

# MNROAD SPECIAL PROVISIONS FOR COMPOSITE PAVEMENT CONSTRUCTION

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- Attached:
- Attachment A “Random Number Table”
  - Fuel Escalation Clause
  - Guidelines for Approval of Computer Generated Schedule of Prices
  - Attachment “MODIFIED DYNAMIC CONE PENETROMETER (DCP) 5-692.255 modified”
  - Attachment “Schedule of Materials Control”
  - Attachment “Combined 2360/2350 (Gyratory/Marshall Design) Specification”
  - Disadvantaged Business Enterprise
  - Equal Opportunity Employee Provisions
  - Stipulation for Foreign Iron or Steel Materials
  - Bid Bond Form No. 21816

PROJECT PLANS

The Plans for this Project, consisting of the sheets tabulated below, were approved by the State Design Engineer.

PROJECT NO.	TYPE OF WORK	TOTAL SHEETS	SHEET NO.	DATE OF APPROVAL
8680-159	Grading, Bituminous and Concrete Surfacing			

New or revised sheets were approved as listed below:

PROJECT NO.	SHEET NO.	DATE OF APPROVAL

## **DIVISION S**

### **PRE-LETTING CONFERENCE**

Bidders are advised that a Pre-Letting Conference will be held at the MnROAD Test Facility, located at 9011 77<sup>th</sup> Street NE, Monticello, Minnesota, at 10:00 a.m. on July 10, 2009 to discuss any questions regarding this Contract. All interested parties are invited to attend.

See [http://MnROAD.dot.state.mn.us/research/MnROAD\\_project/directionstoMnROAD.pdf](http://MnROAD.dot.state.mn.us/research/MnROAD_project/directionstoMnROAD.pdf) for directions to the facility.

### **CONTACT INFORMATION**

Questions regarding this Project, including any questions prior to bidding, shall be directed to Benjamin Worel, (651) 366-5522.

### **USE OF ADHESIVE ANCHORS**

The use of adhesive anchors in sustained tension is prohibited. Other application utilizing adhesive anchors, such as metal rail attachment, in a non-direct tensile application is permitted.

### **PRICE ADJUSTMENT FOR STEEL MATERIALS**

This provision will only apply to reinforcing steel for cast-in-place bridges and retaining walls, structural steel for bridge girders and metal railings, for steel piling for bridges and retaining walls. For concrete pavement, it will also apply to dowel bars, but will not apply for bar reinforcement or steel fabric. Piling includes Shell and H-piling, but does not include sheet piling. Wire fence systems are excluded from metal railings. No other steel material are covered by this Special Provisions.

Mn/DOT will use the 20-City Average for Steel from *Engineering News-Record* as a basis of any price adjustment. The Benchmark Price (BP) will be the published Price for the month bids are opened. The Adjusted Price (AP) will be the published Price for the month that the steel is shipped from the mill or warehouse. The following table indicates which 20-City Average Price will be used for which product.

<b>Product</b>	<b>ENR 20-City Average Cost</b>
For Rebar (reinforcing bars and dowel bars)	Reinforcing Bars: Grade 60, #4
Steel Piling	Steel Piling: H-Pile
Bridge girders (excluding structural bolts and metal attachments)	Hot-Rolled Carbon Steel Plate
Metal Railings	Hot-Rolled Carbon Steel Plate

Price adjustments will be made when, and only when, the Benchmark Price and Adjusted Price differs by 15.00 % or more. Payments will be made only for the price adjustments in excess of 15%.

Adjustments in compensation may be either plus or minus depending on the differences between the Benchmark Index and the Adjusted Index.

The Contractor shall submit copies of the mill or warehouse invoices, showing the shipping dates, for all steel referenced above. These invoices shall cover all steel materials to be placed on this Project. The Contractor shall also submit documentation showing where the steel will be placed on the Project.

This provision will apply to pay items with a total bid dollar value of \$25,000 or greater.

Adjustment Formula

If the price goes up  
 $PA = \{(AP - BP) - (BP * 0.15)\} * Q$

If the Price goes down  
 $PA = \{(BP - AP) - (BP * 0.15)\} * Q$

Where:

BP = Benchmark Price (published cost the month of letting) (\$ per 100 pounds)  
AP = Adjusted Price (published cost the month steel is shipped from mill) (\$ per 100 pounds)  
Q = Quantity (in pounds) of steel material

Adjustments will only be made for fluctuations in the cost of the steel used in these items. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

Adjustments will be paid or charged to the Prime Contractor only. Any Contractor receiving an adjustment under this Special Provision shall distribute the proper proportional part of such adjustment to subcontractors who perform applicable work.

No steel cost adjustments will be made for any indexed items manufactured from steel having a mill shipping date prior to the letting date of the Contract.

### **(1103) DEFINITIONS**

The provisions of Mn/DOT 1103 are supplemented and/or modified with the following:

The definition for SPECIMEN TREE is revised to read as follows:

A notable and valued tree in consideration of species, size, condition, age, longevity, durability, crown development, function, visual quality, and public or private prominence or benefit as indicated in the contract documents or as determined by the Engineer.

### **(1206) PREPARATION OF PROPOSAL**

The provisions of Mn/DOT 1206 are supplemented and/or modified with the following:

The first paragraph of Mn/DOT 1206.2 is hereby changed to read:

The bidder's attention is directed to MN Statute § 161.32 subd. 1c, which provides among other things, that a bid will be rejected if it contains any alterations or erasures that are not corrected as follows:

The following is added to Mn/DOT 1206:

#### **1206.4 VALUE OF SUBMITTAL**

Prior to January 1, 2009, **ALL** submittals with a value of over \$5,000,000.00 (five million dollars) **MUST** utilize the "Two way electronic bidding" method described in Mn/DOT 1206. After January 1, 2009, **ALL** submittals with a value of over **\$1,000,000.00 (one million dollars)** **MUST** utilize the "Two way electronic bidding" method described in Mn/DOT 1206.

### **(1209) DELIVERY OF PROPOSALS**

The provisions of Mn/DOT 1209 are hereby supplemented with the following:

**ALL** bids submitted, after January 1, 2009, with a value of over **\$1,000,000.00 (one million dollars)** **MUST** utilize the "Two way electronic bidding" method described in Mn/DOT 1206.

Bids submitted under \$1,000,000 (one million dollars) may utilize the "Two way electronic bidding" method described in Mn/DOT 1206 or utilizing ANY OTHER METHOD OF APPROVED BID SUBMITTAL MUST RETURN paper copies of the following :

- 1) Title Sheet of the Proposal
- 2) The complete "Schedule of Prices", with all changes made in ink and initialed.
- 3) Form 21126D, attached to the back of this Proposal, with signatures and all addenda acknowledged
- 4) Form CM 32-34 (EEO Clause)
- 5) Non-Collusion Declaration
- 6) Mn/DOT Form 21816

### **(1210) WITHDRAWAL OR REVISION OF PROPOSALS**

The provisions of Mn/DOT 1210 are hereby deleted and replaced with the following:

Any bidder may withdraw or revise its Proposal after it has been deposited with the Contracting Authority, provided the request for withdrawal or revision is received in writing before the time set for opening proposals.

The Department reserves the right to revise the Plans, Specifications, Special Provisions, and Proposal form for any Project at any time prior to the date set for opening the Proposals. Revisions will be made by Addendum, duly numbered and dated, subject to the following provisions:

- (1) Each Addendum will be delivered by certified mail, courier service, fax, or other electronic transmission to each prospective bidder who has received a Proposal form prior to the date of Addendum. The Addendum will be included with all Proposal forms issued to bidders after the date of the Addendum.
- (2) If revisions made by an Addendum require considerable change or reconsideration on the part of the bidder, the date set for opening the Proposals may be postponed, in which case the Addendum will include an announcement of the new date set for opening Proposals.
- (3) Each bidder shall acknowledge receipt of each Addendum, either in the space provided on the Proposal form or by submitting a letter prior to the time set for opening Proposals.

### **(1212) PUBLIC OPENING OF PROPOSALS**

The provisions of Mn/DOT 1210 are hereby deleted and replaced with the following:

Proposals will be opened at the time indicated in the Advertisement for Bids.

### **(1305) REQUIREMENT OF CONTRACT BOND**

The provisions of Mn/DOT 1305 are hereby deleted and replaced with the following:

The successful bidder shall furnish a payment bond equal to the contract amount and a performance bond equal to the contract amount as required by Minnesota Statutes, section 574.26. The surety and form of the bonds shall be subject to the approval of the contracting authority.

The contracting authority shall require for all contracts less than or equal to five million dollars (\$5,000,000.00), that the aggregate liability of the payment and performance bonds shall be twice the amount of the

contract. All contracts in excess of five million dollars (\$5,000,000.00) shall have an aggregate liability equal to the amount of the contract.

#### **(1404) MAINTENANCE OF TRAFFIC**

All traffic control devices shall conform and be installed in accordance to the "Minnesota Manual on Uniform Traffic Control Devices" (MN MUTCD) and Part 6, "Field Manual for Temporary Traffic Control Zone Layouts", the "Guide to Establishing Speed Limits in Highway Work Zones", the Minnesota Flagging Handbook, the provisions of Mn/DOT 1404 and 1710, the Minnesota Standard Signs Manual, the Traffic Engineering Manual, the Traffic Control Layouts/Typical Traffic Control Layouts in the Plans, and these Special Provisions.

The Contractor shall furnish, install, maintain, and remove all traffic control devices required to provide safe movement of vehicular traffic through the Project during the life of the Contract from the start of Contract operations to the final completion thereof. The Engineer will have the right to modify the requirements for traffic control as deemed necessary due to existing field conditions. The highways shall be kept open to traffic at all times, except as modified below.

Traffic control devices include, but are not limited to, barricades, warning signs, trailers, flashers, cones, drums, pavement markings and flaggers as required and sufficient barricade weights to maintain barricade stability.

#### **SPECIAL PROJECT REQUIREMENTS**

(A) **Work will be done on the MnROAD Mainline with it closed to I-94 traffic.**

(B) All Contractor and Mn/DOT vehicles shall obey the maximum speed limit of 40 mph when in the MnROAD test facility and the traffic pattern on the Low Volume Road (LVR) shall be adhered to during construction as follows:

Drive only on the Inside Lane (Clockwise Flow only when using the LVR) (Do not drive on the Outside Lane).

#### **TRAFFIC CONTROL**

(A) The Contractor shall be responsible for the immediate repair or replacement of all traffic control devices that become damaged, moved or destroyed, of all lights that cease to function properly, and of all barricade weights that are damaged, destroyed, or otherwise fail to stabilize the barricades. The Contractor shall further provide sufficient surveillance of all traffic control devices at least once every 24 hours.

The Contractor shall furnish the Engineer names, addresses and phone numbers of at least two (2) local persons responsible for all traffic control devices.

(B) If traffic control layouts are not present in the Plan, or the Contractor modifies the layout or sequence from the Plan, the Contractor shall submit the proposed traffic control layout to the Engineer, for approval, at least fourteen (14) days prior to the start of construction. At least 24 hours prior to placement, all traffic control devices shall be available on the Project for inspection by the Engineer. The Contractor shall modify his/her proposed traffic control layout and/or devices as deemed necessary by the Engineer.

(C) The Contractor shall notify the Engineer in writing at least 72 hours prior to the start of any construction operation that will necessitate lane closure or internal traffic control signing.

(D) The Contractor shall inspect, on a daily basis, all traffic control devices, which the Contractor has furnished and installed, and verify that the devices are placed in accordance with **the Traffic Control Layouts**, these Special Provisions, and/or the MN MUTCD. Any discrepancy between the placement and the required placement shall be immediately corrected.

The Contractor shall be required to respond immediately to any call from the Engineer or his designated representative concerning any request for improving or correcting traffic control devices. **If the Contractor is negligent in correcting the deficiency within one hour of notification the Contractor shall be subject to an hourly charge assessed at a rate of \$250.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(E) The person performing the inspection in paragraph (D) above, shall be required to make a daily log. This log shall also include the date and time any changes in the stages, phases, or portions thereof go into effect. The log shall identify the location and verify that the devices are placed as directed or corrected in accordance with the Plan. All entries in the log shall include the date and time of the entry and be signed by the person making the inspection. The Engineer reserves the right to request copies of the logs as he deems necessary.

The Contractor shall be required to provide copies of the inspection logs, within the time frame agreed upon, when requested by the Engineer. **If the Contractor is negligent in providing the inspection logs within the time frame agreed upon, the Contractor shall be subject to an hourly charge assessed at a rate of \$250.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(F) The third sentence of paragraph 2 in Mn/DOT 1404.7 (Winter Suspension) is hereby revised as follows:

"In the event that any Contractor-owned traffic control devices are damaged or destroyed making them ineffective for their intended use, the Contractor will receive payment in the amount of the value of the traffic control device as determined by the Engineer."

(G) If, at any time, the Contractor fails to, in a timely manner, properly furnish, install, maintain or remove any of the required traffic control devices, the Department reserves the right to properly correct the deficiency. **Each time the Department takes such corrective action, the costs thereof, including mobilization, plus \$5,000 will be deducted from monies due or coming due the Contractor.**

(H) Measurement and Payment:

All traffic control required under this Contract shall be performed as incidental work for which no direct payment will be made.

#### VEHICLE WARNING LIGHT SPECIFICATION

All Contractors', subcontractors' and suppliers' mobile equipment, operating within the limits of the Project with potential exposure to passing traffic, shall be equipped with operable warning lights which meet the appropriate requirements of the SAE specifications. This would include closed roads that are open to local traffic only. This also includes any vehicle which enters the traveled roadway at any time. The SAE specification requirements are as follows:

360 Degree Rotating Lights - SAE Specification J845  
Flashing Lights - SAE Specification J595  
Flashing Strobe Lights - SAE Specification J1318

Lights shall be mounted so that at least one light is visible at all times when at eye level from a 18 m [**60 foot**] radius about the equipment. This specification is to be used for both day and night time operations. All costs incurred to provide warning lights shall be at no cost to the Department. These warning lights shall also be operating and visible when a vehicle decelerates to enter a construction work zone and again when a vehicle leaves the work zone and enters the traveled traffic lane.

Any warning lights shall be on the list of approved lights which may be obtained by contacting:

Vehicle Warning Lights  
Office of Construction MS650  
Transportation Bldg.

OR by calling: (651)366-4216



395 John Ireland Blvd.  
St. Paul, MN 55155

This list is updated periodically. Warning light suppliers and manufacturers may contact the above for information on adding new products to the list.

GENERAL REQUIREMENTS:

(A) The Contractor shall provide protective devices necessary to protect traffic from excavations, drop-offs, falling objects, splatter or other hazards that may exist during construction. This work shall be an incidental cost to the Contractor.

(B) The Contractor will not be permitted to park vehicles or construction equipment so as to obstruct any traffic control device. The parking of workers' private vehicles will not be allowed within the Project limits unless so approved by the Engineer.

(C) All personnel working within the Right-of-Way shall wear reflectorized safety vests. All personnel shall adhere to the following HIGH VISIBILITY PERSONAL PROTECTIVE EQUIPMENT SPECIFICATION.

Each worker exposed to or working adjacent to moving motor vehicles as part of the workers assigned job shall be provided with and required to wear a high visibility warning vest or other high visibility garment. A high visibility garment is defined as being a Class 2 garment or greater as specified by ANSI/ISEA Standard 107-1999.

If the high visibility personal protective equipment becomes faded, torn, dirty, worn, or defaced, reducing the equipment's performance below the manufacturer's recommendations, the high visibility personal equipment shall be immediately removed from service and replaced.

The Contractor will be subject to a non-compliant charge for failure to adhere to the clothing requirements as listed above. **Non-compliant charges, for each incident, will be assessed at a rate of \$500.00 per incident that the Engineer determines that the Contractor has not complied.**

(D) When work will be performed between the official hours of sunset and sunrise, all appropriate practices for night work will apply.

The Contractor shall provide sufficient numbers of light plants to adequately illuminate the work area as determined by the Engineer. All costs incurred to provide such light plants shall be considered an incidental expense for which no direct compensation will be made.

All Contractor's personnel, except operators who will remain in their vehicles at all times, shall wear reflectionly striped (approximately 10 m [**33 feet**] of striping), highly visible, short sleeved one or two piece coveralls (color and striping pattern to be determined by the District Traffic Engineer), at all times while working on the Project. These coveralls shall be considered an incidental expense for which no direct compensation will be made. Any Contractor's employee found on the Project not wearing the prescribed reflection coveralls will be immediately ordered off the Project by the Engineer.

The Contractor shall provide a sufficient amount of 50 mm [**2 inch**] wide highly reflection vehicle marking tape to be applied to Contractor vehicles and equipment, as directed by the Engineer, and as provided by the manufacturer's instructions. This tape shall be considered an incidental expense for which no direct compensation will be made and shall be on the qualified products list for conspicuity vehicle sign sheeting as found at: <http://www.dot.state.mn.us/trafficeng/qpl/Signing.pdf>. Vehicle examples to be marked with tape are Contractor rollers, paver, millers and other equipment normally found in the lane closure.

(E) All temporary rigid orange warning and rigid orange guide signs shall be fabricated with either Type HP FLO (High Performance Fluorescent Sign Sheeting for Rigid Temporary or Permanent Signs) or Sign

Sheeting for Rigid Temporary Fluorescent Orange Signs, and Markers (Type IX FLO). All rigid signs installed, other than those with orange backgrounds, on a temporary basis shall be fabricated with Type HP (High Performance Sheeting for Rigid Permanent Signs) or Sign Sheeting for Rigid Permanent Signs, Delineators, and Markers (Type IX). Inplace signs that still apply during temporary operations may remain in place with no change in sign sheeting required.

Barricades fabricated with either ASTM Type VII, Sign Sheeting for Rigid Temporary Signs or Type HP (High Performance Sheeting for Rigid Permanent Signs) may be intermixed and used on any project until the January 1, 2010 implementation date.

The retroreflection sheeting types and qualified products used for temporary signs and barricades can be found at: <http://www.dot.state.mn.us/trafficeng/products/Mn/DOTapprovedproductlist.xls>.

#### **MILLING, SEALCOATING, AND PAVING OPERATIONS**

(A) Milling and paving operations shall be completed over the full width of all traffic carrying lanes, including turn lanes, bypass, etc., under construction on each day's run.

(B) Any drop-off where traffic will cross from or to the in place surface, or from or to the milled surface, shall be tapered and/or chamfered so as to provide for the safe passage of traffic.

(C) The Contractor shall schedule construction operations so as to minimize traffic exposure to uneven lanes, milled edges, and edge drop-offs. Only after every attempt has been made to avoid these conditions and one or more of them are deemed necessary, the Contractor shall provide and maintain the appropriate traffic control in accordance with the "DROP OFF GUIDELINES" in the Field Manual.

(D) The Contractor shall not mill any notches for surfacing tapers until immediately prior to paving, except that with the Engineer's permission, the Contractor may mill the notches and install and maintain temporary bituminous tapers to provide for the safe passage of traffic until the surfacing taper is installed.

#### **(1505) COOPERATION BY CONTRACTORS**

The provisions of Mn/DOT 1505 are supplemented as follows:

MnROAD Operations Staff will be working in the Project area to install various monitoring equipment throughout the entire Project area. The Contractor shall coordinate activities with MnROAD Operations to ensure that all conduits, monitoring sensors, cable runs, and monitoring systems are installed properly and in a timely manner.

Costs for Contractor support and cooperation shall be considered incidental to the work. No compensation in addition to the Contract prices will be made to the Contractor for any costs incurred by him, or because of any delays to his forces or equipment as a result of this instrumentation work.

The Contractor shall coordinate his/her work and cooperate with these authorized personnel in a manner consistent with the provisions of Mn/DOT 1505.

Within 2 weeks of the completed construction a follow-up meeting will take place to discuss the lessons learned during construction with key Contractor staff. This information will be used for future efforts and Mn/DOT's research construction report.

#### **(1506) SUPERVISION BY CONTRACTOR**

The provisions of Mn/DOT 1506 are supplemented as follows:

At the Preconstruction Conference the Contractor shall designate in writing who the competent superintendent and competent individual (if different) will be for this Project. These persons can only be changed

throughout the duration of the Project by submission of written authorization to the Engineer by the Contractor. The submittal of these persons shall be done before any work is performed on this Project.

The Contractor will be subject to an hourly charge for failure to comply with the requirements of Mn/DOT 1506. Non-Compliance charges, for each incident, will be **assessed at a rate of \$100 per hour**, for each hour or portion thereof, during which the Engineer determines that the Contractor has not complied. No charge will be made if the deficiency is corrected within one (1) hour of notification.

An incident of Non-Compliance will be defined as the receipt of a written work order by the Contractor with instructions to correct a deficiency.

### **(1507) UTILITY PROPERTY AND SERVICE**

Construction operations in the proximity of utility properties shall be performed in accordance with the provisions of Mn/DOT 1507, except as modified below:

Except as indicated in the Plans, there shall be absolutely no digging, driving of posts, or pounding at any depth at the MnROAD facility. MnROAD personnel will mark appropriate construction boundaries and MnROAD utilities.

The Contractor must exercise care in not damaging instrumentation cabinets located along the sides of the test cells. The Contractor shall repair any damage done to the instrumentation cabinets at no cost to the Department.

All utilities that relate to this Project are classified as "Level D," unless the Plans specifically state otherwise. This utility quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guidelines for the Collection and depiction of existing subsurface utility data."

The following utility owners have existing facilities that may be affected by the work under this Contract, all of which they intend where necessary to relocate or adjust in advance of or concurrently with the Contractor's operations.

CenterPoint Energy Resources Corp., d/b/a  
CenterPoint Energy Minnesota Gas  
Charter Communications  
Embarq Minnesota, Incorporated  
Wright-Hennepin Cooperative Electric Association

See <http://www.dot.state.mn.us/utility> for utility operators contact list.

The State's Contractor shall coordinate his/her work and cooperate with the foregoing utility owners and their forces in a manner consistent with the provisions of Mn/DOT 1507 and the applicable provisions of Mn/DOT 1505.

### **(1513) RESTRICTIONS ON MOVEMENT AND STORAGE OF HEAVY LOADS AND EQUIPMENT**

The provisions of Mn/DOT 1513 are hereby deleted and replaced with the following:

The hauling or storage of materials and/or the movement and storage of equipment to and from the Project and over completed structures, base courses, and pavements within the Project that are open for use by traffic and are to remain a part of the permanent improvement, shall comply with the regulations governing the operation of vehicles on the highways of Minnesota, as prescribed in the Highway Traffic Regulation Act.

The Contractor shall comply with legal load restrictions, and with any special restrictions imposed by the Contract, in hauling or storing materials, moving or storing equipment on structures, completed

subgrades, base courses, and pavements within the Project that are under construction, or have been completed but have not been accepted and opened for use by traffic.

The Contractor shall have a completed Weight Information Card in each vehicle used for hauling bituminous mixture, aggregate, batch concrete, and grading material (including borrow and excess) prior to starting work. This card shall identify the truck or tractor and trailer by Minnesota or prorated license number and shall contain the tare, maximum allowable legal gross mass, supporting information, and the signature of the owner. The card shall be available to the Engineer upon request. All Contractor-related costs in providing, verifying, and spot checking the cab card information (including weighing trucks on certified commercial scales, both empty and loaded) will be incidental, and no compensation other than for Plan pay items will be made.

Equipment mounted on crawler tracks or steel-tired wheels shall not be operated on or across concrete or bituminous surfaces without specific authorization from the Engineer. Special restrictions may be imposed by the Contract with respect to speed, load distribution, surface protection, and other precautions considered necessary.

