or grade. Locations will be shown on the plans or described in the construction notes; the Resident may add other locations while construction of the project is in progress. The Contractor will use recycled pavement to the extent it is available, in lieu of new aggregate. The material shall then be pulverized, processed, and blended into a homogeneous mass passing a 50 mm [2 in] square mesh sieve. Material found not pulverized down to a 50mm [2 in] size will be required to be reprocessed by the recycler with successive passes until approved by the Resident. The material shall then be shaped to the cross-slope and grade shown on the plans, typicals, or as directed by the Resident. This pulverized material shall be fine-graded to  $\pm 13$  mm [ $\pm 1/2$  in] tolerance. The initial reclaiming process density requirements will be the same as Section 307.101 unless otherwise directed by the Resident.

The cement shall be spread uniformly over the full width of roadway to be recycled just prior to each pass of the stabilizing operation, in a continuous process by means of a mechanical spreader. Dry stabilizing agents shall be spread at the prescribed rate in the job mix formula as provided by the Department. These additives shall then be uniformly blended into a homogeneous mass until an apparent uniform distribution has occurred. The Resident may adjust the rate of application as necessary.

Sufficient water shall be added during the recycling process to meet the moisture requirements as specified.

The resultant material shall be graded and compacted to the cross-slope and profile shown on the plans or as directed by the Resident. The Contractor will also be responsible for re-establishing the existing profile grade. The completed surface of the full depth recycled course shall be shaped and maintained to a tolerance, above or below the required cross sectional shape, of 10 mm [ $3/8$  in]. Areas not meeting this tolerance will be repaired as described in Section 307.091.

After compaction, the roadway surface shall be treated with a light application of water, and rolled with pneumatic-tired rollers to create a close-knit texture. The finished layer shall be free from:

- A. Surface laminations.
- B. Segregation of fine and coarse aggregate.
- C. Corrugations, centerline differential, potholes, or any other defects that may adversely affect the performance of the layer.

The Contractor shall protect and maintain the recycled layer until a lift of pavement is applied. Frequent light watering shall be performed to keep the finished cement stabilized material moist for at least 48 hours. Watering will continue from 48 hours to 1 week if the equipment is available on-site. Any damage or defects in the layer shall be repaired immediately. An even and uniform surface shall be maintained. The recycled material shall be swept prior to hot mix asphalt placement.

308.091 Repairs Repairs and maintenance of the recycled layers, during and after the curing period, resulting from damage caused by traffic, weather or environmental conditions, or resulting from damage caused by the Contractor's operations or equipment, shall be completed at no additional cost to the Department.

Low areas will be repaired using a hot mix asphalt shim. Areas up to 25mm [1 in] high can be repaired by milling or shimming with hot mix asphalt. Areas greater than 25mm [1 in] high will be repaired using a hot mix asphalt shim. All repair work will be done with the Resident's approval at the Contractor's expense.

#### TESTING REQUIREMENTS

308.10 Quality Control The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The QCP shall meet the requirements of Section 106.4 - Quality Control and this Section. The Contractor shall not begin recycling operations until the Department approves the QCP in writing.

Prior to performing any recycling process, the Department and the Contractor shall hold a Pre-recycle conference to discuss the recycling schedule, type and amount of equipment to be used, sequence of operations, and traffic control. A copy of the QC random numbers to be used on the project shall be provided to the Resident. All field supervisors including the responsible onsite recycling process supervisor shall attend this meeting.

The QCP shall address any items that affect the quality of the Recycling Process including, but not limited to, the following:

- A. JMF(s) including sources for all materials.
- B. Make and type of rollers including weight, weight per inch of steel wheels, and average contact pressure for pneumatic tired rollers.
- C. Testing Plan.
- D. Recycling operations including recycling speed, yield monitoring, procedures for avoiding recycling and curing in inclement weather, methods to ensure that segregation is minimized, procedures for mix design modification, grading and compacting operations, and cement application procedure.
- E. Methods for protecting the finished product from damage and procedures for any necessary corrective action.
- F. Method of grade checks.
- G. Examples of Quality Control forms.
- H. Name, responsibilities, and qualifications of the Responsible onsite Recycling Supervisor experienced and knowledgeable with the process.
- I. A note that all testing will be done in accordance with AASHTO and MDOT/ACM procedures.