Should construction operations necessitate the crossing of an existing pavement, bridges or completed portions of the pavement structure with equipment or loads that would otherwise be prohibited, approved methods of load distribution or bridging shall be provided by the Contractor at no expense to the Department.

Neither by issuance of a special permit, nor by adherence to any other restrictions imposed, shall the Contractor be relieved of liability for damages resulting from the operation and movement of construction equipment.

Unless specifically allowed in the Contract, or approved by the Engineer, all construction material and/or equipment which might be temporarily stored or parked on a bridge deck while the bridge is under construction will be limited by this specification. These requirements are intended to limit construction loads to levels commensurate with the typical design live load. The storage of materials and equipment as a whole will be limited to all of the following:

- Stockpiles of material are limited to a maximum weight of 31,702 kg/100 m<sup>2</sup> (**65,000 lbs./1000 ft<sup>2</sup>**).
- Individual material stockpiles (including but not limited to pallets of products, reinforcing bar bundles, aggregate piles) are limited to a maximum weight of 12,200 kg/10 m<sup>2</sup> (**25,000 lbs./100 ft<sup>2</sup>**).
- Combinations of vehicles, materials, and other equipment are limited to a maximum weight of 90,700 kg (**200,000 lbs.**) per span providing span lengths are over 40 feet long.

The Contractor may submit alternate loadings to the Project Engineer 30 Calendar days prior to placement. Any submittals will require the calculations be certified by a Professional Engineer.

### **(1514) MAINTENANCE DURING CONSTRUCTION**

The provisions of Mn/DOT 1514 are supplemented with the following:

In addition to the Contractor's requirements for sweeping as required under Mn/DOT 2051 (Maintenance and Restoration of Haul Roads), the Engineer may require additional sweeping of roads adjacent to the construction site to provide safe conditions for the traveling public, environmental reasons, local regulatory requirements or as otherwise directed by the Engineer.

Payment for additional sweeping ordered by the Engineer will be made as specified below. (This price represents a shared cost.)

Pick Up Broom W/Operator.....\$55.00 per hour

Self Propelled Pavement Broom W/Operator .....\$30.00 per hour

**(1517) CLAIMS FOR COMPENSATION ADJUSTMENT**

The provisions of Mn/DOT 1517 are hereby supplemented with the following:

**NOTICE OF CLAIM:**

At the time the Contractor gives written notice of the claim, the Contractor and the Department shall immediately begin to keep and maintain complete and specific records to the extent possible. The records shall consist of, but are not limited to, cost and schedule records concerning the details of the perceived claim.

Unless otherwise agreed to in writing, the Contractor shall continue with and carry on the work and progress during the pendency of any claim, dispute, decision or determination by the Engineer, and any arbitration proceedings.

**SUBMISSION OF CLAIMS:**

The Contractor shall submit the claim to the Engineer no later than 60 Calendar Days after receiving written notice from the Engineer that direct damages (money or time due) resulting from the claim has occurred in the opinion of the Engineer. If, in the opinion of the Contractor, the direct damages have not fully occurred, the Contractor shall provide written justification detailing why the direct damages have not fully occurred. This written justification shall be submitted to the Engineer no later than 30 Calendar Days from receiving the notice from the Engineer. If proper justification is not given as required within the 30 Calendar Day requirement or the claim is not submitted to the Engineer within 60 Calendar Days after receiving notice from the Engineer that the direct damages have occurred, the Contractor waives all claims for additional compensation in connection with the work already performed.

The contents of the claim shall be in accordance with Mn/DOT 1517 and shall also include all scheduling documentation related to the claim

The Engineer shall have access to the Contractors records involved in the claim and, when so requested, shall furnish the Engineer copies of claim documentation.

The Contractor shall promptly furnish any clarification and additional information or data requested in writing by the Engineer.

All claims shall be submitted through the Contractor. Submission of claims directly from subcontractors shall constitute a waiver of that portion of the claim.

**DECISION ON CLAIMS:**

The Department intends to resolve claims at the lowest possible administrative level. Upon receipt of the claim, the Engineer will make a written decision in relation to any claim presented by the Contractor within the following time frames:

- (A) For an adjustment in compensation, or other contractual dispute between the parties where the amount in controversy is \$75,000.00 or less, 60 Calendar Days from the receipt of the Contractor's claim;
- (B) For an adjustment in compensation, or other contractual dispute between the parties where the amount in controversy is more than \$75,000.00, 90 Calendar Days from the receipt of the Contractor's claim.

Unless the Contractor and the Engineer otherwise stipulate in writing to a later time, if the Engineer does not make a decision or determination within these time frames, the claim shall be deemed denied.

When the Contract has established a dispute resolution process, that moves the dispute through various levels of both organizations, this process shall also be completed within the above time period.

## MEDIATION

Notwithstanding the formal claims procedures set forth in this Special Provision, the parties may at any time enter into nonbinding mediation by mutual agreement. If the parties agree to mediation, then the time requirements set forth above in Section S-17.3 (A) and (B) are suspended until the mediation is completed. The time and place for mediation, as well as selection of the mediator, shall be established by mutual agreement. The mediator's costs shall be divided equally between the Contractor and the Department. This payment shall be accomplished by the Contractor paying in full all costs and fees for the mediator and then submit the bill to the Engineer for 50 percent reimbursement. Either party may terminate mediation at any time.

## RIGHTS OF ARBITRATION:

The decision of the Engineer in relation to the Contractor's claim shall be deemed final unless the Contractor commences a legal action within the time prescribed by law or unless the Contractor invokes arbitration as prescribed hereafter in these Special Provisions. Nothing herein contained shall be so construed as to preclude the Contractor from commencing a legal action in relation to claims for a single issue in excess of \$75,000.00 but the Contractor's sole legal remedy in relation to claims of \$75,000.00 or less shall be arbitration as prescribed hereafter in these Special Provisions. If the claim amount is in excess of \$75,000, the Contractor and Mn/DOT may mutually agree to arbitration.

If the Contractor seeks to arbitrate a claim of \$75,000 or less, the Contractor shall submit a written request for arbitration to the Department's Claims Engineer in Mn/DOT's Central Office within 30 Calendar Days after the Contractor's receipt of the Engineer's decision. Failure to reasonably conform with this time requirement waives the right to arbitration. The scope of the arbitration proceeding shall be limited to the claim(s) that the Contractor previously presented to the Engineer for decision

## ARBITRATION OF CLAIMS AND DISPUTES:

- (A) For purposes of this section, a claim for adjustment in compensation shall mean an aggregate of operative facts which give rise to the rights which the Contractor seeks to enforce. Stated another way, a claim is the event, transaction, or set of facts that give rise to a claim for compensation. Any Contractor having a claim in excess of \$75,000.00 may waive or abandon the dollar amount in excess of \$75,000.00 so as to bring the claim within the scope of this section. However, the arbitration award shall not exceed \$75,000.00. Various damages claimed by the Contractor for a single claim may not be divided into separate proceedings to create claims within the \$75,000.00 limit.
- (B) More than one separate claim may be presented at each arbitration hearing if agreed to by the Department, the Contractor, and the Arbitrator.
- (C) Selection of the Arbitrator/ Optional Use of the American Arbitration Association:
  - a. Selection of the arbitrator shall be conducted by one representative of the Department and one representative of the Contractor. A single person shall represent the prime and all subcontractors involved in the claim. Separate representation for subcontractors during the selection of the arbitrator is not allowed.
  - b. The parties may mutually agree to have the arbitration process administered by the American Arbitration Association ("AAA").
  - c. The arbitration shall be administered by a single arbitrator.
  - d. The parties shall select an arbitrator by mutual agreement, or, if the parties have agreed to use the AAA to administer the process, shall select an arbitrator from a list of arbitrators provided by the Association in accordance with the Association's procedures.
- (D) Arbitration Proceedings and Decision
  - a. All arbitration of claims shall be conducted in Minneapolis, Minnesota, or another mutually agreed upon location.

- b. Regardless of whether the parties have agreed to use AAA to administer the process, the arbitration proceeding shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect and in accordance with the requirements below. The arbitration procedures set forth in this Special Provision shall take precedence over conflicting American Arbitration Association requirements.
- c. If mutually agreed to by both parties, the arbitration proceeding shall follow the Fast Track rules of the American Arbitration Association.
- d. Unless otherwise agreed to by the parties, the arbitration hearing shall be bifurcated into a liability phase and, if needed, a valuation phase. No evidence or testimony regarding the value of the claim shall be presented during the liability phase.
- e. The Contractor shall first present evidence to support the claim. The Department will then present evidence supporting its defense. Witnesses shall submit to questions or examinations. The arbitrator has the discretion to vary this procedure and shall afford a full and equal opportunity to all parties to be heard. Exhibits, when offered by either party, may be received in evidence by the arbitrator.
- f. The arbitrator shall entertain motions, including motions that dispose of all or part of a claim or that may expedite the proceedings.
- g. There shall be no ex parte communication between any party and an arbitrator.
- h. When satisfied that the presentation of the parties is complete, the arbitrator shall declare the liability phase of the arbitration hearing closed. The arbitrator shall then determine whether Mn/DOT is liable.
- i. If the Department is found to be liable, the arbitration proceeding shall continue before the same arbitrator to resolve all damages issues. The proceedings for this portion of the arbitration shall follow the procedures outlined in Section S-17.6(D)e of this Special Provision.
- j. Within three Calendar Days after the close of the damages portion of the hearing, each party shall submit to the arbitrator their last best offers. The arbitrator shall be limited to awarding only one of the two figures submitted. In no event shall a claim award in arbitration exceed \$75,000.
- k. The decision or award of the arbitrator shall be:
  - i. In writing showing the basis for the decision or award. The arbitrator shall use the Contract and Minnesota law, or, in the absence of Minnesota law on the issue(s), other persuasive authority, as the basis for the decision.
  - ii. Final and binding on both the Department and the Contractor.

The award shall have the same finality as is accorded awards under the Uniform Arbitration Act, Minnesota Statutes Chapter 572.

(E) Arbitration Costs

- a. Each party to the arbitration shall bear its own costs and fees assessed by the American Arbitration Association or independent arbitrator which shall be divided equally between the parties to the arbitration. This payment will be accomplished by the Contractor paying in full all costs and fees for the arbitrator and then submit the bill to the Engineer for 50 percent reimbursement.
- b. Each party shall bear its own preparation costs.

**(1601) SOURCE OF SUPPLY AND QUALITY**

The provision of Mn/DOT 1601 are supplemented as follows:

The Contractor will furnish and use only steel and iron materials that have been melted and manufactured in the United States in executing the work under this Contract, in conformance with the provisions of the U.S. Code of Federal Regulations 23CFR635.410. Domestic products taken out of the United States for any process (e.g. change of chemical content, permanent shape or size, or final finish of product) shall be considered foreign source materials.

All bids must be based on furnishing domestic iron and steel, which includes the application of the coating, except where the cost of iron and steel materials incorporated in the work does not exceed one-tenth of one percent of the total Contract cost or \$2,500.00, whichever is greater. The state may approve the use of foreign iron and steel materials for particular Contract items, provided the bidder submits, a stipulation identifying the foreign source iron and/or steel product(s) and the estimated invoice cost of the product(s), for one or more of the Contract bid items. Each stipulation shall be made on the "Stipulation for Foreign Iron or Steel Materials" form which shall be submitted with the Contractor's proposal. **If the Contractor chooses to use ANY non-domestic iron or steel, the Contractor must submit a stipulation.** The Contractor may use one of the following means to submit their stipulation:

1. Submit the stipulation form within the proposal.
2. If the Contractor submits a "Two Way Electronic Bid" as described in Mn/DOT 1206, the completed chart must be submitted to Mn/DOT prior to the bid opening and no later than 9:30 A.M. on the day of the bid opening.
  - a) The stipulation may be faxed to Nancy Boeve at 651-366-4248.
  - b) The stipulation may be mailed or otherwise delivered to Nancy Boeve, 395 John Ireland Boulevard, M.S. 650, ST. Paul, MN 55155.

The "Stipulation for Foreign Iron or Steel Materials" form is attached or can be found on the Mn/DOT Web site: <http://www.dot.state.mn.us/bidlet/forms.html>.

Prior to completing work the Contractor shall submit to the Engineer a certification stating that all iron and steel items supplied are of domestic origin, except for non-domestic iron and steel specifically stipulated and permitted in accordance with the paragraph above.

Source of Supply and Quality: Mn/DOT 1604 is supplemented as follows: All costs of shop inspection at plants outside the United States shall be borne by the Contractor. Such costs shall be deducted from monies due or to become due the Contractor.

Partial Payment: All provisions for partial payments shall apply to domestic materials only. No payments shall be made to the Contractor for materials manufactured outside of the United States until such materials have been delivered to the job site.

Alternate Bidding Process. Unless an alternate bidding process is specified, use of foreign steel and iron products in quantities in greater than provided above is not permitted. When the alternate bidding process is permitted the Contract may be awarded to the bidder who submits the lowest total bid based on furnishing domestic iron or steel unless such total bid exceeds the lowest total bid based on foreign materials by more than 25 percent.

## **(1602) NATURAL MATERIAL SOURCES**

The provisions of Mn/DOT 1602 are supplemented with the following:

The expansion of any existing natural material sources, or the creation of new Natural Material Sources, will be subject to the requirements of the Farmland Protection Act of 1981 (FPPA or the ACT). Coordination to comply with FPPA shall be the responsibility of the Contractor. Contact the Natural Resources Conservation Service (NRCS) office for the county in which the source is located for further information.

## **(1606) STORAGE OF MATERIALS**

The provisions of Mn/DOT 1606 are hereby supplemented with the following:

The Contractor is hereby advised that the only materials that will be allowed to be stockpiled within Project Limits are materials which will be incorporated into the Project and then only in the quantity needed. Materials cannot be



stockpiled which are for use on other projects. This specification applies to manufactured and natural materials (including material stockpiled for crushing).

If the Contractor elects to crush excavated materials within the Project Limits, the quantity of crushed material will be limited to only the quantity required for this Project. The Contractor will not be allowed to crush materials other than those found within the Project Limits, unless approved in writing by the Engineer. The Contractor will not be allowed to remove crushed material from the Project Limits, unless approved in writing by the Engineer.

Contractor's personnel or any other personnel may not use the roadway for the purpose of stockpiling aggregate or any other material as determined by the Engineer for any length of time during the duration of this Contract.

### **(1701) LAWS TO BE OBSERVED (CULTURAL RESOURCES)**

The provisions of Mn/DOT 1701 are modified and/or supplemented with the following:

It will be Mn/DOT's responsibility to obtain a Cultural Resources Unit (CRU) determination of effect letter for Mn/DOT owned or leased Natural Material Sources if listed in the Construction Plan. It will also be Mn/DOT's responsibility to obtain a CRU Unit determination of effect letter for all Right of Way needed for this Project.

If the Contractor operations require the excavation and dispose of material off Mn/DOT Right of Way, the Contractor is advised of the following:

**The area will be subject to the review and determination of the Mn/DOT CRU. The Mn/DOT CRU will obtain SHPO comment only when required as per the terms of the 2005 Section 106 Programmatic Agreement between the FHWA and SHPO, or if no federal funds are involved, when required by the Minnesota Historic Sites Act and the Field Archaeology Act of Minnesota.** It shall be the Contractor's responsibility to request a review from the CRU, at Contractor's expense, before any material from the requested sources can be used on State Projects or any disposal can be made. Any time delays are the responsibility of the Contractor and are not a basis for claim for damages due to delay of Contract.

- A) It is the Contractor's responsibility to request a review from Mn/DOT's Cultural Resources Unit at:

**G. Joseph Hudak  
Chief Archaeologist  
Cultural Resources Unit  
Office of Environmental Services  
Minnesota Department of Transportation  
395 John Ireland Blvd.  
Mail Stop 620  
St. Paul Minnesota 55155-1899  
Telephone: 651-366-3612  
Fax: 651-366-3603**

and the request must have a description of the Project or disposal area as follows;

1. S.P. number and road number  
Legal location, including a precise location on a plat map (Township, range, section, county)
2. Location of area on a 7.5 minute 1:24,000 USGS topographic quadrangle map, with map name identified and pit, disposal, excavation area or embankment drawn to scale on the map.
3. Size of the area (in acres)
4. Current or past land use (e.g. agricultural)
5. Is excavation or disposal in a new area or an existing one?
6. If existing pit, is there a state pit number?

7. If existing pit, is the excavation or disposal to stay within existing pit margins?
8. What is the approximate thickness of the fill to be disposed of?
9. Is the excavation or fill going to be matched into the land? (e.g. edges contoured and returned to agricultural production)
10. Are there any buildings within one-fourth mile of the excavation and/or disposal site area? If so, plot them on a map and describe what they are (e.g. houses, barns) and their approximate age? Photographs of the buildings may be needed.
11. Mn/DOT Project Engineer name and telephone number.

B) The Contractor shall give the Project Engineer a copy of the Mn/DOT CRU determination of effect letter. If this letter states that there are **no historic properties affected**, no further action is required by the Contractor. The Contractor is hereby advised that all fill or extraction activities in conjunction with a federally funded FHWA project **OR** within tribal boundaries will required up to 30 days to complete tribal consultation.

**HOWEVER**

- C) When the Mn/DOT CRU requires a Cultural Resource Field Survey, the Contractor shall secure professional services to conduct a survey and prepare a report for the Mn/DOT CRU.
1. A list of acceptable Archaeologists will be furnished to the Contractor by the Mn/DOT CRU.
  2. When a Cultural Resource Field Survey is required, Contract time will be adjusted in accordance with Mn/DOT 1806 for any suspension of work required to comply with these requirements. No monetary claims due to delays or loss of time for off-site construction activity will be allowed.
  3. The cost of the cultural resources survey and report are the Contractors responsibility.

The Contractor will **NOT** be given permission to use the proposed material resources site, disposal site, or embankment/excavation site until such time as the Mn/DOT CRU grants its permission.

**(1706) EMPLOYEE HEALTH AND WELFARE**

The provisions of Mn/DOT 1706 are supplemented with the following:

All construction operations shall be conducted in compliance with applicable laws, regulations and industry standards as described in Mn/DOT 1706. The Contractor shall be considered to be **fully responsible** for the development, implementation and enforcement of all safety requirements on the Project, notwithstanding any actions Mn/DOT may take to help ensure compliance with those requirements.

The Contractor shall submit a written safety program to the Engineer at the pre-construction conference addressing safety issues for all Project activities. This program shall contain name(s) of person(s) responsible for all safety requirements and this Contractor's Designee(s) shall be available at all times that work is being performed. The Contractor's designee(s) shall be responsible for correcting violations on the Project as observed by the Engineer or his/her representative.

The Contractor shall not use any motor vehicle equipment on this Project having an obstructed view to the rear unless:

- (A) The vehicle has a reverse signal alarm which is audible above the surrounding noise level; or

- (B) The vehicle is backed up only when an observer signals that it is safe to do so.

**A \$500.00 monetary deduction (per incident) will be assessed by Mn/DOT for violations of safety standards and requirements that have the potential for loss of life and/or limb of Project personnel or the public.** The areas of special concern include, but are not limited to excavation stability protection, fall protection, protection from overhead hazards, vehicle backup protection (see S-22.3 above), confined space safety, blasting operations, and personal safety devices.

None of the monetary deductions listed above shall be considered by the Contractor as allowance of noncompliance incidents of these safety requirements on this Project.

### **(1710) TRAFFIC CONTROL DEVICES**

All traffic control devices and methods shall conform to the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), Minnesota Standard Signs Manual, the Traffic Engineering Manual, and the following:

On any roadway having a 45 mph or higher speed limit prior to construction, all Category I and II temporary traffic control devices used after July 1, 2006 shall meet NCHRP 350 crash testing criteria. This includes all new and used Category I and Category II devices. Category I devices include tube markers, plastic drums and cones, etc. Category II devices include portable sign supports, Type I, II and III barricades, etc.

The Contractor shall provide the Project Engineer a Letter of Compliance stating that all of the Contractors Category I and II Devices are NCHRP 350 approved as of July 1, 2006. The Letter of Compliance must also include approved drawings of the different signs and devices and shall be provided to the Project Engineer at the Pre-construction meeting.

### **(1717) AIR, LAND AND WATER POLLUTION**

The provisions of Mn/DOT 1717 are supplemented and/or modified with the following:

#### **DISCOVERY OF CONTAMINATED MATERIALS AND REGULATED WASTES**

If during the course of the Project, the Contractor unexpectedly encounters any of the following conditions indicating the possible presence of contaminated soil, contaminated water, or regulated waste, the Contractor shall immediately stop work in the vicinity, notify the Engineer, and request suspension of work in the vicinity of the discovery area, in accordance with Mn/DOT 1803.4.

A documented inspection and evaluation will be conducted prior to the resumption of work. The Contractor shall not resume work in the suspected area without authorization by the Engineer.

(A) Indicators of contaminated soil, ground water or surface water include, but are not limited to the following:

- (1) Odor including gasoline, diesel, creosote (odor of railroad ties), mothballs, or other chemical odor.
- (2) Soil stained green or black (but not because of organic content), or with a dark, oily appearance, or any unusual soil color or texture.
- (3) A rainbow color (sheen) on surface water or soil.

(B) Indicators of regulated wastes include, but are not limited to the following:

- (1) Cans, bottles, glass, scrap metal, wood (indicators of solid waste and a possible dump)
- (2) Concrete and asphalt rubble (indicators of demolition waste).
- (3) Roofing materials, shingles, siding, vermiculite, floor tiles, transite or any fibrous material (indicators of demolition waste that could contain asbestos, lead or other chemicals).

- (4) Culverts or other pipes with tar-like coating, insulation or transite (indicators of asbestos).
- (5) Ash (ash from burning of regulated materials may contain lead, asbestos or other chemicals).
- (6) Sandblast residue (could contain lead).
- (7) Treated wood including, but not limited to products referred to as green treat, brown treat and creosote (treated wood disposal is regulated).
- (8) Chemical containers such as storage tanks, drums, filters and other containers (possible sources of chemical contaminants).
- (9) Old basements with intact floor tiles or insulation (could contain asbestos), sumps (could contain chemical waste), waste traps (could contain oily wastes) and cesspools (could contain chemical or oily wastes).

Mn/DOT 1717.2 A2 is hereby deleted and replaced with the following:

## **A2 During Construction**

The Contractor shall implement the Project's Storm Water Pollution Prevention Plan. The Contractor shall schedule and install temporary and permanent sediment and erosion control measures, construct ponds and drainage facilities, finish earth work operations, place topsoil, establish turf, and conduct other Contract work in a timely manner to minimize erosion and sedimentation.

All exposed soil areas with continuous positive slopes that are within 60 m (**200 feet**) of an existing surface waters shall have temporary or permanent erosion protection within 24 hours after the construction activity in that portion of the site has temporarily or permanently ceased and connection is established to the existing surface water. All other positive slopes to constructed surface waters, such as permanent storm water treatment ponds, curb and gutter systems, storm sewer inlets, temporary or permanent drainage ditches, or other storm water conveyance systems, shall have temporary erosion protection or permanent cover for the exposed soil areas as soon as practicable but no later than 14 days after construction activity has temporarily or permanently ceased in that area. For those drainage areas that have a discharge point within 1 mile and flows to an impaired or Special Waters shall have temporary erosion protection or permanent cover for the exposed soil areas as soon as practicable but no later than 7 days after construction activity has temporarily or permanently ceased in that area. Impaired and Special Waters are defined as those listed and referenced in the NPDES Permit.

Positive slopes adjacent to public waters and wetlands will be stabilized at the close of each day when weather forecasts for rain that evening, and/or overnight including weekends. Once work is completed it will be stabilized permanently as soon as practical but no later than seven days.

Exposed soil areas do not include; stockpiles or surcharge areas of sand, gravel, aggregate, concrete, bituminous, or road bed and surfacing material. A perimeter sediment barrier may be necessary to minimize loss when these are within the 60 m (**200 feet**) of existing surface waters or the property edge.

The bottom of temporary or permanent drainage ditches or swales constructed to drain water from a construction site must be stabilized with erosion control measures for the last 60 m (**200 feet**), or more when conditions warrant, from the property edge or from the point of discharge to any existing surface water. Stabilization shall be completed within 24 hours after the construction activity in that portion of the ditch has temporarily or permanently ceased. Ditch stabilization will continue concurrently with construction activities but no later than 14 days after construction activities have permanently or temporarily ceased. Any, culvert pipe or storm sewer pipe that is within the cumulative distance is not part of this distance. Ditch checks may be provided where necessary to slow water flow and capture sediment.

Temporary or permanent ditches used as treatment systems will not need to be stabilized but must provide the proper Best Management Practices for the treatment system.

Pipe outlets shall be provided with temporary or permanent energy dissipation within 24 hours of connecting the pipe to any constructed or existing surface waters.

The Contractor shall limit the surface area of erodible soil that can be exposed to possible erosion at any one time when the permanent erosion control features are not completed and operative.

All liquid and solid wastes generated by concrete washout operations must be contained and not have the opportunity to come in contact with the surface waters or ground water. This includes the ditches, slopes to ditches, curb and gutter/storm sewer systems, and ponds. Areas where there are sandy soils, karsts, and high ground water the washout facility must have an impermeable liner. Liquid and solid wastes must be disposed of properly. A concrete washout sign must be installed adjacent to each washout facility to notify personnel.

Mn/DOT 1717.2E is hereby deleted and replaced with the following:

**E Site Plans**

The Engineer may require the Contractor to submit a site plan, in writing, detailing proposed erosion control and sediment control measures and a schedule indicating starting and completion times for construction operations working in water bodies and/or in direct proximity to waters of the state.

Contractor shall not start work in the affected areas until the schedule and site plan have been accepted by the Engineer and all materials and equipment for the activity are on site.

**(1717) NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**

**PERMIT**

Pollution of natural resources of air, land and water by operations under this Contract shall be prevented, controlled, and abated in accordance with the rules, regulations, and standards adopted and established by the Minnesota Pollution Control Agency (M.P.C.A.), and in accordance with the provisions of Mn/DOT 1717, these Special Provisions, and the following:

By signing the Proposal and completing the NPDES permit application, the Contractor is a co-permittee with the Department to ensure compliance with the terms and conditions of the General Storm Water Permit (MN R100001) and is responsible for those portions of the permit where the operator is referenced. This Permit establishes conditions for discharging storm water to waters of the State from construction activities that disturb 0.4 hectares [1 acre] or more of total land area. A copy of the "General Permit Authorization to Discharge Storm Water Associated with a Construction Activity Under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System Permit Program" is available at <http://www.pca.state.mn.us/water/stormwater/stormwater-c.html> or by calling 651-296-3890.

The Contractor shall apply and pay for the NPDES Permit on this Project. Payment for the application shall be incidental to the Contract and no direct compensation will be made. The Department will provide the Contractor with the application form with Sections 1 thru 3 and 5 thru 14 completed, as part of the Contract document package. The Contractor shall fill out the Contractor's portion (Section 4 and Section 15), complete the application process, and post the Permit and MPCA's letter of coverage onsite.

**A NPDES Permit Declaration form will be sent to the Contractor with the Contract award packet. A copy of the signed permit application and a signed Permit Declaration form must be returned with the Contract and Bond. Submittal of the copy of the signed permit application and Permit Declaration is mandatory for Contract approval. No work which disturbs soil and/or work in waters of the state will be allowed on this Project until the NPDES Permit is in effect and the Department has received the required documentation.**

The Contractor shall be solely responsible for complying with the requirements listed in Part II.B and Part IV of the General Permit.

The Contractor shall be responsible for providing all inspections, documentation, record keeping, maintenance, remedial actions, and repairs required by the permit. All inspections, maintenance, and records required in the General Permit Paragraphs IV.E, shall be the sole responsibility of the Contractor. The word "Permittee" in these referenced paragraphs shall mean "Contractor". Standard forms for logging all required inspection and maintenance activities shall be used by the Contractor. All inspection and maintenance forms used on this Project shall be turned over to the Engineer every two weeks for retention in accordance with the permit.

The Contractor shall have all logs, documentation, inspection reports on site for the Engineer's review and shall post the permit and MPCA's letter of coverage on site. The Contractor shall immediately rectify any shortcomings noted by the Engineer. All meetings with the MPCA, Watershed District, WMO, or any local authority shall be attended by both the Engineer and the Contractor or their representatives. No work required by said entities, and for which the Contractor would request additional compensation from Mn/DOT, shall be started without approval from the Engineer. No work required by said entities and for which the changes will impact the design or requirements of the Contract documents or impact traffic shall be started without approval from the Engineer.

The Contractor shall immediately notify the Engineer of any site visits by Local Permitting Authorities performed in accordance with Part V.H.

Emergency Best Management Practices must be enacted to help minimize turbidity of surface waters and relieve runoff from extreme weather events. It is required to notify the MPCA Regional Contact Person within 2 days of an uncontrolled storm water release. The names and phone numbers of the MPCA Regional Contract personnel can be found at: <http://www.pca.state.mn.us/water/stormwater/stormwater-c.html>. The Contractor is reminded that during emergency situations involving uncontrolled storm water releases that the State Duty Officer must be contacted immediately at 1-800-422-0798 or 1-651-649-5451.

The Contractor shall review and abide by the instructions contained in the permit package. The Contractor shall hold Mn/DOT harmless for any fines or sanctions caused by the Contractor's actions or inactions regarding compliance with the permit or erosion control provisions of the Contract Documents.

The Contractor is advised that Section 1 of the NPDES application form makes reference to a Storm Water Pollution Prevention Plan (SWPPP). This Project's SWPPP is addressed throughout Mn/DOT's Standard Specifications for Construction, as well as this Project's Plan and these Special Provisions. The following table identifies NPDES permit requirements and cross-references where this Contract addresses each requirement.

<b>NPDES Permit Requirements</b>	<b>Cross-Reference within this Contract</b>
Obtain NPDES Permit; Permit Compliance; Submit Notice of Termination	Mn/DOT 1701, 1702; and 1717 Special Provisions: 1717 (Air, Land & Water Pollution), 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Certified Personnel in Erosion / Sediment Control Site Management Develop a Chain of Command	Mn/DOT 1506, 1717, and 2573; Special Provisions: 1717 (Air, Land & Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Project / Weekly Schedule (for Erosion / Sediment Control) Completing Inspection / Maintenance Log / Records	Mn/DOT 1717 and 2573; Special Provisions: 1717 (Air, Land & Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit); and
Project Specific Construction Staging	The Plans; Mn/DOT 1717; Special Provisions: 1717 (Air, Land & Water Pollution), 1717 (National Pollutant Discharge Elimination System (NPDES) Permit); and 1806 (Determination and Extension of Contract Time)
Temporary Erosion / Sediment Control	The Plans; Mn/DOT 2573 and 2575
Maintenance of Devices / Sediment removal Removal or Tracked Sediment Removal of Devices	The Plans; Mn/DOT 1717 and 2573; Special Provisions: 1514 (Maintenance During Construction), 1717 (Air, Land & Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Dewatering	Mn/DOT 2105.3B and 2451.3C; May also require DNR Permit
Temporary work not shown in the Plans Grading areas (unfinished acres exposed to erosion)	Mn/DOT 1717, 2573, and 2575; Special Provisions: 1717 (Air, Land & Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Permanent Erosion / Sediment Control and Turf Establishment	The Plans; Mn/DOT 1717, 2573, and 2575; Special Provisions: 1717 (Air, Land & Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)

**IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

By signing this bid form, the bidder will be deemed to have stipulated as follows:

(1) That any facility to be utilized in the performance of this Contract, unless such Contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub. L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 C.F.R. Part 15), is not listed on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 C.F.R. 15.20.

(2) That the state transportation department shall be promptly notified prior to Contract award of the receipt by the bidder of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility to be utilized for the Contract is under consideration to be listed on the EPA List of Violating Facilities.

**(1802) TRAINING FOR CONSTRUCTION TRUCK OPERATORS**

Operators of construction trucks hauling construction materials such as borrow, aggregate base, asphalt mixtures and concrete paving mixtures are encouraged to become certified as a Level I Construction Truck Operators (CTO).

This one-day session taught in various Mn/DOT Districts features classroom and hands-on educational experiences. The objective of the CTO Training is to make the driver aware of the Federal and State requirements and regulations regarding the construction truck and driver, and the safe driving techniques that will result in the safe operation of the construction truck. Presenters include Minnesota State Patrol, Minnesota Department of Transportation and the Minnesota Safety Center.

This training is co-sponsored by the Minnesota State Patrol, the Minnesota Highway Safety Center, the Minnesota Trucking Association, the Minnesota Asphalt Pavement Association and the Minnesota Department of Transportation.

Additional information about this certification program can be obtained by contacting any of the following:

	<b>PHONE #</b>	<b>FAX #</b>
Minnesota Asphalt Pavement Association: E-mail: <a href="mailto:info@mnapa.org">info@mnapa.org</a>	651-636-4666	651-636-4790
Minnesota Department of Transportation: E-mail: <a href="mailto:motorcarrier@dot.state.mn.us">motorcarrier@dot.state.mn.us</a> Website: <a href="http://www.dot.state.mn.us/motorcarrier">http://www.dot.state.mn.us/motorcarrier</a>	Toll Free: 1-888-472-3389 651-405-6060	651-405-6082
Minnesota Highway Safety Center: E-mail: <a href="mailto:tjsakry@stcloudstate.edu">tjsakry@stcloudstate.edu</a> Website: <a href="http://mnsafetycenter.org">http://mnsafetycenter.org</a>	Toll Free: 1-888-234-1294 320-255-4732	320-255-3942
Minnesota State Patrol: Website: <a href="http://www.dps.state.mn.us/patrol/comveh/index.htm">http://www.dps.state.mn.us/patrol/comveh/index.htm</a>	Toll Free: 1-888-472-3389 651-405-6171	651-405-6082
Minnesota Trucking Association: E-mail: <a href="mailto:john@mnrtruck.org">john@mnrtruck.org</a> Website: <a href="http://www.mnrtruck.org">www.mnrtruck.org</a>	651-646-7351	651-641-8995



### **(1803) PROSECUTION OF WORK**

The provisions of Mn/DOT 1803 are supplemented and/or modified with the following:

Since this is a "Research Project", Mn/DOT personnel will observe, photograph, monitor, video, etc., selected construction activities performed under this Contract.

The Contractor shall coordinate his/her work and cooperate with research personnel and any other Agencies as may be involved in the Project in a manner consistent with the provisions of Mn/DOT 1505.

The MnROAD parking lot shall **not** be utilized for parking the Contractors equipment during the extent of the Contract. There are other areas within the facility that can be utilized for this purpose.

There will be specific time frames, following specific operations, when the Contractor will be required to stop work within individual cells. These time periods are required to allow MnROAD Operations time to install, replace and calibrate conduits, cables and sensors.

Upon completion of the aggregate base course for all three test cells, MnROAD operations require five (5) working week days total to install instrumentation.

Upon completion of the lower concrete layers in all three cells, MnROAD operations will install additional instrumentation. This will have minimal impact on the Contractor during the paving of the HMA and PCC surface mixes.

Upon completion of the lower concrete paving on cell 70, the Contractor shall wait one week or until the concrete flexural strength is greater than 550 psi, before paving the HMA overlay materials.

Costs for Contractor support shall be considered incidental. No compensation in addition to the Contract prices will be made to the Contractor for any costs incurred by him, or because of any delays to his forces or equipment as a result of these requirements.

### **(1806) DETERMINATION AND EXTENSION OF CONTRACT TIME**

The Contract Time will be determined in accordance with the provisions of Mn/DOT 1806 and the following:

The starting date required under this Contract shall be either before September 11, 2009 or between April 1, 2010 and May 30, 2010. Construction operations shall not commence prior to Contract Approval and a two-week written notice shall be given to the MnROAD Engineer before work can be started.

Construction operations shall be completed within Forty (40) working days (8 weeks @ 5 Monday-Friday days/week) once work has started. The Forty (40) working days includes the five (5) working days needed for Mn/DOT research instrumentation installation.

When, in the opinion of the Engineer, work on the Project cannot be performed due to failure of material delivery beyond the control of the Contractor, the Engineer will agree to a Suspension of Work in conformance with Mn/DOT 1803.4 and/or will cease the charging of working days, whichever the Engineer deems applicable.

A Resumption of Work Order will be issued by the Engineer after the Contractor has received delivery of the required material, and/or the Engineer will resume the charging of working days.

### **(1807) FAILURE TO COMPLETE THE WORK ON TIME**

The provisions of Mn/DOT 1807 are supplemented as follows:

In addition to the charges shown in the Schedule of Liquidated Damages, the Department will assess a monetary deduction in an amount equal to \$1,000 per Calendar Day for failure to complete all the work, with the exception of maintenance and Final Cleanup, under the Contract in the time specified therefore, until that work is, in all things, completed to the satisfaction of the Engineer.

The Department may reduce the daily liquidated damages to \$500 when the only remaining items are maintenance or Final Cleanup.

For informational purposes only, bidders are advised that in addition to the requirements of Mn/DOT 1807, other Sections of these Special Provisions, as shown below, contain requirements for assessment of monetary deductions to this Contract:

1404	MAINTENANCE OF TRAFFIC
1506	SUPERVISION BY CONTRACTOR
1706	EMPLOYEE HEALTH AND WELFARE

The liquidated damages set forth in Mn/DOT 1807 and any monetary deductions as set forth above may apply equally, separately, and may be assessed concurrently.

### **(1901) MEASUREMENT OF QUANTITIES**

The provisions of Mn/DOT 1901 are supplemented by the following:

#### Uniform Load

In the event that the Contractor requests the use of Uniform Loads, the method of arriving at uniform loading must be approved by the Engineer. Automated weighing devices will be required when belt scales are used in Uniform Load determinations. Periodic Spot checks will be required. Trucks will be stopped and required to be run over a commercial scale.

Loose Volume measured by truck Volume will not be allowed.

### **(1904) EXTRA AND FORCE ACCOUNT WORK**

The provisions of Mn/DOT 1904 are supplemented and/or modified with the following:

The Contractor is required to submit force account work itemized statements of costs in accordance with Mn/DOT 1904 to the Engineer on Mn/DOT form TP-21659 (Summary of Daily Force Account). Copies of this form can be obtained from the Engineer.

The following sentence shall be added to the second paragraph of Mn/DOT 1904:

"Under no circumstance will the negotiated unit price for Extra Work which is performed by a subcontractor include a Prime Contractor allowance which exceeds that provided for in 1904(4), Paragraph 3."

### **(1910) FUEL ESCALATION CLAUSE**

The provisions of Mn/DOT 1910 are hereby deleted and replaced with the attached Fuel Escalation Clause.

### **(2011) MACHINE CONTROL**

Due to this Project being located at the MnROAD Research Facility, and the Design Methods utilized by Mn/DOT on this Project, no files will be made available to the Contractor for machine control.

## **(2051) MAINTENANCE AND RESTORATION OF HAUL ROADS**

The provisions of Mn/DOT 2051 are supplemented by the following:

In addition to the amount the Contractor bids for Item 2051.501 (Maintenance and Restoration of Haul Roads), the State agrees to reimburse the Contractor at the predetermined unit prices set forth below for materials ordered by the Engineer. All materials ordered by the Engineer for the Maintenance and Restoration of haul roads will be measured as set forth in the applicable section of the Standard Specifications.

Each of the following materials measured as provided above, will be paid for at the following predetermined unit prices:

2118.501	Aggregate Surfacing, Class 1	\$6.62/t	<b>\$6.00/ton</b>
2130.501	Water	\$2.50/m <sup>3</sup>	<b>\$10.00/1000(M)gal.</b>
2131.502	Calcium Chloride Solution	\$0.14/liter	<b>\$0.50/gal.</b>
2211.501	Aggregate Base, Class 5	\$6.62/t	<b>\$6.00/ton</b>
2360.501	Type SP 12.5 Wearing Course Mixture (4, B)	\$27.50/t	<b>\$24.95/ton</b>

Crushing will not be required in the production of Class 1 material.

The above prices will be considered to be compensation in full for furnishing and providing the materials complete in place, including, but not limited to, royalty, waste, equipment rental, labor, overhead, profit, and incidentals. When materials other than those listed above are ordered by the Engineer, they will be paid for as extra work in accordance with Mn/DOT 1403, with **the Contractor and the Department sharing equally in the costs**. Separate payment will not be made for costs of blading and reshaping necessary for the maintenance and restoration of haul roads. The cost of such work shall be incidental, and at the Contractor's expense.

The above shall be performed to restore visible damage.

## **(2104) REMOVING PAVEMENT AND MISCELLANEOUS STRUCTURES**

Abandoned structures and other obstructions shall be removed from the Right of Way and disposed of in accordance with the provisions of Mn/DOT 2104, except as modified below:

Measurement and payment for the removal and disposal of materials will be made only for those Items of removal work specifically included for payment as such in the Proposal and as listed in the Plans. The removal of any unforeseen obstruction requiring in the opinion of the Engineer equipment or handling substantially different from that employed in excavation operations, will be paid for as Extra Work as provided in Mn/DOT 1403.

All removals shall be disposed of by the Contractor outside the Right of Way in accordance with Mn/DOT 2104.3C3 to the satisfaction of the Engineer.

If the Contractor is required to dispose of treated wood the following shall apply:

### **TREATED WOOD DISPOSAL**

This work consists of disposing of treated wood in accordance with the following:

(A) ***Description of Services***

For each site the Contractor shall:

- Describe the method of material pickup and the expected material condition, i.e.: specific lengths, etc.

- Describe the method of waste material transport and waste material disposal site.
- Dispose treated wood in a MPCA permitted lined solid waste landfill (not a demolition landfill).
- The Contractor has the option to chip creosote treated wood on site. After the wood is chipped on site, it can be transported off site and incinerated at a MPCA permitted incinerator. Call 651.366.3630 for list of incinerators permitted to burn creosoted treated wood. This applies to creosote treated wood only.
- Within 30 days after the treated wood is transported off site, the Contractor shall provide the Project Engineer with disposal records. Records include manifests, scale tickets, and invoices. Records shall indicate type of treated wood, quantity, date, and location of disposal.

### **(2105) EXCAVATION AND EMBANKMENT**

Roadway excavation and embankment construction shall be performed in accordance with the provisions of Mn/DOT 2105, except as modified below:

All topsoil excavation required to reconstruct the roadways shall be salvaged, stockpiled and subsequently replaced on the newly graded inslopes on the Project. Payment for such work shall be made under Item 2105.535 (salvaged topsoil) at the Contract price per cubic yard, which shall be compensation in full for all work associated with stripping, stockpiling and replacing the topsoil on the disturbed areas.

Mn/DOT 2105.2A2 Rock Excavation is revised to read as follows:

Rock excavation shall consist of all materials that cannot, in the Engineer's opinion, be excavated without drilling and blasting or without the use of rippers, together with all boulders and other detached rock each having a volume of 1 cubic meter (**1 cubic yard**) or more, but exclusive of those quantities that are to be paid for separately under the item of rock channel excavation.

The last paragraph in Mn/DOT 2105.3B Preparation of Embankment Foundation, is revised to read as follows:

Before backfilling depressions within the roadway caused by the removal of foundations, basements, and other structures, the Contractor shall enlarge the depressions as directed by the Engineer.

The first and second sentences in the second paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, are revised to read as follows:

When the soils are so varied that selection and placement of uniform soils is not practical, the Contractor shall use disks, plows, graders or other equipment to blend and mix suitable soils to produce a uniform soil texture, moisture content and density; except that, all soils that contain 20 percent or more particles passing the 75  $\mu\text{m}$  (#200) sieve shall be blended, mixed and dried with a disk, within the entire upper 2 meters (**6 feet**) of embankment. The disk shall meet the requirements of 2123 N, Disk Harrow. A disk is also to be used below the upper 2 meters (**6 feet**) of the embankment fill area, if in the opinion of the Engineer, the Contractor is not producing a uniform soil texture.

The fifth paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

Peat, muskeg, and other unstable materials that are not to be used in the roadbed embankments shall be deposited in the areas indicated in the Plans or elsewhere as approved by the Engineer. All other material that is considered unsuitable for use in the upper portion of the roadbed shall be placed outside of a 1:1 slope down and outward from the shoulder lines on fills under 10 m (**30**

**feet**) in height or outside of a 1 vertical to 1.5 horizontal slope down and outward from shoulder lines on fills over 10 m (**30 feet**) in height, or used to flatten the embankment slopes, or disposed of elsewhere as approved by the Engineer.

The second sentence in the eighth paragraph of Mn/DOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

No stones exceeding 150 mm (**6 inches**) in greatest dimension will be permitted in the upper 1 m (**3 feet**) of the roadbed embankment.

The fourth to last paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, which begins with "All combustible debris materials (stumps, roots, logs, brush, etc.) together with all..." is hereby deleted and replaced with the following:

All noncombustible materials other than soils (oversized rock, broken concrete, metals, plastic pipe, etc.) shall be disposed of in accordance with 2104.3C.

The ninth paragraph of Mn/DOT 2105.5 is hereby deleted and replaced with the following:

If the Proposal fails to include a bid item for rock excavation or rock channel excavation, and material is uncovered that is so classified, excavation of the rock will be paid for separately at the Contract price for common excavation or common channel excavation, plus an additional \$26.00 per cubic meter (**\$20.00 per cubic yard**). If no bid item is provided for common channel excavation, excavation of materials classified as rock channel excavation will be paid for at the Contract price for common excavation plus an additional \$28.00 per cubic meter (**\$21.50 per cubic yard**). Such stipulated prices for rock excavation will apply up to a maximum of 200 m<sup>3</sup> (**260 cubic yards**) of excavation per item or to such quantity as may be performed by mutual consent prior to execution of an Extra Work agreement.

The twelfth paragraph of Mn/DOT 2105.5 is hereby deleted and replaced with the following:

- (a) That portion of the additional excavation that is removed from below a plane parallel to and 5 m (**15 feet**) below the natural ground surface will be measured in 2 m (**5 foot**) depth zone increments and paid for separately at adjusted unit prices. The adjusted unit price will be equal to the Contract bid price for muck excavation plus \$0.39 per cubic meter (**\$0.30 per cubic yard**) for the additional excavation within the 5-7 m (**15-20 foot**) depth zone and an additional \$0.26 per cubic meter (**\$0.20 per cubic yard**) for each additional 2 m (**5 foot**) increment of depth beyond 7 m (**20 feet**).

Compaction of any embankment material, including culvert backfills, shall be obtained by the "Quality Compaction" method described in Mn/DOT 2105.3F.

No compensation will be made for the construction of the impervious soil seals.

Excess soils and rock not used on the Project shall become the property of the Contractor and shall be disposed of outside of the Right of Way. No direct compensation will be paid for the preparation of an acceptable Disposal Plan or for Off-Project disposal of excess materials. Disposal sites shall be left in a well graded condition with all solid wastes and boulders adequately covered.