The Project Superintendent shall be named in the QCP, and the responsibilities for successful implementation of the QCP shall be outlined.

The Contractor shall sample, test, and evaluate the full depth reclamation process in accordance with the following minimum frequencies:

## MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Density	1 per 300 m [1000 ft] / lane	AASHTO T 310
Air Temperature	4 per day at even intervals	
Surface Temperature	At the beginning and end of each days operation	
Yield of all materials (The daily yield, yield since last test, and total project yield.)	1 per 300 m [1000 ft] / lane	

The Department has the right to view any QC test and to request a QC test at any time. The Contractor shall submit all QC test reports and summaries in writing, signed by the appropriate technician, and present them to the Department's onsite representative by 1:00 P.M. on the next working day, except when otherwise noted in the QCP due to local restrictions. The Contractor shall make all test results, including randomly sampled densities, available to the Department onsite.

The Contractor shall cease recycling operations whenever one of the following occurs:

- A. The computed yield differs from the approved Job Mix Formula by 10% or more.
- B. The Contractor fails to follow the approved QCP.
- C. The Contractor fails to achieve 98% density after corrective action has been taken.

Recycling operations shall not resume until the Department agree on the corrective action to be taken.

308.101 Test Strip The contractor shall assemble all items of equipment for the recycling operation on the first day of the recycling work. The Contractor shall construct a test strip for the project at a location approved by the Resident. The Responsible onsite Recycling Supervisor will work with Department personnel to determine the suitability of the mixed material, cement dispersion within the mixed material, moisture control within the mixed material, and compaction and surface finish. The test strip section is required to:

- A. Demonstrate that the equipment and processes can produce recycled layers to meet the requirements specified in these special provisions.
- B. Determine the effect on the gradation of the recycled material by varying the forward speed of the recycling machine and the rotation rate of the milling drum.
- C. Determine the sequence and manner of rolling necessary to obtain the compaction requirements and establish a target TMD. The Contractor and the Department will calibrate their respective gauges at this time.

The test strip shall be at least 100 m [300 ft] in length of a full lane-width (or a half-road width). Full recycling production will not start until a passing test strip has been accomplished. If a test strip fails to meet the requirements of this specification, the Contractor will be required to repair or replace the test strip to the satisfaction of the

Resident. Any repairs, replacement, or duplication of the test strip will be at the Contractor's expense.

Acceptance density testing of the recycled material will be performed by the Department using the nuclear method. After the test strip has been pulverized, the cement added and mixed, and the roadway brought to proper shape, it will be rolled as directed until the nuclear density readings show an increase in dry density of less than 16 kg/m<sup>3</sup> [1 pcf] for the final four roller passes. This density will be used as the target TMD for the recycled material. The remaining full depth recycled material shall be compacted to a minimum density of 98% of the target density as determined in the control section.

ACCEPTANCE TEST FREQUENCY

Property	Frequency	Test Method
In-place Density	1 per 600 m [2000 ft] / lane	AASHTO T 310

**308.11 Miscellaneous** No new pavement shall be placed on the full depth recycled pavement until a curing period of 48 hours has elapsed. If inclement weather occurs, the Department reserves the right to extend the curing period. **Between 24 and 48 hours after compaction, the finished course shall be vibrated with between 2 and 4 passes of a 11 Mg [12 ton] minimum weight steel-wheel vibratory roller, traveling at a speed of approximately 3.2 kph [2 mph] and vibrating at maximum amplitude (or as directed by Resident). The section shall have 100% coverage exclusive of the outside 300 mm [1 ft] to induce minute cracks in the treated base course. Additional passes may be required to achieve the desired crack pattern or section modulus as directed by the Resident.**

**308.12 Method of Measurement** Full Depth Recycled Pavement with Cement will be measured by the square meter [square yard].

**308.13 Basis of Payment** The accepted quantity of Full Depth Recycled Asphalt Pavement with Cement will be paid for at the contract unit price per square meter [square yard], complete in-place which price will be full compensation for furnishing all equipment and labor for pulverizing, blending, placing, grading, compacting, and for all incidentals necessary to complete the work.

The addition of materials to restore profile grade and/or cross-slope in areas shown on the plans or described in the construction notes will be paid separately under designated pay items within the contract.

Payments will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
308.36 Full Depth Recycling With Cement	Square Meter [Square Yard]