No disposal shall occur in those areas defined below as "environmentally sensitive" unless the Contractor can document that: 1) non-sensitive areas are not available; or that 2) the material can be used to benefit an "environmentally sensitive" area. All necessary permits for the disposal operations shall be obtained by the Contractor and approval from the appropriate State and Federal Agencies shall be included in the Contractor's Disposal Plan.

- (A) No disposal shall occur in the following "environmentally sensitive" area:

- (1) Wetlands, as described in "Wetlands of the United States", Circular 39, published by the U.S. Department of Interior, Fish and Wildlife Service;
- (2) 100-year frequency flood plains;
- (3) Archaeological or historic sites – See Section S-21 (LAWS TO BE OBSERVED (CULTURAL RESOURCES)) of these Special Provisions for specific requirements;
- (4) Areas with stability or settlement problems;
- (5) Areas with artesian conditions;
- (6) Unique animal or plant communities;
- (7) Landscapes or geologic formations with exemplary, unique, rare or threatened/endangered characteristics.

(B) Any environmentally sensitive areas shown in the Plan are approximate only. If it is anticipated that said areas may be affected by disposal site usage and/or any of the Contractor's operations, the Engineer will determine exact limits on an "as needed basis".

(C) Prior to the disposal of any excess grading materials, concrete rubble, bituminous materials, or any other materials requiring disposal, the Contractor shall have on file a written Disposal Plan with written approval by the Engineer. The written Disposal Plan must reflect not only the above requirements, but also the following points:

- (1) That legal permission from the property owner has been obtained;
- (2) That all required local and county disposal permits have been obtained;
- (3) That the MPCA has reviewed and granted permits as necessary for solid waste disposal;
- (4) That the disposal area and Plan meet with requirements of the U.S. Fish and Wildlife Service as noted in Executive Order 11990 and Circular 39, as verified by field review. In this regard, the Contractor shall give notice sufficient to permit the Engineer and a representative from the Mn/DOT Office of Environmental Services to conduct a site review; and
- (5) That the limits of the disposal area will be staked by the Contractor so as to accommodate the site review and aid the Contractor in limiting disposal operations so that encroachments do not inadvertently occur.

The Contractor is required to present his/her Disposal Plan in detail at the Pre-construction Conference.

**(2123) EQUIPMENT RENTAL**

The provisions of Mn/DOT 2123 are modified and/or supplemented with the following:

The following is added to Mn/DOT 2123.3 SPECIFIC REQUIREMENTS:

**N      Disk Harrow**

The disk harrow shall be of sufficient size and mass to manipulate the soils to a depth of approximately 300 mm [**12 inches**] and shall meet the approval of the Engineer.

The following is added to Mn/DOT 2123.5 BASIS OF PAYMENT:

2123.610      Disk Harrow .....hour

**(2130) APPLICATION OF WATER**

The provisions of Mn/DOT 2130 are modified as follows:

The third paragraph of Mn/DOT 2130.5 is hereby deleted and the following substituted therefore:

Water applied by order or approval of the Engineer for dust control will be paid for at a unit price of \$5.45 per cubic meter (**\$20 per 1000 gallons**) in the absence of the Contract bid Item 2130.501.

### **(2211) AGGREGATE BASE AND AGGREGATE BASE FROM STOCKPILE**

Aggregate base courses shall be constructed in accordance with the provisions of Mn/DOT 2211 except as modified below:

Compaction of the class 5 aggregate base shall be achieved by the "Modified Penetration Index Method". See Section S-41.2 and the attached "MODIFIED DYNAMIC CONE PENETROMETER (DCP) 5-692.255 modified" for information about this compaction method.

Mn/DOT 2211.3C3 Penetration Index Method is hereby deleted and replaced with the following:

#### **C3 Modified Penetration Index Method**

The full thickness of each layer of class 5 shall be compacted to achieve a penetration index value as described in the modified dynamic cone penetrometer (DCP) test procedure, as determined by a Mn/DOT standard dynamic cone penetrometer (DCP) device. For test purposes, a test layer will be described in the modified dynamic cone penetrometer (DCP) test procedure. Two DCP tests shall be conducted at selected sites within each 800m<sup>3</sup> (**1000 cubic yards**) (CV) of constructed base course, with a minimum of two DCP test per test cell.. If either of the tests fails to meet the specified requirements, the material represented by the test shall be recompacted and retested for penetration index compliance.

Water shall be applied to the base material during the mixing and spreading operations so that at the time of compaction the moisture content is no less than 5 percent of dry weight.

See the attached "MODIFIED DYNAMIC CONE PENETROMETER (DCP) 5-692.255 modified".

The Contractor shall provide uniform Class 5 material from the same source to be used on all four test cells in the Project. All other aggregate base materials are available from stockpiles located within the MnROAD Test Facility. Hauling and loading of materials from stockpiles shall be considered incidental. The Project Engineer will identify the class of materials in each stockpile designated for use.

The Contractor shall supply 15 cubic yards, extra material samples, of Class 5 aggregate base materials for research testing. This material shall be hauled to the MnROAD Stockpile Area by the Contractor.

Aggregate base materials for the demonstration slab shall be provided by Mn/DOT with onsite (MnROAD stockpile area) materials designated by the Engineer. Compaction of the aggregate base materials shall be achieved by quality compaction.

Mn/DOT 2211.3F2(d) under Acceptance Testing is hereby deleted and replaced with the following:

- (d) Samples for gradation testing will be taken randomly by the Engineer prior to compaction, in accordance with the random sampling method described in the Grading and Base Manual.

Mn/DOT 2211.3F2(j) under Acceptance Testing, is revised to read as follows:

- (j) One gradation sample will be taken from each subplot and tested. Payment will be based on the average results from the four subplot samples for each specified sieve.

The third paragraph after Mn/DOT 2211.3F2(k) under Acceptance Testing, is revised to read as follows:

A 5% price reduction will be assessed to both individual or averaged test lots for each test result that fails to meet specified gradations for sieve sizes not listed in Tables 2211-B and 2211-C by more than 2%. These price reductions are cumulative and shall be analyzed both separately and averaged by lot when applicable.

Table 2211-B in Mn/DOT 2211.3F2 Acceptance Testing, is hereby deleted and replaced with the following:

**Table 2211-B  
AGGREGATE BASE PAYMENT SCHEDULE  
(4 Sublots/4 Samples)**

% Passing Outside Specified Limits*		
4.75 mm (#4), 2.00 mm (#10), and 425 µm (# 40) Sieves	75 µm (#200) Sieve	Acceptance Schedule (Price Reduction)
1	0.1	5%
-----	0.2	6%
-----	0.3	9%
-----	0.4	11%
-----	0.5	14%
2	0.6	15%
> 2	> 0.6	Corrective Action
<p>*Based on average of 4 tests Price reductions for more than one failing sieve size shall be cumulative. The compensation due to the Contractor for the quantity of material represented by the failing test results shall be reduced by the sum of the respective percentages. The Contractor does not have the option of taking a price reduction in lieu of complying with the Specifications.</p>		

The following is added to Table 2211-C in Mn/DOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Substantial compliance will be eliminated when two or more test failures occur and test failures meeting substantial compliance will be subject to the next higher price reduction. One sieve failure = one test failure. Test failures for each material type will be treated separately.

The following is added to Table 2211-D in Mn/DOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Substantial compliance will be eliminated when two or more test failures occur and test failures meeting substantial compliance will be subject to the next higher price reduction. Test failures for each material type will be treated separately.

Measurement will be made by volume, computed on the basis of planned dimensions of the aggregate base using surface area and thickness. Payment will be made under Item 2211.607 (Aggregate Base (CV) from Stockpile) or Item 2211.503 (Aggregate Base (CV) Class 5) at the Contract bid price per cubic meter [**cubic yard**], which shall be payment in full for all costs involved.



## **(2221) AGGREGATE SHOULDERING**

Aggregate shouldering courses shall be constructed in accordance with the provisions of Mn/DOT 2221 except as modified below:

Compaction shall be achieved by the "Quality Compaction Method" described in Mn/DOT 2211.3C.

The second sentence in Mn/DOT 2221.1 is revised to read as follows:

The aggregate shall be produced and placed under the Contractor's quality control program in accordance with the Mn/DOT Grading and Base Manual.

The following is hereby inserted after the first paragraph of Mn/DOT 2221.3C:

Water shall be applied to the shouldering material during the mixing and spreading operations so that at the time of compaction the moisture content is not less than 5 percent of the dry weight.

## **CERTIFIED READY-MIX CONCRETE PLANTS**

Mn/DOT 2461.4D7 is hereby deleted and replaced with the following:

### **D7 Certified Ready-Mix Plant Program**

Mn/DOT requires quality control of concrete production under a Certification program for ready-mix concrete plants. **The Prime Contractor is responsible to assure that all ready-mix concrete used on this Contract is produced by a certified ready-mix plant.**

To ensure that proper testing procedures and documentation are followed, the Ready-Mix Producer shall obtain and have on site a copy of the current Mn/DOT Concrete Manual. The manual is available via the Mn/DOT Concrete Engineering Unit website.

To facilitate communication between the Producer and the Engineer regarding quality control, the Producer shall equip the Certified Ready-Mix Plant with a working facsimile machine.

### **D7a Certification Documents**

The Contractor shall obtain all of the ready-mixed concrete used on this Contract from a Certified Concrete Plant meeting all of the pertinent requirements of Mn/DOT Standard Specifications 1604 and 2461 and the following.

It is the Prime Contractor's responsibility to ensure that the Ready-Mix Concrete Producer adheres to all of the requirements. At the time of delivery, a Certificate of Compliance shall accompany each truckload of ready-mixed concrete used by the Contractor or any sub-contractor on this Contract. **A computerized Certificate of Compliance is required when supplying any concrete for an Agency Contract.** Computerized means that the concrete mix design quantities batched are recorded from load cells and meters.

If the computer that generates the Certificate of Compliance malfunctions, the Producer may finish any pours that are in progress provided the plant issues handwritten Certificates of Compliance on the most current version of Mn/DOT form TP 00042. New pours shall not commence without a working computerized Certificate of Compliance.

**If the distance of the Certified Plant to the point of placement does not allow delivering the concrete in compliance with 2461.4D6, the Contractor may supply concrete from a non-certified source provided less than 20 cubic meters (yards) of Agency concrete is produced each day and a handwritten Certificate of Compliance Form TP 00042 is provided.**

The Certificate of Compliance shall label each item of information and shall include:

- 1) Name of the ready-mix concrete plant
- 2) Name of the Contractor
- 3) Date
- 4) State Project Number (SP) or (SAP)
- 5) Bridge Number (when applicable)
- 6) Time concrete was batched
- 7) Truck number
- 8) Quantity of concrete in this load
- 9) Running total of each type of concrete, each day for each project
- 10) Type of concrete (Mn/DOT Mix Designation Number)
- 11) Cementitious Materials (portland cement, ground granulated blast furnace slag, fly ash, silica fume, others) including brand, type and production mill and production power plant for fly ash using MN/DOT Standard Abbreviations available on the Concrete Engineering Unit website
- 12) Admixture brand and product name using MN/DOT Standard Abbreviations
- 13) Aggregate sources using State Pit Numbers
- 14) Admixture quantity per 100 wt. of cement or oz/cm(cy) for:
  - air-entraining admixtures,
  - water reducing admixtures,
  - other admixtures
- 15) The Certificate of Compliance shall list the batch information for all materials and use Mn/DOT standardized labels to represent each column in the order listed below. It is preferable that all the information is presented across the page (a through k) but printing the information using two lines is satisfactory provided that the materials are identified in each line of information and is presented in the following order.

Metric Certificate of Compliance

<u>CATEGORY</u>	<u>STANDARD LABEL</u>
a) <b>Ingredients (aggregate, cementitious, water, admixtures)</b>	<b><u>Ingredient</u></b>
b) <b>Product Source (Mn/DOT Standard Abbreviation)</b>	<b><u>Source</u></b>
c) <b>Total Moisture Factor (in decimals to 3 places)</b>	<b><u>MCFac</u></b>
d) <b>Absorption Factor (in decimals to 3 places)</b>	<b><u>AbsFac</u></b>
e) <b>Mn/DOT mix design oven dry (OD) weights (kg/m<sup>3</sup>)</b>	<b><u>OD</u></b>
f) <b>Absorbed moisture in the aggregates (kg/m<sup>3</sup>)</b> <span style="float: right;"><i>(e x d)</i></span>	<b><u>Abs</u></b>
g) <b>Saturated surface dry (SSD) weights for aggregates (kg/m<sup>3</sup>)</b> <span style="float: right;"><i>(e + f)</i></span>	<b><u>SSD</u></b>
h) <b>Free moisture (kg/m<sup>3</sup>)</b> <span style="float: right;"><i>(c - d) x e</i></span>	<b><u>Free Mst</u></b>
i) <b>Target weights for one cubic meter of concrete (kg/m<sup>3</sup>)</b> <span style="float: right;"><i>(g + h)</i></span>	<b><u>CM Targ</u></b>
j) <b>Target batch weights (kg)</b> <span style="float: right;"><i>(CMs x i)</i></span>	<b><u>Target</u></b>
k) <b>Actual batch weights (kg)</b>	<b><u>Actual</u></b>

English Certificate of Compliance

<u>CATEGORY</u>	<u>STANDARD LABEL</u>
a) <b>Ingredients (aggregate, cementitious, water, admixtures)</b>	<u>Ingredient</u>
b) <b>Product Source (Mn/DOT Standard Abbreviation)</b>	<u>Source</u>
c) <b>Total Moisture Factor (in decimals to 3 places)</b>	<u>MCFac</u>
d) <b>Absorption Factor (in decimals to 3 places)</b>	<u>AbsFac</u>
e) <b>Mn/DOT mix design oven dry (OD) weights (lbs/cy)</b>	<u>OD</u>
f) <b>Absorbed moisture in the aggregates (lbs/cy)</b> <span style="float: right;"><i>(e x d)</i></span>	<u>Abs</u>
g) <b>Saturated surface dry (SSD) weights for aggregates (lbs/cy)</b> <span style="float: right;"><i>(e + f)</i></span>	<u>SSD</u>
h) <b>Free moisture (lbs/cy)</b> <span style="float: right;"><i>(c - d) x e</i></span>	<u>Free Mst</u>
i) <b>Target weights for one cubic yard of concrete (lbs/cy)</b> <span style="float: right;"><i>(g + h)</i></span>	<u>CY Targ</u>
j) <b>Target batch weights (lb)</b> <span style="float: right;"><i>(CYs x i)</i></span>	<u>Target</u>
k) <b>Actual batch weights (lb)</b>	<u>Actual</u>

Note: Actual cubic meters (cubic yards) batched may vary due to differences in: air content, weight tolerances, specific gravities of aggregates and other variables.

- 16) Total Water (**Batch Water + Free Moisture**) (kg/lbs)  
 17) The Certificate of Compliance shall compute the water available to add [(Mix Design Water)x (*Target CM (CY's)*) – Total water] (liters/gallons)

The Certificate of Compliance shall provide space for water adjustment information, including:

1. Temper or trim water in liters (gallons) added to truck at plant (filled in by batchman or driver)
2. Trim water in liters (gallons) added to truck at the jobsite (filled in by driver)
3. Total actual water in kg (lbs) = (**Total Water from Certificate of Compliance + any additions**) (filled-in by Field Inspector)

**Note: Drivers are required to fill-in spaces. Enter Zero (0) if no water is added.**

- 18) The ticket shall also include the following information printed with enough room beside each item to allow the field inspector to record the appropriate test results: air content, air temperature, concrete temperature, slump, cylinder number, location/part of structure, time discharged, and signature of Inspector.  
 19) Location for Producer's Representative signature.

A Mn/DOT Certified Plant I Technician representing the Producer shall review the first Certificate of Compliance for each mix type, each day, for accuracy and hand sign the Certificate at a location designated for signature. By signing the Certificate of Compliance the representative agrees to the terms of this policy and certifies that the materials itemized in this shipment comply with the applicable Minnesota Department of Transportation specifications and the Project Plans.

**Definitions**

- Mix Design Water – The maximum allowable water content for one cubic meter (yard) of concrete as noted on Mn/DOT Estimated Composition of Concrete Mixes Form TP-02406  
 Total Moisture Factor - See 5-694.311 of Concrete Manual  
 Absorption Factor - See 5-694.311 of Concrete Manual  
 Free Moisture – The water that is carried on the surface of the aggregate that becomes part of the total water  
 Batch Water – Water actually batched into the truck by the batcher  
 Total Water = Batch Water + Free Moisture

Temper Water – Water added in mixer to adjust slump.  
 Trim Water – Water added to the truck after batch was discharged from plant  
 Total Actual Water - The water in the concrete mixture at the time of placement from any source other than the amount absorbed by the aggregate. It includes all batch water placed in the mixer, free moisture on the aggregate and any water added to the ready mix truck prior to placement  
 Ready-Mix Producer or “Producer” – Party that is producing the concrete for the Contract. It is understood that the Ready Mix Producer is the agent of the Prime Contractor

D7b Quality Control Testing and Sampling  
 The Prime Contractor/Producer, supplying concrete from a Ready-Mix Plant involved in the Certified Plant Program, will provide testing of the materials in the concrete as outlined below. A Plant Level II Technician Quality Control Supervisor, certified by Mn/DOT, shall oversee all testing and plant operations. The Quality Control Supervisor shall remain on site during concrete production or be accessible by cellular phone to assure their presence at the plant site within one hour. A Mn/DOT Certified Plant Technician will maintain or oversee the maintenance of a plant diary. The diary, kept at the plant site for 5 calendar years, will document yards produced each day, tests performed, material problems, breakdowns, weather, etc., all to the approval of the Engineer.

The testing rates stated in the Schedule of Materials Control are minimums. **All samples shall be taken in a random manner using an appropriate number generator.** Changes in the material require taking additional tests. Changes include but are not limited to: variable gradation results, new aggregates arriving on site, moisture conditions changing due to weather, or any other condition that warrants additional testing in the opinion of the Engineer. **The Agency may determine when additional testing is necessary.**

Mechanical shakers are required for sieve analysis of fine and coarse aggregates. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing discuss the equipment and calibration necessary for performing the required tests. The following is a list of the applicable tests and standards.

AASHTO T-27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T-255	Total Moisture Content of Aggregate by Drying
AASHTO M-92	Wire-Cloth Sieves for Testing Purposes. The sieves shall comply with the requirements of 5-693.420B of the Department's Bituminous Manual "Equipment Calibration and Verification Policies and Procedures for Laboratory certification".
AASHTO M-231	Weighing Devices Used in the Testing of Materials. The scales shall comply with the requirements of 5-693.820 of the Department's Bituminous Manual "Calibration of weigh scales".

The provisions of 2461.4D3 apply regarding requirements to notify the Engineer of intent to pour concrete. If the Ready-Mix Producer needs to change plants for an unexpected reason, it is allowable on an infrequent basis if the Quality Control Supervisor obtains approval from the Project Engineer or Metro Inspection (for the Metro District) before the plant change is made.

The Agency Plant Monitor shall watch the material sampling process whenever possible.

D7c Moisture Content  
 All moisture tests are run by a Plant Level I Technician certified by Mn/DOT.  
 The Ready-Mix Producer shall determine the moisture content in all fractions of the aggregate according to the Schedule of Materials Control. Changes in the material may require additional testing. The Producer is responsible for all costs associated with determining the moisture content, including equipment, labor, and materials.

The Ready-Mix Producer will provide the Agency with all documentation for each moisture test, which is kept on file at the plant site for 5 calendar years. The moisture content of each aggregate is charted and available at the plant. The Producer must allow Agency personnel to observe the batching process to verify weights shown on the Certificate of Compliance.

The moisture content of the aggregate is determined by the oven dry method as outlined in the Mn/DOT Concrete Manual. In addition to the standard moisture test, the Producer may choose to determine moisture content in the fine aggregate by use of a moisture probe. This method is acceptable if an Agency Representative has approved the moisture probe.

To obtain approval for the use of a moisture probe, the Producer must calibrate the moisture probe using the method described in 5-694.128 of the Mn/DOT Concrete Manual. The Producer is required to verify and chart both the probe moisture content and the oven-dry verification moisture test at a minimum rate of once per week. The Engineer may reduce this rate of verification if the comparisons justify it. The written permission of the Engineer is required to use other methods.

D7d Gradations

All gradation testing is performed by a Plant Level I Technician certified by Mn/DOT. Testing rates shall be determined according to the Schedule of Materials Control.

The Ready-Mix Producer shall determine the gradation of the fine aggregate to insure conformity to Mn/DOT Specification 3126 and the coarse aggregates to insure conformity to Mn/DOT Specification 3137 or as otherwise required or permitted in the Special Provisions of the Contract. The Producer is responsible for all costs associated with running gradations including equipment, labor and materials. The Producer shall perform all testing at the plant site to assure immediate re-sampling and testing of failing material.

The Producer shall run gradations and perform calculations as outlined in the Mn/DOT Concrete Manual. The Producer shall split and bag all Quality Control samples and clearly identify them (Date, Test No., Time, Type of Material, Plant, Sampling Location) and retain them for a period of two weeks for companion sampling by the Agency.

The Ready-Mix Producer shall document the results of all gradations on the Weekly Concrete Aggregate Report (Mn/DOT Form 2449) utilizing every other column to provide room for Agency companion results. The Ready-Mix Producer will chart all sieves of the coarse aggregate and the 2.36 mm (#8), 600  $\mu$ m (#30), and 300  $\mu$ m (#50) sieves of the fine aggregate quality control samples using procedures outlined in the Concrete Plant I Certification Course. In addition, the Producer shall plot the results of the Agency verification samples on the same chart. Supporting documentation for all gradations and charts is kept on file at the plant site for 5 calendar years.

Agency Plant Monitors will take verification samples for quality assurance according to the Schedule of Materials Control. **(NOTE: Where problems with compliance with the Certified Ready Mix Program occur, plant inspections and testing rates shall increase).**

Agency Plant Monitors shall observe the actual water batched on a minimum of one load of concrete each time a verification gradation is collected. This observation includes: watching the ready-mix truck reverse the drum after washing to remove all wash water, checking to verify that an accurate moisture test is utilized during batching, confirming that the water measuring device is providing accurate data, and verifying that any additional water added to adjust the slump is recorded. It is extremely important that the actual water is verified since the durability of the concrete depends on maintaining a low water-cement ratio. The Agency Plant Monitor shall document the actual water batched on the Weekly Certified Ready-Mix Plant Report (Mn/DOT Form 24143) and submit a copy to the Concrete Engineering Unit with a copy of the Weekly Concrete Report (Mn/DOT Form 2448).

If the gradation tests on split samples from quality control or verification samples result in a variation between the Producer and the Agency greater than that set forth below, the two parties will cooperatively take and split a new sample. The Producer's representative shall test the sample while witnessed by the Agency Plant Monitor. This will serve as a check on the process to correct deviations from the standard testing procedure. If this problem continues, the Project Engineer, the District Materials Engineer and the Concrete Engineer will make a total review of this plant.

If the results still do not agree, the parties shall resolve the dispute by Third Party Resolution according to procedures described in the Mn/DOT Contract Administration Manual.

Allowable variations on percent passing any sieve:

<u>Sieve</u>	<u>% Allowed</u>
50 mm - 9.5 mm (2" - 3/8")	+ or - 6
4.75 mm - 600 μm (#4 - #30)	+ or - 4
300 μm (#50)	+ or - 3
150 μm (#100)	+ or - 2
75 μm (#200)	+ or - 0.6

The Ready-Mix Producer, after an acceptable time period, may request a reduction in testing rates if past results warrant. Such a request is subject to approval by the Mn/DOT Concrete Engineer. This approval is based on extraordinary procedures performed by the Aggregate Supplier and Ready-Mix Producer to insure consistency and quality control. Extra fractions and bins are an example of such a procedure.

**D7e Concrete Plant Contact Report**

Prior to the production of Agency concrete each construction season, an Agency Plant Monitor shall perform a thorough on-site inspection of the concrete plant and complete a Concrete Plant Contact Report (Mn/DOT Form 2163). This Contact Report contains the information necessary to assure that the plant can produce concrete meeting specifications. The Producer signs the report thereby certifying compliance with the Certified Ready Mix requirements and continual maintenance of the plant as reviewed.

**D7f Non-Compliance**

If a proposed plant cannot produce concrete, perform testing, or report information as required during completion of the Concrete Plant Contact Report, concrete from this plant is not acceptable.

After completing the Concrete Plant Contact Report and starting the Project, any procedural changes that cause non-compliance with this program will result in decertification of the plant and cessation of further production of concrete for this Project. Decertification will also occur at any plant that continually produces concrete that is in noncompliance as detailed above. Complete disregard of this specification or fraudulent test reports are grounds for immediate Decertification. Decertification could include any or all, but is not limited to, the following actions:

- 1) Revocation of Plant Certification.
- 2) Revocation of Technician Certification for individual(s) involved.
- 3) Loss of bidding privileges as determined by the State Construction Engineer.
- 4) Criminal prosecution for fraud as determined by the Attorney General.

Decertification actions are determined by the Mn/DOT Concrete Engineer.

**CONCRETE CURING**

Mn/DOT specifications: 2301.3M2, 2401.3G, 2404.3C3, 2521.3C3b, 2531.3G2 are hereby modified to include the following provision:

The Contractor shall place all types of membrane cure material homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). The membrane cure shall be placed within ½ hour of concrete placement or once the bleed water has disappeared unless otherwise directed by the Engineer. Failure to comply with these provisions will result in a price reduction for the concrete item involved in accordance with Mn/DOT 1503.

**Exception: Specific Mn/DOT approved alpha methyl styrene curing membranes may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, the color shall be of a uniform solid opaque consistency meeting the intent of the above requirement.**

**(2301) CONCRETE PAVEMENT**

Concrete Pavement shall be constructed in accordance with the provisions of Mn/DOT 2301 and as modified below:

Concrete Incentive/Disincentives shall not apply.

Mix types for the concrete mixtures on this Project as shown in Table 45.1A:

**TABLE 45.1A – Concrete Mix Types**

<b>Concrete Mixtures</b>	<b>Location</b>	<b>Recycled PCC Coarse Aggregate Percent</b>
Low Cost Mix	Lower Concrete Layer Cells 72 & Demonstration Slab 24 foot paving width	0
Recycled Mix	Lower Concrete Layer Cells 70-71 & Demonstration Slab 24 foot paving width	50% RCA
Exposed Aggregate Concrete	Surface Concrete Layer Concrete Overlay Cells 71-72 & Demonstration Slab 24 foot paving width	0

**CONTRACTOR CONCRETE MIX DESIGN**

The Contractor shall develop the mixture proportions for the Low-Cost Mix, the Recycled Mix, and the Exposed Aggregate Concrete (EAC) mix.

The Contractor shall submit all mix designs using the Mn/DOT Contractor Concrete Paving Mix Design Submittal package available from the Mn/DOT Concrete Engineering Unit’s website.

The Contractor shall design the concrete paving mixture based on a volume of 1.000 m<sup>3</sup> [**cubic yard**] according to industry standard practice. Grade A paving concrete shall be designed and placed at a water cementitious ratio not greater than 0.40.

The concrete pavement demonstration slab shall not commence until 15 days after preliminary approval of the Contractor's concrete pavement mix design and job mix formula (JMF) by the Concrete Engineer. Final approval of the mixture is based on satisfactory field placement.

Prior to the start of paving the Contractor shall submit to an AMRL certified testing laboratory enough cement, supplementary cementitious material (fly ash, GGBFS, silica fume, etc.), fine aggregate, coarse aggregate, chemical admixtures for each trial mixture. Sufficient materials shall be submitted for multiple trial mixes to optimize the mix design proportions.

The Contractor is required to contact the Engineer a minimum of 2 days prior to any mixing so that a Mn/DOT representative can observe the process. This same 2-day notification is required prior to any physical testing on hardened concrete samples. Additionally, any hardened concrete test specimens must be retained for a minimum of 90 days and be made available for Mn/DOT to examine.

The following tests shall be conducted at the AMRL certified laboratory on each of the concrete mix trials:

- Slump and air content (at <5, 15, 30 minutes after the completion of mixing)
- Flexural Strength (3<sup>rd</sup> point) at 1, 3, 7, 28 and 56 days (sets of 2)

#### Job Mix Formula

A Formula (JMF) containing proportions of materials and individual gradations of each material plus a composite gradation according to the requirements of Section S-60.10 (COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE) of these Special Provisions.

#### Air Content

The air content for all paving grade concrete shall be 7.0 percent plus or minus 1.5 percent. The air content shall be measured after placement on the grade but before consolidation. Mn/DOT 2461.4A4b shall be adjusted accordingly based on the 7.0 percent target value.

#### (PCC/PCC) COMPOSITE PAVEMENT OPERATION

1. Place lower concrete layer
2. Place top concrete layer (15-90 minutes between first and second paver determined by experience from the demo slab). This material can be supplied by pumping or with the use of a conveyer belt from the driving lane or low volume road.
3. Finish smooth
4. Spray on a curing/retarder compound
5. Brush concrete surface with rotating wire brush—2 passes (after 5 to 24 hours determined by experience from the demo slab) to create an Exposed Aggregate Concrete (EAC) surface texture.
6. Spray curing/retarder compound on exposed aggregate surface
7. Saw and seal joints

#### (HMA/PCC) COMPOSITE PAVEMENT OPERATION

1. Place lower concrete layer
2. Finish smooth
3. Texture surface (longitudinal tined)
4. Spray on a curing compound
5. Saw concrete joints
6. Pave HMA surface after 7 days or a concrete compressive strength of 550psi. Tack coat will be placed on the concrete before the HMA paving.
7. Saw and seal HMA over the PCC transverse joints leaving 100 feet unsealed.

#### DEMONSTRATION SLAB

A 200 foot Demonstration Slab similar to Cell 71 (100 foot) and Cell 72 (100 foot) shall be constructed by the Contractor in MnROAD's stockpile area over a granular base. The purpose of the Demonstration Slab is to replicate the actual construction process, equipment, materials, placement methods, and haul times that will be used on the MnROAD mainline I-94 construction. The demonstration slab shall be installed prior to final concrete placement in cells 70, 71 & 72, at a time determined by the Contractor. The Contractor must also correct any construction related issues learned from the demonstration slab before the mainline test cells are built. The Contractor will only be paid for one mobilization.



#### LOWER LAYER CONCRETE FOR Cells 70, 71, & 72

The lower layer concrete surface of cell 70 (HMA Overlay Cells) shall require a curing compound and shall be textured with longitudinal tining and sawn according to the Plans. These cells shall cure for 7 days or until the flexural strength of the concrete samples reach 550 psi, before the HMA overlay is placed.

The lower concrete layer of cells 71 & 72 (PCC Overlay Cells) will neither require curing, texturing, or sawing before the second PCC overlay layer is placed.

The tie bars and dowel bars (with the use of dowel baskets) shall be placed in the lower layer of the concrete at the mid-depth of the finished depth of the concrete layer(s). Cell 70 (6 inch PCC) dowels shall be placed at 3 inch height and cells 71-72 (9 inch PCC both layers) dowels shall be placed at 4.5 inch height. The dowel bars shall be sprayed with a Mn/DOT approved form release agent.

#### UPPER LAYER CONCRETE FOR CELLS 71 & 72

The top concrete layer of cells 71 and 72 shall be finished smooth and sprayed with a retarder/curing compound that Mn/DOT will provide to the Contractor. This retarder/curing compound shall be applied with an airless sprayer to avoid streaking or overlap. Other spray equipment may be demonstrated on the demonstration slab and approved by the Engineer. If this retarder/curing compound is not available at the time of construction, the top layer of the PCC/PCC pavement shall be sprayed with a Mn/DOT Approved retarder and within 20 minutes, covered in accordance with Mn/DOT 2301.3M1. In this case, the retarder can be applied by conventional methods.

Brushing to create the EAC (Exposed Aggregate Concrete) surface will occur at a mutually agreed upon time between the Contractor and Engineer. This will be decided following experience gained from of the Demonstration Slab and considering the environmental conditions at the time of construction. The target uniform texture depth is 1.0 mm but can vary between the depths of 0.8-1.2 mm as determined by ASTM E2157 (texture meter) or ASTM E965 (sand patch). Texture depths shall be achieved by a front-end mounted, rotating wire brush (plastic will not be allowed) to be approved by the Engineer. A minimum of two (2) passes shall be made with the wire brush. The time of brushing shall be between 5 and 24 hours after the concrete overlay is placed

Once the EAC surface has been brushed, a Mn/DOT Approved curing compound shall be immediately applied and sawing shall be completed.

Paragraph 2 of Mn/DOT 2301.3B shall be deleted and replaced with the following:

If the slipform method of construction is used, the base course from out to out of the paver treads shall be accurately fine graded to the required elevation by an approved fine grading machine mounted on crawler treads. Base construction shall be completed and the required subgrade density obtained to a width at least 1.3 m (**3 feet**) beyond the outside edges of the pavement including any integrant curb before the fine grading is performed. The aggregate base shall have sufficient stability and firmness to support the fine grading equipment and slipform paver without any distortion of the alignment or grade line.

Paragraph 1 of Mn/DOT 2301.3H1c shall be deleted and replaced with the following:

The frequency of the vibrators shall be established based on the workability of the concrete and experience from the demonstration slab. Electronic, internal, T-shaped, poker vibrators shall be used (either of the surface or internal vibration type) at a recommended operating frequency of 150 to 250 Hz. Other types of vibrating equipment may be approved by the Engineer. The vibrator impulses shall be delivered directly to the concrete and the intensity of vibration shall be sufficient to consolidate the concrete mass thoroughly and uniformly throughout its entire depth and width. The Contractor will be allowed to increase the speed of the vibrators with the permission of the Engineer.

### SLIPFORM CONSTRUCTION

Two slipform pavers shall be used in sequence for the PCC/PCC composite pavement construction. The slipform paver shall operate in such a way that the concrete mixture is distributed and consolidated evenly, with the use of two stringlines (one on each side of the two paving lanes). The Contractor may propose and demonstrate other placement methods with the approval of the Engineer.

The second paver shall follow the first paver by approximately 15 to 90 minutes. The actual timing will be made by a mutual decision between the Contractor and the Engineer and shall be determined by environmental conditions and the properties of the bottom concrete layer and experience from the demo slab.

Mn/DOT 2301.3J sentence 1 of paragraph 2 is hereby deleted and the following substituted therefore:

Consolidation of all concrete layers in cells 70, 71, & 72 shall be accomplished with either an electronic internal T-shaped vibrator or a longitudinally crooked poker vibrator, as stated in Section S-45.10 (CONCRETE PAVEMENT) of these Special Provisions. Frequencies of these vibrators shall be adjusted to the workability of the concrete and speed of the paving machines.

### CONCRETE PAVEMENT JOINTS

Cell 70 (HMA over PCC) will have unsealed single saw cuts for both transverse and longitudinal joints. Both transverse and longitudinal joints shall be cut at depth of T/3, where T indicates the depth of the concrete layer(s). Joints of Cell 70 (6 inch PCC) shall be cut to 2 inch depth.

Cells 71 & 72 shall contain sealed transverse joints with Preformed Elastomeric Compression Joint Seals meeting Mn/DOT 3721. See Section S-64 (PREFORMED ELASTOMERIC COMPRESSION JOINT SEALS FOR CONCRETE) of these Special Provisions. All longitudinal sawn joints in concrete pavement shall be sealed with hot pour sealant. Both transverse and longitudinal joints shall be cut at depth of T/3, where T indicates the depth of the concrete layer(s). Joints of Cells 71 & 72 (9 inch PCC) shall be cut to 3 inch depth.

Concrete joints in cells 71 & 72 shall be cut following surface texturing at a mutually agreed upon time between the Contractor and the Engineer. This will be decided following construction of the demonstration slab and considering the environmental conditions at the time of construction.

Mn/DOT 2301.3P1 is hereby deleted and the following substituted therefore:

#### **2301.3P1 Workmanship and Quality**

##### 2301.3P1a Surface Requirements

##### 2301.3P1a (1) Defective Pavement

The Engineer will only accept pavement that meets the specified requirements within permissible tolerances for payment at the Contract bid prices. Pavement that fails to meet the minimum requirements when tested in the prescribed manner is considered defective. Defective pavement is subject to the provisions made herein for correction or adjusted payment. In addition, the concrete incorporated in the work is subject to 2461.

The Engineer will determine the limits of each individual defective pavement area and, when such areas are subject to price adjustment, the area is computed to the nearest whole square meter [**square yard**], except that areas of less than 1 m<sup>2</sup> [**square yard**] are considered 1 m<sup>2</sup> [**square yard**]. The condition of each individual defective area of pavement is assessed based on the greatest deficiency within that area.

##### 2301.3P1a (2) Random or Uncontrolled Cracking

If any random or uncontrolled crack occurs in concrete pavement, the Engineer may require replacement of the pavement or portions thereof or require repairs and/or may require a reduced payment. If the Engineer approves repair of the pavement, the Contractor shall repair the pavement using dowel bar load transfer techniques listed in the latest Department's Concrete Pavement Rehabilitation Standards/Details. The Contractor shall submit to the Engineer for approval, the specific standard technique

intended for repair. After approval by the Engineer, the Contractor shall perform replacement or repair work at no expense to the Department. The Contractor shall replace failed repairs at no expense to the Department. Acceptance of the repairs shall comply with the acceptance procedure for the pavement portion of the Project.

Mn/DOT 2301.3P1b and 2301.3P1c is hereby deleted.

Table 2301-3 of Mn/DOT 2301.3P2 is hereby deleted and replaced with the following:

The Contractor shall strive to construct the pavement to the planned thickness. Thickness deficiency up to 0.5 inch will not be penalized. Excessive thickness or thickness deficiency more than 0.5 inch will require removal and replacement by the Contractor at no expense to the Agency.

#### Additional Material Samples

The Contractor shall supply extra material samples for research testing above and beyond the typical construction contractual testing requirements for all three mixtures used at MnROAD. This includes the low cost, recycled, and EAC concrete mixtures.

1. Fresh concrete sampled from the paver for beams and cyclinder samples. (MnROAD will sample from the paver).
2. One (1) 5-gallon bucket of each type of cementitious materials used. (Contractor will sample for MnROAD).
3. 5 cubic yards of each aggregate type (coarse and fine materials) used (MnROAD will pickup from concrete plant during construction).

#### MEASUREMENT AND PAYMENT

(A) Payment for the concrete pavement construction will be made under Item 2301.502 (Concrete Pavement Standard Width \_\_”) at the Contract bid price per square yard, which shall be payment in full for all costs incidental thereto.

(B) Measurement of the Structural Concrete for Exposed Aggregate Concrete Pavement (EAC) on Cells 71 and 72 as well as the demonstration slab will be made in accordance with the provisions of Mn/DOT 2301.4B. Payment for the Structural Concrete for constructing Exposed Aggregate Concrete Pavement (EAC) on Cells 71 and 72 as well as the demonstration slab will be made under Item 2301.607 (Structural Concrete (Special)) at the Contract bid price per cubic yard, which shall be payment in full for all costs incidental thereto.

(C) Measurement of the Structural Concrete for the Low Cost Mix Concrete Pavement on Cell 72 as well as the demonstration slab will be made in accordance with the provisions of Mn/DOT 2301.4B. Payment for the Structural Concrete for constructing the Low Cost Mix Concrete Pavement on Cell 72 as well as the demonstration slab will be made under Item 2301.607 (Structural Concrete (Special 1)) at the Contract bid price per cubic yard, which shall be payment in full for all costs incidental thereto.

(D) Measurement of the Structural Concrete for Recycled Mix Concrete Pavement on Cells 70 and 71 as well as the demonstration slab will be made in accordance with the provisions of Mn/DOT 2301.4B. Payment for the Structural Concrete for constructing Recycled Mix Concrete Pavement on Cells 70 and 71 as well as the demonstration slab will be made under Item 2301.607 (Structural Concrete (Special 2)) at the Contract bid price per cubic yard, which shall be payment in full for all costs incidental thereto.

#### **(2301) DRILL AND GROUT REINFORCEMENT BARS (EPOXY COATED)**

This work shall consist of drilling, grouting, and inserting No. 19 epoxy coated reinforcement bars in accordance with the provisions of Mn/DOT 2301 and the following:

Measurement will be made by the weight of epoxy coated reinforcement bars that are furnished, installed, and grouted in place as specified. Payment will be made under Item 2301.608 (Drill and Grout Reinforcement Bars (Epoxy Coated)) at the Contract bid price per kilogram [**pound**], which shall be payment in full for all costs incidental thereto.

### **(2331) BITUMINOUS JOINT SAWING AND SEALING**

This work shall consist of saw cutting, cleaning, drying and sealing transverse joints in new bituminous surfaces according to the Plans, the applicable Mn/DOT Standard Specifications, and the details in the Plan, as directed by the Engineer, and the following:

Bituminous transverse joints shall be cut with a single saw cut of 1/2 inch wide by 5/8 inch deep for the 3 inch Superpave Mixture. The sawn bituminous joints shall be located within 0.5 inch of the concrete joints. See Section S-44.13 (CONCRETE PAVEMENT) of these Special Provisions.

### **MATERIALS**

(A) Joint Sealant Material

The Contractor shall provide certification that the sealant meets the requirements of ASTM D-3405 with the following modifications:

Penetration at 25<sup>0</sup> C [**77<sup>0</sup> F**] .....90 - 150  
Bond at -11<sup>0</sup> C [**-20<sup>0</sup> F**], Std. Specimen, 3 cycles, 200% extension..... Passes  
The sealant material shall weigh not less than 1.08 [**9.00**] nor more than 1.12 kg/liter [**9.35 lbs/gallon**].

The crack sealant compounds shall be packaged in sealed containers. Each container shall be clearly marked with the name of the manufacturer, the trade name of the sealant, the manufacturer's batch and lot number, the pouring temperature, and the safe heating temperature.

A copy of the manufacturer's recommendations concerning the heating and application of the joint sealant material shall be submitted to the Engineer before the commencement of the work. These recommendations shall be followed by the Contractor. The temperature of the sealer in the field application equipment shall never exceed the safe heating temperature recommended by the manufacturer. Any given quantity of material shall not be heated at the pouring temperature for more than six hours and shall never be reheated. Material shall not be placed if the material's temperature is below the manufacturer's recommended minimum application temperature.

Mixing of different manufacturers' brands or different types of sealants shall be prohibited.

(B) Bond Breaker Tape

Bond breaker tape shall consist of regular masking tape or other suitable bond breaker tape designed for use with hot pour sealants. The width of the tape may be equal to but not more than 3 mm [**1/8 inch**] narrower than the width of the saw cut.

### **WEATHER LIMITATIONS**

Sealant materials may be placed during a period of rising temperature after the air temperature in the shade and away from artificial heat sources has reached 4.4<sup>0</sup> C [**40<sup>0</sup> F**] and indications are for a continued rise in temperature. During a period of falling temperature, placement of the sealant material shall be suspended until the above conditions are met.

Sealants shall not be placed when, in the opinion of the Engineer, the weather or roadbed conditions are unfavorable. Sawing and sealing shall be permitted only during daylight hours.

### **EQUIPMENT REQUIREMENTS**

The melting kettle shall be double jacketed boiler type, equipped with both agitation and recirculation systems capable of melting and applying the sealant through a pressure-fed hose and wand. The melter

shall be capable of starting at ambient temperature and bringing the sealing material to application temperature in one hour or less, while continuously agitating and recirculating the sealant. The melter shall be equipped with automatic thermostatic controls and temperature gages to monitor the sealant temperature in the applicator lines and temperature of heat transfer oil in the kettle jacket.

A self-propelled power saw capable of providing a straight cut of uniform depth and width shall be used. Diamond saw blades with either single or gang blade arrangement shall be used. The saw blade or blades shall be of such size and configuration such that the desired joint reservoir shape and deep saw cut are achieved in one pass of the saw. Two pass cutting will not be allowed. No spacers between blades shall be allowed unless the Contractor can show that the desired reservoir and saw cut can be obtained with them. Either wet or dry sawing will be permitted provided the above conditions are met.

The air compressor shall be capable of producing a continuous stream of clean, dry air through the nozzle at 690 kPa [**100 psi**] and 3.5 m<sup>3</sup>/minute [**125 cubic feet per minute (CFM)**] minimum. The compressed air unit shall be equipped with water and oil traps and must produce sufficient air volume and pressure to remove all debris from the sawed joint and all adjacent road surfaces in a safe manner such that the debris will not re-enter the joint prior to the sealing operation.

The heat lance shall operate with propane and compressed air in combination and be capable of achieving a temperature of heated air at the exit orifice of 982<sup>0</sup> C [**1,800<sup>0</sup> F**] and a discharge velocity of 914 m/sec. [**3,000 feet per second**].

### CONSTRUCTION DETAILS

#### (A) General

The Contractor shall conduct the operation so that saw cutting of transverse joints, cleaning, and sealing are a continuous operation. Traffic shall not be allowed to knead together or damage the sawed joints. Sawed joints not sealed before traffic is allowed on the pavement shall be re-sawed, if necessary, when sawing and sealing operations resume at no additional cost to the State. Saw cutting, cleaning and sealing shall not be done within 48 hours of placement of the wear course.

#### (B) Saw cutting of Transverse Joints

The transverse saw cut joints shall be cut into mainline pavement directly above existing transverse joints in the mainline pavement, but shall terminate a distance of 300 mm [**1 foot**] shy of the shoulder pavement unless otherwise detailed on the Plans or directed by the Engineer. Existing joints shall be marked by the Contractor so that the joint can be located after the final bituminous course is completed. The Contractor's procedure for locating these transverse cracks shall be subject to approval of the Engineer.

#### (C) Cleaning Operation

Dry sawed joints shall be thoroughly cleaned with an air compressor meeting the requirements previously outlined. Cleaning shall continue until the joint is dry and all dirt, dust or deleterious matter is removed from the joint and adjacent pavement to the satisfaction of the Engineer.

Wet sawed joints and adjacent pavement shall be thoroughly cleaned with a water blast (345 kPa [**50 psi**] minimum) immediately after sawing to remove any sawing slurry, dirt or deleterious matter adhering to the joint walls or remaining in the joint cavity. The joints shall then be dried with an air compressor. Cleaning shall continue until the joint is dry and all dirt, dust or deleterious matter is removed to the satisfaction of the Engineer. If the air compressor produces dirt or other residue from the joint cavity, the Contractor may be required to re-clean the joint with a water blast.

Following cleaning, the sawed joints shall be dried and warmed with a hot air lance. The Contractor shall be careful not to burn the pavement surface. After the hot air lance has been used to warm and dry the joint, the backer tape shall be placed into the bottom of the joint reservoir. Under no circumstances shall more than two (2) minutes elapse between the time the hot air lance is used and the sealant is placed.

The Contractor shall be required to provide protective screening, subject to approval of the Engineer, if his cleaning operations could cause damage to or interference with traffic in adjacent lanes.

(D) Sealing Operation

The joints shall be sealed when the sealant material is at the pouring temperature recommended by the manufacturer. The Contractor shall fill the joint such that after cooling, the sealant is flush with the adjacent pavement along the edges and the center does not sag more than 3 mm [**1/8 inch**] below the pavement or shoulder surface. Care shall be taken in the sealing of the joints so that the joints are not overfilled and the final appearance shall present a neat fine line. The applicator wand shall be returned to the machine and the joint sealant material recirculated immediately upon completion of each joint sealing. The Engineer may require the Contractor to use a squeegee to force the sealant material into narrow joint shapes if in the opinion of the Engineer the sealant material is not flowing into the joint properly. Sand shall not be spread on the sealed joints to allow for opening to traffic. The sealant shall be tack free before opening to traffic. A given quantity of sealant material shall never be heated at the pouring temperature for more than six (6) hours and shall never be reheated.

(E) Acceptance Sampling

The Contractor shall record the temperature of the kettle and the temperature of the sealant once every hour during the actual working operations. This information is to be recorded on the forms provided by the Engineer. At the end of each days production, the completed forms shall be presented to the Engineer, and they shall be placed in a permanent file by the Engineer. The Engineer shall continuously review the sealant temperatures. Temperatures measured more than -12° C [**10° F**] above the manufacturer's specified safe heating temperature shall result in the rejection of the material in use and the Contractor shall dispose of the overheated material, at his expense, in an acceptable manner.

**WORKMANSHIP**

Sealed joints shall be rejected if there is evidence of poor workmanship or obvious defects, such as, but not limited to the following:

- (a) Sawed joint not filled completely
- (b) Lack of bond to the sides of the joint
- (c) Excessive debris or moisture in the joint
- (d) Contamination of the sealant
- (e) Sawed joint not filled flush

Rejected sealed joints shall be repaired, the sealant removed and disposed of in an appropriate manner and the joints resealed as necessary, to the Engineer's satisfaction and at no further cost to the State.

**MEASUREMENT AND PAYMENT**

Measurement will be made by the length of joints sawed and sealed as specified. Payment will be made under separate items for each joint type at the Contract bid price per meter [**linear foot**], which shall include the cost of all labor, equipment and materials necessary to complete the work as specified.

<b><u>Item No.</u></b>	<b><u>Item</u></b>	<b><u>Unit</u></b>
2331.603	Sawed/Sealed Joint .....	meter [ <b>linear foot</b> ]

**(2357) BITUMINOUS TACK COAT**

The provisions of Mn/DOT 2357 are hereby deleted and replaced with the following:

**2357.1 DESCRIPTION**  
 This work shall consist of the application of bituminous material (emulsion or liquid asphalt) on a bituminous or concrete pavement prior to paving a new lift of Hot Mixed Asphalt.

**2357.2 MATERIALS**

**A Bituminous Material.....3151**

The bituminous material for tack coat will be limited to one of the following kinds of emulsified asphalt. However, the Engineer may authorize the use of medium cure cutback asphalt (MC-250) during the early and late construction season when it is anticipated the air temperature may drop below 32 degrees Fahrenheit.

Allowable grades are as follows:

Emulsified Asphalt

Anionic..... SS-1, SS-1h

Cationic ..... CSS-1, CSS-1h

Cutback Asphalt

Medium Cure Liquid Asphalt ..... MC-250

Only Certified Sources are allowed for use. Mn/DOT's Certified Source List is located at the following link: <http://www.dot.state.mn.us/products/index.html>.

**2357.3 CONSTRUCTION REQUIREMENTS**

**A Restrictions**

Tack coat operations shall be conducted in a manner that offers the least inconvenience to traffic, with movement in at least one direction permitted at all times without pickup or tracking of the bituminous material.

The tack coat shall not be applied when the road surface or weather conditions are unsuitable as determined by the Engineer. The daily application of tack coat shall be limited to approximately the area on which construction of the subsequent bituminous course can reasonably be expected to be completed that day.

**B Equipment**

The bituminous material shall be applied with a distributor meeting the requirements of 2321.3C1.

**C Road Surface Preparations**

At the time of applying bituminous tack coat material, the road surface shall be dry and clean and all necessary repairs or reconditioning work shall have been completed as provided for in the Contract and approved by the Engineer.

All objectionable foreign matter on the road surface shall be removed and disposed of by the Contractor as the Engineer approves.

Preparatory to placing an abutting bituminous course, the contact surfaces of all fixed structures and the edge of the in-place mixture in all courses at transverse joints and in the wearing course at longitudinal joints shall be given a uniform coating of liquid asphalt or emulsified asphalt, applied by methods that will ensure uniform coating.

**D Application of Bituminous Tack Coat Material**

Unless otherwise indicated in the Plans or provisions, the bituminous tack coat material shall be applied within the application rates shown below in Table 2357.3-D as based on pavement type or condition and type of bituminous material. The Engineer shall approve the time and rate of application. Only a Mn/DOT certified asphalt emulsion supplier is allowed to dilute the emulsion. When diluted, the supplier shall provide asphalt emulsion diluted 1 part emulsion to 1 part water. Dilution of asphalt emulsion in the field is not allowed. The Engineer may waive the tack coat requirement when multiple lifts are paved on the same day.

**Table 2357.3-D**

**Tack Coat Application Rates**

Pavement Type or Condition	Application Rate, liter/square meter [ <b>gallons/sy</b> ]		
	Undiluted Emulsion SS-1, SS-1H, CSS-1, CSS-1H	Diluted Emulsion (1 part Emulsion to 1 part water) <sup>1</sup> SS-1, SS-1H, CSS-1, CSS-1H	MC Cutback <sup>2</sup> MC-250
New HMA	0.14 – 0.23 [ <b>0.03 – 0.05</b> ]	0.28 – 0.46 [ <b>0.06 – 0.10</b> ]	0.14 – 0.23 [ <b>0.03 – 0.05</b> ]
Aged HMA <sup>3</sup> or Un-milled PCC	0.23 – 0.37 [ <b>0.05 – 0.08</b> ]	0.46 – 0.69 [ <b>0.10 – 0.15</b> ]	0.23 – 0.37 [ <b>0.05 – 0.08</b> ]
Milled HMA or Milled PCC	0.32 – 0.46 [ <b>0.07 – 0.10</b> ]	0.64 – 0.92 [ <b>0.14 – 0.20</b> ]	0.32 – 0.46 [ <b>0.07 – 0.10</b> ]

- 1- As provided by the asphalt emulsion supplier
- 2- When approved by the Engineer
- 3- Older than 1 year

The temperature of the bituminous material at the time of application shall be approved by the Engineer, within the limits specified following:

SS-1, SS-1H, CSS-1, CSS-1H ..... 21 to 71°C (**70 to 160° F**)  
 MC-250 ..... 74 to 104°C (**165 to 220° F**)

Unless otherwise directed, sand shall be spread on the newly tacked surface at pedestrian crossings.

**2357.4 METHOD OF MEASUREMENT**

**A Bituminous Material**

Bituminous material used for tack coat will be measured by volume at 15°C (**60° F**).

**2357.5 BASIS OF PAYMENT**

All costs of furnishing and applying bituminous tack coat material will be incidental with no direct compensation being made therefore.

**(2357) BITUMINOUS MATERIAL FOR SHOULDER TACK**

This work shall consist of treating aggregate shoulders with bituminous material, in accordance with the provisions of Mn/DOT 2357 and the following:

Bituminous Material for Shoulder Tack shall consist of emulsified asphalt, meeting Mn/DOT 3151 for SS-1, CSS-1, or CSS-1h; and shall not be toxic to plant life.

Water may be added up to 25 percent by volume to the asphalt emulsion as provided for in Mn/DOT 2357.3D. However, added water will be excluded from the application rate and pay quantities.

Water shall be applied to the ground surface immediately in advance of placing the asphalt emulsion. The rate and quantity of water to be applied shall be as directed by the Engineer. In general, the soil shall be moistened to a depth of at least 25 mm [**1 inch**]. Application of water shall be in accordance with Mn/DOT 2130. The asphalt emulsion shall be applied at the rate of 0.81 L per square meter [**0.18 gallons per square yard**]. During placement, every effort shall be taken to obtain a uniform distribution over the area specified. Distributor spray bars shall be used to the fullest extent possible and hand held nozzles are to be used only in inaccessible areas.

**MEASUREMENT**

Bituminous material used for tack coat will be measured by volume at 15°C [**60°F**].



**PAYMENT**

Payment for the accepted quantity of bituminous material used for shoulder tack at the Contract bid price per unit of measure will be compensation in full for all costs of furnishing and applying the material as specified. Furnishing and applying sand on newly tacked surfaces at pedestrian crossings shall be at no expense to the Department with no direct compensation being made therefore. Payment for the shoulder tack will be made on the basis of the following schedule:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
2357.606	Bituminous Material for Shoulder Tack.....	liter [ <b>gallon</b> ]

**(2360) PLANT MIXED ASPHALT PAVEMENT**

Mn/DOT 2360 is hereby deleted from the Mn/DOT Standard Specifications and replaced with the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification**.

Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

**TABLE 50.1A - BITUMINOUS MIXTURE REQUIREMENTS**

<b>Mixture Designations</b>	<b>Location</b>	<b>RAP %</b>	<b>Binder Grade</b>	<b>Comments</b>
SPWEB440F	Cell 70 Driving/Passing lanes	0	64-34	Superpave
SPWEB440B	Cell 70 (both shoulders) Cell 71 (both shoulders) Cell 72 (both shoulders)	(1)	58-28	Superpave shoulders

(1) Percent is unspecified. Contractor to determine percentage in mixture design as allowed per 2360 Specification.

Pavement smoothness requirements of 2360.7C will not apply on this Project. The requirements of 2360.7B (Surface Requirements) will apply.

The hot mix asphalt shall be placed in the dimensioned lifts as indicated in the Plans typical sections.

The provisions of 2360.2 of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** are modified to include the following :

No Recycled Asphalt Shingles or RAP are allowed in the SPWEB440F HMA mixture used on this Project.

The provisions of 2360.3 of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** are modified to include the following:

The Contractor shall supply extra material samples for research testing:

1. Twenty-five (25) 3 gallon buckets of hot mix asphalt from each cell (MnROAD will sample from the paver).
2. Five (5) 5-gallon buckets of asphalt binder from each cell taken from the asphalt plant (MnROAD will sample).
3. 8 cubic yards of each aggregate used in the HMA Mixtures

2360.6 of the attached Combined 2360/2350 (Gyratory/Marshall Design) Specification is hereby deleted and replaced with the following:

## **2360.6 PAVEMENT DENSITY**

### **A General**

All pavements will be compacted in accordance with the Maximum Density Method unless otherwise specified in the Contract special provisions or as noted in Section 2360.6C. Density evaluation will be for both compacted mat density and compacted longitudinal joint density on those projects utilizing gyratory design.

### **B Maximum Density Method**

All courses or layers of plant mixed asphalt mixtures for which the Maximum Density Method is used shall be compacted to a density not less than the percentage shown in the Table of Required Density, Tables 2360.6-B2 and 2360.6-B2 LJ, for the applicable mixture and course and longitudinal joint type (i.e. confined or unconfined). Longitudinal joint density will not be evaluated on those lifts, which have a 1% reduced density requirement. If the Contractor elects to waive the 1% reduced density requirement as per 2360.6B4, then the Longitudinal Joint Density will be a requirement.

### **B1 Maximum Density Determination**

The Density requirements listed in Table 2360.6B2 are percent of maximum specific gravity ( $G_{mm}$ ) based on the individual lot. The Maximum specific gravity value used to calculate the percentage density for the lot shall be the average value obtained from the maximum gravity results from production tests taken during that days paving. If only one or two maximum specific gravity values were obtained that day, then the moving average value (at that test point) shall be used. If three or more maximum specific gravity values are obtained that day, then the average of those tests alone shall be used as indicated above.

### **B1a Pavement Density Determination**

The density of each lot shall be expressed as a percentage of the maximum specific gravity (%  $G_{mm}$ ) obtained by dividing the average bulk specific gravity for the lot by the maximum specific gravity multiplied by 100, (maximum specific gravity basis is the average  $G_{mm}$  of QC tests done on the day that the individual lot was paved as described above). Determination of the bulk specific gravity of the cores shall be in accordance with AASHTO T-166, Mn/DOT modified. For coarse graded mixtures the Engineer may require determination of bulk specific gravity of the cores be in accordance with ASTM D6752 Mn/DOT modified (Corelok). Both the Contractor and Mn/DOT shall use the same test method to determine bulk specific gravity. The determination of coarse and fine graded mixtures will be based on the percentage of material passing the 2.365 mm sieve [#8] as defined in Table 2360.3-B2c.

Compaction operations shall be completed within 8 hours of mixture placement and before core samples are obtained for density determination. Only pneumatic tired or static steel rollers are permitted for any compactive effort performed between 6 and 8 hours after mixture placement.

Compacted mixtures represented by samples or tests having deficient densities shall not be re-rolled. The Contractor shall not operate below the specified minimum density on a continuing basis. A continual basis shall be defined as all lots in a day's production failing to meet minimum density or more than 50% of lots on multiple days which fail to meet minimum density requirements. Production shall be stopped until the source of the problem is determined and corrective action is taken to bring the work into compliance with specified minimum required density.

### **B2 Required Density**

Minimum density requirements for gyratory (SP) designed mixtures are listed in Table 2360.6-B2. Minimum density requirements for longitudinal joint are listed in Table 2360.6-B2 LJ.

Unless otherwise indicated in the Plans or Special Provisions, shoulders wider than 1.8 meters [6 feet] paved shall be compacted by the Maximum Density Method. When shoulders are required to be compacted by the Maximum Density Method and are paved in a separate operation or have a different required minimum density than the driving lane, the lot tonnage placed on the shoulder shall be delineated in separate lots from the driving lanes for the day paving was conducted.

Unless otherwise indicated in the Plans or Special Provisions a narrow shoulder, 1.8 meter [6 feet] or less wide, that is paved in the same pass as a driving lane or that is paved separately will be compacted by the Ordinary Compaction Method. Mixture compacted under Ordinary Compaction is excluded from lot density requirements and that tonnage is also excluded from incentive/disincentive payment.

If the Plans or Special Provisions indicate a narrow shoulder is to be compacted by the Maximum Density Method, the minimum required density is listed in Table 2360.6-B2. If the minimum required density of the shoulder is different than the driving lane, the tonnage placed on the shoulder shall be delineated in separate lots from the driving lane.

Echelon paving (two pavers running next to each other in adjacent lanes) shall be considered separate operations.

**Table 2360.6-B2  
Required Minimum Lot Density (Mat)**

	SP Wear and All MV and LV Mixtures <sup>(1)(2)</sup>	SP Nonwear <sup>(1)(2)</sup>	SP Shoulders <sup>(1)(2)</sup>	
			Designed at 3% voids	Designed at 4% voids
% Gmm	92.0	93.0	93.0	92.0

- 1) Minimum reduced by one percent on the first lift constructed over PCC pavements.
- 2) Minimum reduced by one percent for the first lift constructed on aggregate base (mainline and shoulder), reclaimed or cold in-place recycled base courses and first lift of an overlay on a roadway with a 6.35 metric ton [7 ton] or less spring load restriction (roadway includes shoulders).

**Table 2360.6-B2 LJ  
Longitudinal Joint Density Requirement**

Percent Density		
Location	Confined Edge* of Mat	Unconfined Edge* of Mat
Long. Joint -- Wear & Shoulder (4% air voids)	89.0	86.5
Long. Joint -- Non-Wear & Shoulder (3% air voids)	90.0	87.5

Note: \*Confined shall be defined as the edge(s) of the placed mat abutting another mat, pavement surface, or curb and gutter. Unconfined or unsupported means there is no abutment of the side of the mat being placed with another mat, pavement surface, etc.

**B2a Lots & Core Locations**

**Table 2360.6-B2a  
Lot Determination**

Daily Production		Lots
Metric (ton)	[English (Ton)]	
270* – 545	[300* – 600]	1
546 – 910	[601 – 1,000]	2
911 – 1,455	[1,001 – 1,600]	3
1,456 – 3,275	[1,601 – 3,600]	4
3,276 – 4,545	[3,601 – 5,000]	5
4,546 +	[5,001 +]	6

\*When mix production is less than 270 metric tons [300 tons], establish 1<sup>st</sup> lot when accumulative tonnage exceeds 270 metric tons [300 tons].

**Compacted Mat Density**

Divide the days production into equal lots as shown in Table 2360.6-B2a. The Engineer may require additional density lots be established to isolate areas affected by equipment malfunction/breakdown, heavy rain, or other factors that may affect the normal compaction operations. Obtain four cores in each lot. Two cores will be taken from random locations selected by the Engineer. The third and fourth cores (the companion cores) shall be taken within 0.3 meters [1 foot] longitudinally from the first two cores. All companion cores shall be given to the Department Street Inspector immediately upon completion of coring and sawing. The random locations will be determined by the Engineer using statistically derived stratified random number tables or other approved methods of random number generation. These will also be used for partial lots. If the random core location falls on a longitudinal joint cut the core with the outer edge of the core barrel 0.3 meters [1 foot] away (laterally) from the edge of the top of the mat (joint). Cores for compacted mat density will not be taken within 300 mm [1 foot] of any longitudinal joint. The Contractor shall be responsible for maintenance of traffic, coring, patching the core holes, and sawing the cores if necessary to the proper thickness prior to density testing.

**Longitudinal Joint Density**

Longitudinal joint density will be evaluated at random lots, as determined by the Engineer near the end of the days paving operation, for 20% of the lots established for compacted mat density (Table 2360.6-B2a). Determine the number of lots for longitudinal joint density by multiplying the number of lots calculated for mat density by 0.20 and rounding up to the next higher whole number. There is a minimum requirement of 1 lot per day for longitudinal joint density evaluation.

Within lots designated as Longitudinal Joint Density lots, the Contractor will take the 4 cores per lot requirement for mat density, plus the Contractor shall take an additional 4 cores for longitudinal joint density. Cores for longitudinal joint density shall be taken at one of the locations (station) where cores are taken for “mat density”. This determination will be made at random. A total of 6 cores will be at this location (station). Cores for longitudinal joint density will be taken on both sides of the lane being paved. These “edge cores” shall be cut with the outer edge of the core barrel within 150 mm (6 inches) from the edge of the top of the mat for both confined and unsupported edges. Companion cores shall be taken within 0.3 meters (1 foot) longitudinally from each “edge core”. The 2 cores for “mat density” (regular and companion core) shall be taken either 2 feet right or 2 feet left of the center of the lane being paved, regardless of random number generation.

**B3 Core Testing**

Cores will be taken and tested by the Contractor. Core locations will be determined and marked by the Engineer. The Contractor shall schedule the approximate time of testing during normal Project work hours so that the Engineer may observe and record the saturated surface dry and immersed weight of the cores.

Density determination will be made by the end of the next working day after placement and compaction. If multiple layers are placed in a single day, cores shall be sawn and separated for each layer, tested and reported by the end of the next working day.

The Contractor will cut pavement samples from the completed work with power equipment, and restore the surface by the end of the next working day with new, well compacted mixture without additional compensation. Failure to restore the surface within 24 hours of coring shall subject the Contractor to a fine of \$100 per working day, per lot, until the core holes are restored. Cores shall be cut using a 100 mm [4 inch] minimum outer diameter coring device. All samples shall be marked with the lot number and core number or letter. The cores shall be transported to the laboratory as soon as possible to prevent damage due to improper handling or exposure to heat. These companion cores may be tested by the Inspector on Department scales or transported to the Department's Field Laboratory or District Materials Laboratory.

Measure each core three times for thickness prior to saw cutting; report the average lift thickness on the core sheet. These average thicknesses will contribute to thickness compliance as described in Section 2360.7A

#### **Companion Core Testing**

The Department will select at least one of the two companion cores per lot to be tested. However, the Department may elect to test **all** companions to provide a direct verification of all individual and daily average test results. For lots designated as Longitudinal Joint Density lots, the Agency will test at least one of the Mat Density companion cores and at least one of the Longitudinal Joint Density companion cores.

Verification of the Contractor and Agency core bulk specific gravities will involve two comparisons. The first comparison will compare core bulk specific gravities of the Contractor's individual cores and the corresponding Agency companion cores. The second comparison will compare the "days' average" core bulk specific gravities of Contractor and Agency tests.

The comparison of the individual core bulk specific gravities will have a tolerance of 0.030 between the Contractor's bulk specific gravity and the Agency's bulk specific gravity. If the tolerance is exceeded, the Agency's result will be substituted for the Contractor's result.

For the comparison of the Contractor and Agency "days' average" bulk specific gravities use only those tests that meet the 0.030 individual tolerance and compare the average of the Contractor specific gravities with the average of the Agency specific gravities. The tolerance will be variable depending on how many samples are compared and will be equal to 0.030 divided by the square root of the number of samples compared ( $0.030/\sqrt{n}$ ). If this tolerance is exceeded, all the Agency's test results will be substituted for the Contractor's results for that day's paving.

The Engineer may allow re-coring of a sample only when the core has been damaged through no fault of the Contractor, either during the coring process or in transit to the laboratory.

The Agency may elect to develop and make available to the Contractor, an Internet data collection tool, to collect and analyze density core bulk specific gravity data. In this case, the Contractor may voluntarily use this tool to input density core data. In such a case, the Agency would use the data to determine the reliability of the Contractor's density core data. If the analysis finds an acceptable level of reliability, the Agency would authorize a reduction of coring frequency for companion cores to one Agency companion for every two Contractor's cores.

**B4 Maximum Density Acceptance and Payment Schedule**

The density of compacted mixture shall be accepted by pavement cores on a lot basis.

The Contractor’s cores will be used for acceptance, after the Agency result substitutions have been made, as stipulated above. Payment factors for mat density and longitudinal joint density are listed in Tables 2360.6-B4 LJ, 2360.6-B4a LJ, and 2360.6-B4b LJ shown below. Incentive and disincentive payments are for both wearing and non-wearing courses. However, incentive payment for longitudinal joint density will be limited to only those lots in which longitudinal joint density has been evaluated.

When the density requirement has been reduced by one percent, per Table 2360.6-B2, footnote 1 & 2, payment adjustments for lot densities will be made as specified in Table 2360.6-B4A. Incentive payments are excluded when the minimum density has been reduced. However, at the Contractors request and with approval of the Engineer, the reduced density requirement may be waived and density evaluated under Table 2360.6-B4, including incentives, for first lift constructed on aggregate base, reclaimed or cold in-place recycled base courses and first lift of an overlay on a roadway with a 6.35 metric ton [7 ton] or less spring load restriction (reduced density shall not be waived for the first lift constructed on PCC pavements). The request and approval shall be made after the first days paving and before the third days paving begins. Once the request has been approved, evaluation of density will be in accordance with Table 2360.6-B2 (excluding footnote 2) and Table 2360.6-B4, and will remain in effect for the duration of mixture placement on that lift. The Contractor will also be responsible for compliance with any construction requirements on subsequent lifts.

**Table 2360.6-B4 LJ  
Payment Schedule for Maximum Mat Density**

% Density <sup>(2)</sup> SP Wear, and SP Shld (4% Void)	% Density <sup>(2)</sup> SP Non-Wear, SP Shoulders (3% Void)	<b>Pay Factor A</b>
93.6 and above	94.6 and above	1.04 <sup>(3)</sup>
93.1 - 93.5	94.1 - 94.5	1.02 <sup>(3)</sup>
92.0 - 93.0	93.0 - 94.0	1.00
91.0 - 91.9	92.0 - 92.9	0.98
90.5 - 90.9	91.5 - 91.9	0.95
90.0 - 90.4	91.0 - 91.4	0.91
89.5 - 89.9	90.5 - 90.9	0.85
89.0 - 89.4	90.0 - 90.4	0.70
Less than 89.0	Less than 90.0	<sup>(4)</sup>

**Table 2360.6-B4A <sup>(1)</sup>  
1% Reduced Table**

Percent of Max Specific Gravity <sup>(2)</sup> SP Wear, and SP Shld (4% Void)	Percent of Max Specific Gravity <sup>(2)</sup> SP Non-Wear, and SP Shoulders (3% Void)	Percent Payment
91.0 and above	92.0 and above	100
90.0 - 90.9	91.0 - 91.9	98
89.7 - 89.9	90.5 - 90.9	95
89.4 - 89.6	90.0 - 90.4	91
89.2 - 89.3	89.5 - 89.9	85
89.0 - 89.1	89.0 - 89.4	70
Less than 89.0 <sup>(4)</sup>	Less than 89.0	<sup>(4)</sup>

**Table 2360.6-B4a LJ <sup>(5)</sup>**  
**Payment Schedule for Longitudinal Joint Density**  
**(SP Wear, and SP Shld (4% Void))**

% Density <sup>(2)</sup> Long. Joint (Confined Edge)	Pay Factor B (Confined Edge)	% Density <sup>(2)</sup> Long. Joint (Unsupported Edge)	Pay Factor C (Unsupported Edge)
91.6 and above	1.02 <sup>(3)</sup>	89.6 and above	1.02 <sup>(3)</sup>
91.1-91.5	1.01 <sup>(3)</sup>	89.1-89.5	1.01 <sup>(3)</sup>
89.0-91.0	1.00	86.5-89.0	1.00
88.0-88.9	0.98	85.5-86.4	0.98
87.5-87.9	0.95	85.0-85.4	0.95
87.0-87.4	0.91	84.5-84.9	0.91
86.5-86.9	0.85	84.0-84.4	0.85
Less than 86.4	0.70	Less than 83.9	0.70

**Table 2360.6-B4b LJ <sup>(5)</sup>**  
**Payment Schedule for Longitudinal Joint Density**  
**(SP Non-Wear, and SP Shoulders (3% Void))**

% Density <sup>(2)</sup> Long. Joint (Confined Edge)	Pay Factor B (Confined Edge)	% Density <sup>(2)</sup> Long. Joint (Unsupported Edge)	Pay Factor C (Unsupported Edge)
92.6 and above	1.02 <sup>(3)</sup>	90.6 and above	1.02 <sup>(3)</sup>
92.1-92.5	1.01 <sup>(3)</sup>	90.1-90.5	1.01 <sup>(3)</sup>
90.0-92.0	1.00	87.5-90.0	1.00
89.0-89.9	0.98	86.5-87.4	0.98
88.5-88.9	0.95	86.0-86.4	0.95
88.0-88.4	0.91	85.5-85.9	0.91
87.5-87.9	0.85	85.0-85.4	0.85
Less than 87.4	0.70	Less than 84.9	0.70

- (1) Minimum reduced by one percent for the first lift constructed on aggregate base (mainline and shoulder), reclaimed or cold in place recycled base courses and first lift of an overlay on a roadway with a 6.35 metric ton [7 ton] or less spring load restriction (roadway includes shoulders). Minimum reduced by one percent on the first lift constructed on PCC pavements (reduced density cannot be waived).
- (2) In calculating the percent of maximum specific gravity, report to the nearest tenth.
- (3) The payment in this portion of the specification shall apply only if the day's weighted average individual production air voids are within - 0.5 percent of the target air void value. The weighted average air voids shall be based on all the mixture production tests (2360.4e) for the corresponding day and shall be weighted by the tons the corresponding test represents.
- (4) The HMA material represented by the lot shall be paid at a 70% pay factor, unless a single core density is less than 87.0% of the maximum specific gravity (Gmm). If a single core density is less than 87.0% of Gmm, the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. Reduced payment will be 50 percent of the Contract bid price. If the mixture is to be removed and replaced, the Contractor at his expense will remove and replace with mixture that meets the density requirement. The limits of the area to be removed and replaced will be determined by additional core samples. These additional core samples shall be taken at the same offset from centerline as the original core; unless the original low density core was taken within 0.45 m [1.5 feet] of an edge of the paver pass. In that case, the additional cores shall be taken 0.45 m [1.5 feet] from the edge of the paver pass. The densities shall be determined at 15 m [50 foot] intervals, both ahead and back of the point of unacceptable core density (less than 87.0% of Gmm), until a point of acceptable core density (87.0% of Gmm or greater) is found. If the incremental core density testing extends into a previously accepted lot, removal of the unacceptable material will be required; however, the results of these tests shall not be used to

recalculate the previously accepted lot density. All costs incurred from additional coring and testing, resulting from unacceptable core density, will be paid by the Contractor. The unacceptable pavement area is to be computed as the product of the longitudinal limits so determined by the 15 m [50 foot] cores and the full width of the paver pass, laying in the traffic lane or lanes. Shoulders shall be exempt from this calculation unless density failure occurred in the shoulder area.

After the unacceptable material (core density less than 87.0% of Gmm) has been removed and replaced, the density of the replacement material will be determined by the average of two cores. Payment for the replacement material will be in accordance with Tables 2360.6-B4 or 2360.6-B4A, whichever applies. There will be no payment for the material removed. The remainder of the original lot shall have a 70% pay factor.

- (5) Incentive payment for longitudinal joint density will be limited to only those lots in which longitudinal joint density has been evaluated.

### **Pay Factor Determination**

The total pay factor will be determined by selecting one of the following three cases based on longitudinal joint construction i.e., whether the edges of the mat (right and left) are confined or unsupported. Confined shall be defined as the edge(s) of the placed mat abutting another mat, pavement surface, or curb and gutter. Unsupported means there is no abutment of the side of the mat being placed with another mat, pavement surface, etc.

Case 1) Total Pay Factor = (Pay Factor A) X (Pay Factor B) X (Pay Factor C)

Case 2) Total Pay Factor = (Pay Factor A) X (Pay Factor B) X (Pay Factor B)

Case 3) Total Pay Factor = (Pay Factor A) X (Pay Factor C) X (Pay Factor C)

Where: Pay Factor A is for mat density

Pay Factor B is confined edge density, and

Pay Factor C is for unsupported edge density

**Note: Use a pay factor of 1.00 for Pay factor B and/or Pay factor C in lots where no cores are taken at the longitudinal joint.**

### **C Ordinary Compaction Method**

Ordinary compaction shall be used for layers identified in the typical sections with a minimum planned thickness of less than 40 mm [1 1/2 inches], thin lift leveling, wedging layers, patching layers, driveways, areas which cannot be compacted with standard highway construction equipment. Unless otherwise indicated in the Plans or Special Provisions recreational trails shall also be compacted by ordinary compaction. The ordinary compaction method shall not be used on mainline, ramp, or loop paving, unless otherwise designated in the Plans or special provisions. When density is evaluated by the ordinary compaction method a control strip shall be used to establish a rolling pattern. This shall be used by the Contractor for the compaction of the asphalt mixture for the layer on which the control strip is constructed, or until a new control strip is constructed. The control strip requirement may be waived, by the Engineer, in small localized areas or other areas not conducive to its establishment.

A control strip shall be constructed at the beginning of the work on each lift of each course. Each control strip shall have an area of at least 330 m<sup>2</sup> [395 square yards] and shall be of the same thickness as the lift it represents. The subgrade or pavement course upon which a control strip is to be constructed shall have the prior approval of the Engineer. The control strips shall remain in place and become part of the completed work.

The materials used in the construction of the control strips shall conform to the specified requirements for the course. The materials used in the control strip shall be from the same source and of the same type as the materials used in the remainder of the course that the control strip represents.



The equipment used in the construction of the control strips shall be approved by the Engineer and shall be the same type and mass used on the remainder of the pavement course represented by the control strip. A minimum of two rollers shall be required. A rolling pattern shall be established for each roller. A pneumatic-tired roller shall be available for compaction operations within 24 hours after request by the Engineer. The final rolling shall be performed with a tandem steel-wheeled roller. Areas that are inaccessible to the conventional type rolling equipment shall be compacted to the required density by using trench rollers or mechanical tampers.

Construction of the control strips will be as directed by the Engineer. Compaction shall commence as soon as possible after the mixture has been spread to the desired thickness and shall continue until no appreciable increase in density can be obtained by additional roller's coverages. Densities will be determined by means of a portable nuclear testing device or suitable approved alternate and a growth curve shall be developed to determine the optimum rolling pattern. The Contractor shall furnish documentation of the growth curve to the Engineer.

To determine when no appreciable increase in density can be obtained, two test points shall be established in the control strip on a random basis and the density at each point shall be measured by a portable nuclear device or suitable approved alternate after each roller pass. Rolling shall be suspended when testing shows either a decline of more than 2% of the maximum specific gravity or when additional roller passes fail to increase the density.

After said testing is accomplished, rolling on the remainder of that course shall be done in accordance with the pattern developed in the test strip for that roller. A separate rolling pattern and time interval shall be established for each roller.

A new control strip shall be ordered by the Engineer when:

- (a) A change in the JMF is made, or
- (b) A change in the source of material is made or a change in the material from the same source is observed.

A new control strip may be ordered by the Engineer or requested by the Contractor when:

- (a) Ten days of production have been accepted without construction of a new control strip, or
- (b) There are other reasons to believe that a control strip density is not representative of the HMA mixture being placed.

The nuclear testing device shall be furnished and operated by the Contractor. The furnishing of the testing device and the operator will be considered incidental to the furnishing and placement of the HMA mixture and shall not be compensated for separately. The device shall be calibrated according to procedures described in the Mn/DOT Bituminous Manual.

Each course shall be uniformly compacted until there is no further evidence of consolidation and all roller marks are eliminated. When this method is employed, and the quantity of mixture placed by the paver exceeds 100 metric tons [**110 tons**] per hour, at least two rollers are required for compacting the mixture placed by each paver.

## **C1 Rollers**

The following requirements for rollers apply only when compaction is obtained by the ordinary compaction method.

## **C2 Steel-Wheeled Rollers**

Steel-wheeled rollers shall be self-propelled and has a minimum total mass of 7.3 metric tons [**8 tons**], or as otherwise specified in the Contract. When vibratory rollers are used, they shall produce

45 kN per meter [**3,085 lbf per foot**] of width. The frequency should be at least 2400 vpm and amplitude setting low. The roller shall be capable of reversing without backlash and shall be equipped with spray attachments for moistening all rollers on both sets of wheels.

**C3 Pneumatic-Tired Rollers**

The pneumatic-tired roller shall have a compacting width of 1.5 m [**5 feet**] or more. It shall be so constructed that the gross wheel load force shall be a minimum of 13 kN [**3,000 pounds**] per wheel for LV and MV mixtures and SP Level 2-3 mixtures and 22 kN [**5,000 pounds**] per wheel for SP Level 4-6 mixtures and can be varied as directed by the Engineer. The tire arrangement shall be such that full compaction will be obtained over the full width with each pass of the roller.

The roller may be self propelled or provided with suitable tractive equipment, unless otherwise specified in the Contract. If more than one roller is propelled by a single tractive unit, then that combination will be counted as a single roller unit.

**C3a Vibratory Pneumatic-Tired Rollers**

Vibratory pneumatic-tired rollers shall be self-propelled and have a minimum total mass of 7.3 metric tons [**8 tons**], or as otherwise specified in the Contract. The compacting width shall be 1.5 m [**5 feet**] or more. The tire arrangement shall be such that full compaction will be obtained over the full width with each pass of the roller.

**C4 Trench Rollers**

Trench rollers shall be self propelled and have a mass of not less than 4 400 kg per meter [**2,960 pounds per foot**] of width.

**C5 Mixture Temperature Controls**

If compaction is obtained by the ordinary compaction method, the minimum laydown temperature in all courses (as measured behind the paver or spreading machine) of the asphalt mixture shall be in accordance with the temperature requirements of Table 2360.6-C5. Unless directed by the Engineer in writing, no paving is allowed under the Ordinary Compaction Method when the air temperature is below 0°C [**32°F**].

**Table 2360.6-C5  
Mixture Temperature Control**

Air Temperature	Compacted Mat Thickness, mm <sup>(A)</sup>			
	25 mm [ <b>1 inch</b> ]	40 mm [ <b>1-1/2 inch</b> ]	50 mm [ <b>2 inch</b> ]	≥75 mm [ <b>3 inch</b> ]
°C [°F]				
+0-5 [ <b>32-40</b> ]	--	129 <sup>(B)</sup> [ <b>265</b> ]	124 [ <b>255</b> ]	121 [ <b>250</b> ]
+ 6-10 [ <b>41-50</b> ]	130 <sup>(B)</sup> [ <b>270</b> ]	127 [ <b>260</b> ]	121 [ <b>250</b> ]	118 [ <b>245</b> ]
+ 11-15 [ <b>51-60</b> ]	127 <sup>(B)</sup> [ <b>260</b> ]	124 [ <b>255</b> ]	118 [ <b>245</b> ]	115 [ <b>240</b> ]
+ 16-21 [ <b>61-70</b> ]	121 <sup>(B)</sup> [ <b>250</b> ]	118 [ <b>245</b> ]	115 [ <b>240</b> ]	113 [ <b>235</b> ]
+ 22-27 [ <b>71-80</b> ]	118 [ <b>245</b> ]	115 [ <b>240</b> ]	113 [ <b>235</b> ]	113 [ <b>235</b> ]
+ 28-32 [ <b>81-90</b> ]	113 [ <b>235</b> ]	110 [ <b>230</b> ]	110 [ <b>230</b> ]	110 [ <b>230</b> ]
+ 33 [ <b>91+</b> ]	110 [ <b>230</b> ]	110 [ <b>230</b> ]	110 [ <b>230</b> ]	107 [ <b>225</b> ]

(A) Based on approved or specified compacted lift thickness.

(B) A minimum of one pneumatic-tire roller shall be used for intermediate rolling unless otherwise directed by the Engineer. The Engineer may specify or modify in writing (with concurrence from the Department Bituminous Engineer) a minimum laydown temperature.

**BASIS OF PAYMENT**

Payment for the accepted quantities of asphalt mixture used in each course at the Contract prices per unit of material shall be compensation in full for all costs of constructing the asphalt surfacing as specified, including the costs of furnishing and incorporating any asphalt binder, mineral filler, hydrated lime, or anti-stripping additives that may be permitted or required.

Apply reduced payment only when mixture includes steel slag as one of the aggregate proportions. If the production Marshall lab density at the recommended or established asphalt content is in excess of 2565 kg/m<sup>3</sup> [**160 pounds per cubic foot**], payment for mixture will be calculated at the following percent of the Contracted unit price.

$$\% \text{ Payment} = \{100 - \{[100 \times (\text{production density at design gyrations} - 2565)] / 2565\}\}$$

$$\% \text{ Payment} = \{100 - \{[100 \times (\text{production density at design gyrations} - 160)] / 160\}\} \text{ ENGLISH}$$

In the absence of Contract items covering shoulder surfacing and other special construction, the accepted quantities of material used for these purposes will be included for payment with the wearing course materials.

The Contractor is responsible to complete yield checks and monitor thickness determinations so that the constructed dimensions correspond with the required Plan dimensions throughout the entire length of the Project. The tolerances for lift thickness shown in 2360.7A and B, Thickness and Surface Smoothness Requirement is for occasional variations and not for continuous over-running or under-running, unless ordered or Authorized by the Engineer.

Payment for the item of asphalt mixture production at the Contract unit price of mixture produced shall be compensation in full for all costs of producing the mixture and loading it on board the Department's trucks at the mixing plant. The provisions of Mn/DOT 1903 are modified to the extent that the Department will not make a price adjustment in the event of increased or decreased quantities of asphalt mixture items.

Payment for plant mixed asphalt surface will be made on the basis of the following schedule:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
2360.501	Type SP (1) Wearing Course Mixture ((3),(4)).....	metric ton [ <b>ton</b> ]
2360.502	Type SP (1) Non Wearing Course Mixture ((3),(4)).....	metric ton [ <b>ton</b> ]
2360.503	Type SP (1) (2) Course Mixture ((3),(4)) (5) mm [ <b>inch</b> ] thick.....	square meter [ <b>square yard</b> ]
2360.504	Type SP (1) (2) Course Mixture ((3),(4)).....	[ <b>square yard inch</b> ]
2360.505	Type SP (1) Bituminous Mixture for Specified Purpose.....	metric ton [ <b>ton</b> ]
2360.506	Type SP (1) Bituminous Mixture Production .....	metric ton [ <b>ton</b> ]

- (1) Aggregate Size Designation, 9.5, 12.5 or 19 as appropriate.
- (2) "Wearing" or "Non Wearing" as appropriate.
- (3) Traffic Level as per Table 2360-1-A.
- (4) AC binder grade designation.
- (5) Specified lift thickness.

**(2360) PLANT MIXED ASPHALT PAVEMENT – USE OF ADJUSTED AFT INSTEAD OF VMA FOR MIXTURE QUALITY AND ACCEPTANCE**

The provisions of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** of these Special Provisions is hereby modified as follows in order to use the calculated Adjusted Asphalt Film Thickness (Adj. AFT) instead of Voids in the Mineral Aggregate (VMA) to ensure adequate effective asphalt volume. VMA values will still be calculated for information purposes, but will not be used for acceptance criteria. The calculation of Adjusted AFT will be based on the calculated aggregate surface area (SA) and the effective asphalt content.

AGGREGATE SURFACE AREA (SA)

The aggregate surface area (SA) shall be calculated by the following formula<sup>(1)</sup>:

$$SA = 2 + 0.02a + 0.04b + 0.08c + 0.14d + 0.30e + 0.60f + 1.60g$$

Where:

SA = Aggregate Surface Area in SF/lb. of dry aggregate

a, b, c, d, e, f and g are the percent of total aggregate passing the #4, #8, #16, #30, #50, #100 and #200 sieves, respectively. The percent passing each of the sieves shall be rounded to the nearest 1 percent, except for the #200 sieve, which shall be rounded to the nearest 0.1 percent.

- (1) Mixtures with a combined (-)#4  $G_{sb}$  less than 2.580, or greater than 2.700, will have the calculated SA adjusted accordingly. The SA will be increased for mixtures with a combined (-)#4  $G_{sb}$  less than 2.580, and decreased for mixtures with a combined (-)#4  $G_{sb}$  greater than 2.700. The SA adjustment procedure is as follows: Adjusted SA = SA x  $(2.650 \div \text{Mixture } (-)\#4 G_{sb})$ . There will be no SA adjustment for mixtures with a combined (-)#4  $G_{sb}$  between 2.580 and 2.700.

ADJUSTED ASPHALT FILM THICKNESS (Adj. AFT)

**Adjusted Asphalt Film Thickness (Adj. AFT)**

$$\text{Adjusted AFT} = \text{AFT} + 0.06(\text{SA}-28)$$

Asphalt Film Thickness (AFT)

The asphalt film thickness (AFT) shall be calculated by the following formulas:

$$\text{AFT} = \frac{P_{be} \times 4870}{100 \times P_s \times \text{SA}}$$

Where:

AFT = Asphalt Film Thickness in microns

$P_{be}$  = Effective Asphalt Content as a percent of the total mixture

4870 = Constant Conversion Factor

$P_s$  = Percent Aggregate in Mixture /100, or  $(100-P_b) /100$

$P_b$  = Percent Total Asphalt Cement in Mixture

SA = Calculated Aggregate Surface Area in SF/lb.

Example of AFT Calculation

Assume:  $P_b = 5.9\%$   
 $P_{be} = 4.9\%$  (based on total mixture weight)  
Combined (-)#4  $G_{sb}$  between 2.580 and 2.700  
% passing #4 = 73%  
% passing #8 = 58%  
% passing #16 = 42%  
% passing #30 = 28%  
% passing #50 = 17%  
% passing #100 = 7%  
% passing #200 = 5.4%

$$\text{SA} = 2 + (0.02)(73) + (0.04)(58) + (0.08)(42) + (0.14)(28) + (0.30)(17) + (0.60)(7) + (1.6)(5.4) = 31.0 \text{ SF/lb.}$$

$$\text{AFT} = \frac{(4.9)(4870)}{(100)[(100-5.9)/100](31.0)} = \frac{23,863}{(100)(0.941)(31.0)} = 8.2 \text{ microns}$$

Example of Adjusted AFT Calculation

$$\text{Adj. AFT} = 8.2 + 0.06(31.0-28.0) = 8.2 + 0.06(3.0) = 8.2 + 0.2 = 8.4 \text{ microns}$$

The Adjusted AFT will be greater than the AFT if the SA is greater than 28.0 SF/Lb., and will be less than the AFT if the SA is less than 28.0 SF/Lb.

#### MIXTURE DESIGN

- (A) The Contractor's trial mix shall have a minimum Adjusted AFT of 8.5 microns.
- (B) Table 2360.3-B2b is modified to add minimum Adjusted AFT requirements, and eliminate the VFA requirements. The minimum Individual and Moving Average (n=4) Adjusted AFT shall be 7.5 and 8.0 microns, respectively.
- (C) The VMA requirements listed in Table 2360.3-B2c are eliminated; however, VMA values shall still be calculated for information purposes.

#### DOCUMENTATION (MIX DESIGN)

- (A) Section 2360.3C5 is modified to include the percent passing the #16, #30, #50 and #100 sieves in addition to the sieves listed in Table 2360.2-E.
- (B) Section 2360.3C13 (i) is modified to include Adjusted AFT. The VMA and VFA shall remain included for information purposes.
- (C) Section 2360.3C13 is modified to add (k) "The calculated Adjusted Asphalt Film Thickness (Adj. AFT)" at each asphalt binder content.
- (D) Section 2360.3C14 is modified to add (f) "The calculated Adjusted Asphalt Film Thickness (Adj. AFT)".

#### MIXTURE DESIGN REPORT

The Mixture Design Report listed in Section 2360.3E will not include any VMA requirements.

#### PRODUCTION SAMPLING AND TESTING RATES

- (A) Table 2360.4-E titled "Production Sampling and Testing Rates" is modified as follows:
  - (1) To add that the adjusted asphalt film thickness (Adj. AFT) shall be calculated each time a gradation test is required. The calculation procedure to be used is illustrated in this Special Provision.
  - (2) The Sampling and Testing Rate for gradations is modified to "1 gradation per 900 metric tons (**1000 tons**), or portion thereof (minimum of one per day)", or at the same rate as the QC Mixture Property ( $G_{mm}$  and  $G_{mb}$ ) tests are required by the SCHEDULE OF MATERIALS CONTROL. All gradations will include the percent passing the #16, #30, #50 and #100 sieves.
- (B) Section 2360.4-E6 is modified to "Testing to determine the blended aggregate gradation shall be determined every 900 metric tons (**1000 tons**), or portion thereof (minimum of one per day) on samples taken at the same time as the required mixture sample for a given increment.

#### PRODUCTION DOCUMENTATION (Records)

Section 2360.4-F2a is modified to add (16) "Calculated adjusted asphalt film thickness (Adj. AFT)".

#### PRODUCTION DOCUMENTATION (Control Charts)

Section 2360.4-G5 is modified to eliminate voids in the mineral aggregate (VMA) and replace with adjusted asphalt film thickness (Adj. AFT).

### JMF LIMITS

- (A) Section 2360.4H is modified as follows:

“The production air voids and Adjusted AFT are based on the specified requirements as shown in Tables 2360.3-B2b (as modified by this Special Provision). Gradations and asphalt binder content limits are based upon the current Department reviewed Mixture Design Report. Gradation control sieves include each sieve shown in Table 2360.2-E. The mixture production targets are listed on the Mixture Design Report. JMF limits are the target plus or minus the limits shown in Table 2360.4-H (as modified by this Special Provision). JMF limits are used as the criteria for acceptance of materials based on the moving average. A moving average is the average of the last four test results.”

- (B) Table 2360.4-H, JMF limits (N=4), is modified as follows:

- (1) The VMA requirement is eliminated. The VMA will be calculated for information, but is not included in acceptance criteria.
- (2) The JMF limits for the gradation sieves shall be the same as the “Broad Band” limits listed in Table 2360.2-E. The gradation JMF limits (for both Moving Average and Individual results) shall not exceed those listed in Table 2360.2-E.

### JMF ADJUSTMENT

- (A) Section 2360.4J1, paragraph #3, is modified to exclude any reference to VMA.

- (B) The last sentence of paragraph #3 is changed to:

“The JMF asphalt content may only be reduced if at least the last **four** Adjusted AFT production tests (calculations) average 8.5 microns or more, and have minimum Individual Adjusted AFT’s of at least 7.5 microns.

- (C) Sections 2360.4J1 and 2360.4K are modified to “eliminate any reference to VMA”.

### FAILING MATERIALS

- (A) Section 2360.4L2 is eliminated.

- (B) Section 2360.4L3 is modified so that an individual gradation test which is outside the “Broad Band” gradation limits listed in Table 2360.2-E is a failure. It is not allowed twice the JMF limits.

- (C) Table 2360.4-L3, Reduced Payment Schedule for Individual Test Results, is modified as follows:

- (1) The VMA item is eliminated.
- (2) Add “Adjusted AFT” as an item. The Pay Factors are 90% for an Individual Adjusted AFT less than 7.5 microns and 75% for an Individual Adjusted AFT less than 7.0 microns but greater than 6.0 microns.

- (D) Section 2360.4L5 is eliminated.

- (E) Add the following table and text as Section 2360.4L9, Individual Failure(s) – Adjusted AFT.

**Table 2360.4-L9  
Reduced Payment Schedule for Individual Test Results - Adjusted AFT**

Individual Adjusted AFT (microns)	Pay Factor
7.5 or Greater	100%
7.4 to 7.0	90%
6.9 to 6.1	75%
6.0 or Less	R&R <sup>(1)</sup>

<sup>(1)</sup> Remove and Replace at the Contractor’s expense

Reduced payment or removal and replacement as shown in Table 2360.4-L9 shall apply to all tonnage represented by the individual test (calculation). This tonnage includes all material placed from the sample point of the failing test (calculation) until the sample point when the test (calculation) result meets either 7.5 microns (to receive 100% payment), 7.0 microns (to receive 90% payment) or 6.1 microns (to receive 75% payment).

When the failure occurs at the first test after the start of daily production, the tonnage subjected to reduced payment, or removal and replacement, shall be calculated as described above and shall include the tonnage from the start of production that day.”

- (F) Add the following Section 2360.4L10, Moving Average Failure at Start-Up - Adjusted AFT

“The Moving Average (n=4) Adjusted AFT will not be calculated until the **sixth** test after the beginning of mixture production of that specific mixture. This calculation shall include the Individual results of test (calculation) # **3, 4, 5 and 6**.

- (G) Add the following table and text as Section 2360.4L11, Moving Average Failure – Adjusted AFT

**Table 2360.4-L11  
Reduced Payment Schedule for Moving Average Test Results - Adjusted AFT**

Moving Average Adjusted AFT (microns)	Pay Factor
7.9 or less	80%

If the Moving Average (n=4) of the Adjusted AFT is less than 8.0 microns, the mixture is considered unsatisfactory, and will be accepted at a reduced payment. Reduced payment will be 80 percent of the Contract bid price.

Tonnage subjected to replacement or reduced payment shall be calculated as the tons placed from the sample point of all Individual Adjusted AFT results less than 8.0 microns, which contributed to the Moving Average value that was less than 8.0 microns, to the sample point when the Individual Adjusted AFT is 8.0 microns or greater. When the failure occurs at the first test after the start of daily production, the tonnage subjected to reduced payment shall be calculated as described above and shall include the tonnage from the start of production that day.

**QUALITY ASSURANCE**

Table 2360.4-M titled “Allowable Differences (Tolerances) Between Contractor and Mn/DOT Test Results” is modified to add the sieves and tolerances listed in the following table:

**Additional Fine Sieve Gradation Tolerances**

<b>Sieve size</b>	<b>Allowable Tolerance (% passing)</b>
1.18 mm [#16]	4%
0.60 mm [#30]	4%
0.30 mm [#50]	3%
0.15 mm [#100]	2%
0.075 mm [#200]	* 1.2%

\* The #200 sieve is not a new sieve, but the allowable tolerance has been changed from Table 2360.4 -M.

The allowable difference between the Contractor and Mn/DOT verification Adjusted AFT calculation is 1.2 microns.

The Contractor’s Adjusted AFT shall be calculated using his individual test values except for any individual test results that are out of tolerance. The individual test tolerances are listed in Table 2360.4-M (as modified by this Special Provision). The Contractor shall substitute any individual Mn/DOT test results that are resolved to be out of tolerance.

If the Adjusted AFT calculation is out of tolerance, the Mn/DOT Adjusted AFT calculation (based on Mn/DOT test results) will be Equalized and used for the Individual Adjusted AFT result, and calculation of Moving Average Adjusted AFT results. Equalization of the Mn/DOT Adjusted AFT result consists of increasing the original Mn/DOT value by 0.5 microns. This increased value will then be used for acceptance.

**VERIFICATION TESTING**

Add calculated adjusted asphalt film thickness (Adj. AFT) to the mixture properties that will be used to verify the mixture quality for acceptance. The voids in the mineral aggregate (VMA) will be used for information, but not acceptance.

**(2461) STRUCTURAL CONCRETE**

The provisions of Mn/DOT 2461 are modified in accordance with the following:

Mn/DOT 2461.3D1 first paragraph and item (a) and Mn/DOT 2461.3D2 item (b) are hereby deleted and the following inserted therefore:

For the Low-Cost and Recycled Mixes, the cementitious fraction shall be comprised of up to 60% supplementary cementitious materials, including but not limited to fly ash conforming to Mn/DOT 3115 and/or ground granulated blast furnace slag conforming to Mn/DOT 3102. However, the actual substitution shall be limited by weather conditions expected during paving and cold weather concreting procedure shall be strictly adhered to as applicable.

Mn/DOT 2461.4A4a and 2461.3B3 are hereby deleted and the following inserted therefore:

**4A4a Water Content**

Water to cement ratio of the concrete shall be 0.40 or less. The water content shall consist of the free water carried by the aggregate plus the water added at the mixer, and may also include the water used in making extremely dilute admixture solutions.



The Engineer will test the concrete for consistency as often as may be necessary during the progress of the work. The Department reserves the right to reject any concrete batch the consistency of which is outside of the slump range. The slump for the Low-Cost and Recycled Mixes shall be such that a person can walk on the surface of the lower layer immediately after the paver has passed without leaving a significant footprint or causing the sides to deform. The slump of the Exposed Aggregate Concrete Mix shall be consistent with the construction methods.

When any test shows the slump to be in excess of the upper limit of the slump range, the concrete represented by that test will be rejected unless adjustments satisfactory to the Engineer are made in the concrete prior to use.

The Contractor shall adjust the slump within the allowable range to optimize both placement and finishing.

- (1) Concrete without water reducer  
When not using a Mn/DOT approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Mn/DOT Concrete Unit Website, the values for the slump shall meet the range as specified below in Table 2461-2 for a slump range **without** water reducer. **No tolerances shall be applied to the slump range.**
- (2) Concrete with water reducer  
When using an approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Mn/DOT Concrete Unit Website, the values for the slump shall meet the range as specified below in Table 2461-2 for a slump range **with** water reducer. **No tolerances shall be applied to the slump range.**

**TABLE 2461-2  
SLUMP RANGE DESIGNATION**

Slump Designation	Slump Range <u>Without</u> Water Reducer	Slump Range <u>With</u> Water Reducer
1	12-25 mm <b>(1/2-1 inch)</b>	12-25 mm <b>(1/2-1 inch)</b>
2	25-50 mm <b>(1-2 inches)</b>	25-75 mm <b>(1-3 inches)</b>
3	25-75 mm <b>(1-3 inches)</b>	25-100 mm <b>(1-4 inches)</b>
4	50-100 mm <b>(2-4 inches)</b>	50-125 mm <b>(2-5 inches)</b>
5	50-125 mm <b>(2-5 inches)</b>	50-150 mm <b>(2-6 inches)</b>
6	75-150 mm <b>(3-6 inches)</b>	75-175 mm <b>(3-7 inches)</b>

If unusual placement conditions are encountered in the work that renders the specified consistency unsuitable, contact the Concrete Unit. The Concrete Unit will provide mix composition modifications to provide the desired change in consistency while maintaining the other specified properties of the concrete mix. The addition of water only, for the purpose of temporarily facilitating the placement of concrete under such unusual conditions, will not be permitted.

**Concrete Placed by the Slip-Form Method**

Providing the concrete does not slough, is adequately consolidated and meets all other requirements, the Contractor may place the concrete at a slump value that optimizes placement for that designated mixture.

**Non Conformance**

Material not meeting requirements shall not knowingly be placed in the work. **The Contractor does not have the option of taking a price reduction in lieu of complying with the Specifications.**

Should any non-conforming material be inadvertently placed in the work, it will not be accepted for payment at Contract prices but will be subject to the following tables governing acceptance and payment provided the material was placed to the satisfaction of the Engineer. Otherwise the determination will be made according to other procedures addressed in 1503. The price reduction will represent only the quantity of material represented by the sample and actually used.

When concrete is a minor component of the Item Unit Bid Price such as concrete for sign posts, the Engineer will base any price reductions on a concrete price of \$80.00 per cubic yard. Otherwise, the Contractor may remove and replace the concrete or comply with the following:

**GENERAL CONCRETE\***

*Below slump range	Pay at 95 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed
Up to 40 mm (1-1/2 inch) over slump range	Pay at 75 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed
45 mm – 55 mm (1-3/4 inch – 2-1/4 inch) over slump range	Pay at 50 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed
>55 mm (2-1/4 inch) over the slump range	Pay at 25 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed

**\*If piling or footing concrete is placed below the slump range, a price reduction of \$104.00 per cubic meter (\$80.00 per cubic yard) will apply to the concrete represented by the slump test. See Concrete Placed by the Slip-Form Method above (No price reduction for low slump provided the concrete is adequately placed).**

**BRIDGE DECK CONCRETE**

Below slump range	Pay at 95 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed
Up to 40 mm (1-1/2 inch) over slump range	Pay at 75 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed
>40 mm (1-1/2 inch) over slump range	Pay at 25 % of the Unit Bid Price for the concrete represented provided the material is satisfactorily placed

**LOW SLUMP BRIDGE DECK CONCRETE**

12 mm to 25 mm (1/2 inch to 1 inch) specified

Below slump range	No deduction if material is satisfactorily placed
Up to 12 mm (1/2 inch) over slump range	Pay at 50% of unit bid price for the concrete item represented provided the material is satisfactorily placed
>12 mm up to 20 mm (1/2 inch. up to 3/4 inch) over slump range	No Pay at the unit bid price for the concrete item represented provided the material is satisfactorily placed
>20 mm (3/4 inch) over the slump range	No Pay - Contact Concrete Unit for recommendation

**LOW SLUMP CONCRETE - PATCHING**

12 mm to 25 mm (1/2 inch to 1 inch) specified

Below slump range	No deduction if material is satisfactorily placed
Up to 12 mm (1/2 inch) above the slump range	Pay at 75% of unit bid price for the concrete item represented provided the material is satisfactorily placed
≥20 mm (3/4 inch) above the slump range	Pay at 25% of unit bid price for the concrete item represented provided the material is satisfactorily placed

Mn/DOT 2461.4A4b shall be modified with the following:

The air content for all paving grade concrete shall be 7.0 percent plus or minus 1.0 percent. The air content shall be measured after placement on the grade but before consolidation. 2461.4A4b shall be adjusted accordingly based on the 7.0 percent target value.

Cold Weather Concrete Pavement Protection Guidelines

The following guidelines can be used to determine what curing or covering requirements are necessary for newly constructed concrete pavement. These are only guidelines, the Contractor must use proper judgment in assuring that the concrete pavement does not freeze. These guidelines are considered to be the minimum protection against frost, use of these guidelines does not guarantee concrete won't freeze or sustain other cold weather damage.

All of the materials listed below should be used in conjunction with regular membrane curing compound or extreme service membrane curing compound, depending on the date and location of the project as stipulated in specification 2301.3M. Placement of blankets and plastic shall be in conformance with 2301 and all other applicable specifications.

One sheet of plastic: If overnight low temperature is expected to be from approximately 3 to 6 degrees Fahrenheit below freezing.

Two sheets of plastic: If overnight low temperature is expected to be from approximately 7 to 10 degrees Fahrenheit below freezing.

Straw or similar insulating material: If overnight low temperature is expected to be approximately 10 degrees or more below freezing.

**(2572) PROTECTION AND RESTORATION OF VEGETATION**

The provisions of Mn/DOT 2572 are supplemented and/or modified with the following:

The first paragraph after Mn/DOT 2572.3A(5) under Protecting and Preserving, is revised to read as follows:

The Contractor shall not place temporary structure, store material, or conduct unnecessary construction activities within a distance of 8 m (**26 feet**) outside the dripline of trees designated to be preserved without approval from the Engineer.

The second paragraph of Mn/DOT 2572.3A2 Clean Root Cutting, is revised to read as follows:

The Contractor shall immediately and cleanly cut damaged and exposed roots. Trees designated for protection shall have damaged roots cut back to sound healthy tissue and shall have topsoil immediately placed over the exposed roots. The Contractor shall immediately cover root ends that are exposed by excavation activities with 150 mm (**6 inches**) of topsoil as measured outward from the cut root ends. Exposed cut oak roots shall be immediately (within 5 minutes) treated with a wound dressing material consisting of latex paint or shellac. The Contractor shall limit cutting to a minimum depth necessary for construction and shall use a vibratory plow or other approved root cutter prior to excavation.

The third sentence of Mn/DOT 2572.3A8 Destroyed or Disfigured Vegetation, is revised to read as follows:

The Engineer will assess damages of trees and landscaping at not less than the appraisal damages as determined by the current edition of the "Guide for Plant Appraisal – Council of Tree and Landscape Appraisers" published by the International Society of Arboriculture.

### **(2573) STORM WATER MANAGEMENT**

The provisions of Mn/DOT 2573 are supplemented and/or modified with the following:

The second paragraph of Mn/DOT 2573.3A1 Erosion Control Supervisor, is revised to read as follows:

The Erosion Control Supervisor shall be a responsible employee of the prime Contractor and/or duly authorized by the prime Contractor to represent the prime Contractor on all matters pertaining to the NPDES construction storm water permit compliance. The Erosion Control Supervisor shall have authority over all Contractor operations which influence NPDES permit compliance including grading, excavation, bridge construction, culvert installation, utility work, clearing/grubbing, and any other operation that increases the erosion potential on the Project. In addition, the Erosion Control Supervisor shall **implement the Contractor's quality control program and other provisions in accordance with 1717.2** and be available to be on the Project within 24 hours at all times from initial disturbance to final stabilization as well as perform the following duties:

Mn/DOT 2573.3 A2, Construction of Temporary Storm Water Basins, is revised to read as follows:

Temporary storm water basins shall be constructed concurrently with the start of soil disturbing activities whenever practicable. The basins must be made fully functional and have storm water runoff from the localized watershed directed to the basins. The exposed side slopes of the basins must be mulched and/or seeded within the time periods as set forth in 1717, or as directed by the Engineer.

The second paragraph of Mn/DOT 2573.3 A5, Vehicle Tracking Onto Paved Surfaces, is revised to read as follows:

The Contractor is responsible for insuring paved streets are clean at the end of each working day or more often as necessary to provide safety to the traveling public. Tracked sediment on paved surfaces must be removed by the Contractor within 24 hours of discovery, in accordance with 1717.2. Payment for street sweeping to provide safe conditions for the traveling public, environmental reasons or regulatory requirements shall be as provided in accordance with 1514.

The first sentence of Mn/DOT 2573.3E2 is revised to read as follows:

The bioroll shall be installed and anchored with wood stakes. The stakes shall be at a minimum nominally 25 mm x 50 mm (**1 inch x 2 inch**) and a minimum of 400 mm (**16 inches**) long with a pointed end.

The first paragraph of Mn/DOT 2573.3J Filter Log Installation, is revised to read as follows:

**J Filter Log Installation**

Filter logs shall be placed in accordance with the Plan. Straw and wood fiber filter logs shall be staked in place with wood stakes. Wood stakes shall be at a minimum 25 x 51 mm (**1 x 2 inch**) nominal size by 400 mm (**16 inches**) long. The stakes shall be driven through the back half of the log at an angle of approximately 45 degrees with the top of the stake pointing upstream. When more than one log is needed for length, the ends shall be overlapped 150 mm (**6 inches**) with both ends staked. Staking shall be every 0.3 m (**1 foot**) along the log unless precluded by paved surface or rock.

Mn/DOT 2573.5 Basis of Payment, is revised to read as follows:

Payment for storm water management and sediment control items will be compensation in full for all labor, materials, equipment, and other incidentals necessary to complete the work as specified, including the costs of maintenance and removal as required by the Contract. The Contractor will receive compensation at the appropriate Contract prices, or in the absence of a Contract bid price, according to the following unit prices, or in the absence of a Contract price and unit price, as Extra Work. In the absence of a Contract item for Erosion Control Supervisor, this work shall be considered incidental.

Mn/DOT 2573.5 E, Unit Prices, is revised to read as follows:

The Department will pay the following unit prices for temporary sediment control items in the absence of a Contract bid price:

(1) Bale Barrier.....	\$13.45/m ( <b>\$4.10 per linear foot</b> )
(2) Silt Fence, Heavy Duty.....	\$10/m ( <b>\$3.00 per linear foot</b> )
(3) Flotation Silt Curtain, Type: Still Water, 1.2 m ( <b>4 foot</b> ) depth.....	\$54.10/m ( <b>\$16.50 per linear foot</b> )
(4) Sediment Trap Excavation.....	\$7.20/m <sup>3</sup> ( <b>\$5.50 per cubic yard</b> )
(5) Bituminous Lined Flume .....	\$6.00/m <sup>2</sup> ( <b>\$5.00 per square yard</b> )
(6) Silt Fence, Type Machine Sliced .....	\$6.50/m ( <b>\$2.00 per linear foot</b> )
(7) Sediment Removal, Backhoe .....	\$175 per hour
(8) Filter Log, Type Straw Bioroll .....	\$1.00/m ( <b>\$3.00/foot</b> )
(9) Filter Log, Type Rock Log .....	\$16.50/m ( <b>\$5.00/foot</b> )
(10) Flocculant Sock .....	\$300 each

**(2575) RAPID STABILIZATION SPECIFICATIONS**

This work shall consist of operations necessary to rapidly stabilize small critical areas, to prevent off site sedimentation and/or to comply with permit requirements. The work may be performed at any time during the Contract and will be conducted on small areas that may or may not be accessible with normal equipment. This work shall be done in accordance with the applicable Mn/DOT Standard Specifications, the details shown in the Plan, and the following:

**BASIS OF PAYMENT**

In the absence of a Contract bid price, the Department will pay the following unit prices for Rapidly Stabilizing Small Scattered Critical Areas directly abutting Waters of the State during rough grading and as required in the NPDES permit. These unit prices shall be construed to include mobilizations for this activity.

Rapid Stabilization	Pre-Approve Prices	
Method 1	\$900/ha ( <b>\$400/acre</b> )	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 0.4 to 0.8 ha [ <b>1 to 2 acres</b> ] of coverage.
Method 2	\$2220/ha ( <b>\$898/acre</b> )	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 0.4 to 0.8 ha [ <b>1 to 2 acres</b> ] of coverage.
Method 3	\$149.50/m <sup>3</sup> ( <b>\$566/M gallon</b> )	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 11.4 to 34 m <sup>3</sup> [ <b>3000 to 9000 gallons</b> ] of product slurry.
Method 4	\$3.00/m <sup>2</sup> ( <b>\$2.50/SY</b> )	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 150 to 650 m <sup>2</sup> [ <b>200 to 800 SY</b> ] of coverage.
Method 5	\$48.60/metric ton ( <b>\$45/ton</b> )	Approved price reflects small quantities. Quantities installed per Project visit are assumed to require approximately 9 to 18 metric tons [ <b>10 to 20 tons</b> ] of riprap.

**(3101) PORTLAND CEMENT**

Mn/DOT 3101 is hereby deleted and replaced with the following:

Cement shall be from certified sources only. Portland cement furnished under this Specification shall conform to AASHTO M 85 for the type specified except as herein modified:

- 1) Fineness shall be measured by the Air permeability test.

**Fineness, specific surface  
Air permeability test  
(all cement types except Type III):**

**Square Meter per Kilogram**

Average value, min.....	360.0
Min. value, any one sample .....	340.0
Average value, max .....	420.0
Max. value, any one sample .....	440.0

The average value shall be determined on the last five samples from a source.

- 2) When the specifications require that low alkali cement be used, the total alkalis in the portland cement (Na<sub>2</sub>O + 0.658 K<sub>2</sub>O) shall not exceed 0.60 percent. The total alkalis in the cementitious material shall not exceed 3.0 kg/m<sup>3</sup> [**5.0 pounds per cubic yard**].
- 3) A maximum of 5.0% limestone by mass (**weight**) may be interground with the cement provided that the chemical and physical requirements are met. Only intergrind limestone that is naturally occurring, consisting of at least 70% by mass of one or more of the mineral forms of calcium carbonate. Calculate and report the limestone content in portland cement on the Test Mill Report as described in ASTM C 150, Annex A1. Include the CO<sub>2</sub> content of the portland cement on the Test Mill Report. Determine the CO<sub>2</sub> content in accordance with ASTM C 114. When any quantity of limestone is added, report the C<sub>3</sub>S as calculated in ASTM C 150, Annex A1, using the actual CO<sub>2</sub> value.
- 4) All delivery invoices shall include a standardized Cement Certification Statement which is as follows: **(insert company name) certifies that the cement produced at (insert plant and location) conforms to AASHTO and Mn/DOT Specifications for Type (insert Type) cement.** The change of source or color, or both, of cement on a Project shall not be permitted without the written approval of the Concrete Engineer.

### **(3103) PORTLAND-POZZOLAN CEMENT**

Mn/DOT 3103 is hereby deleted and replaced with the following:

Portland-Pozzolan cement shall be from certified sources only. Portland-Pozzolan cement furnished under this Specification shall conform to AASHTO M 240, Type IS, Type I(SM), Type IP, Type I(PM), Type IP-A or any other portland-pozzolan cement as approved by the Concrete Engineer, except as modified by the following:

- (1) The fly ash constituent of the interground cement shall not exceed 20 percent.
- (2) The fly ash constituent of blended cement shall not exceed 15 percent.
- (3) The ground granulated blast furnace slag constituent of the interground cement shall not exceed 35 percent.
- (4) The ground granulated blast furnace slag constituent of blended cement shall not exceed 35 percent.

All delivery invoices shall include a standardized Cement Certification Statement which is as follows: (insert company name) certifies that the cement produced at (insert plant and location) conforms to AASHTO and Mn/DOT Specifications for Type (insert Type) cement. The change of source or color, or both, of cement on a Project will not be permitted without the written approval of the Concrete Engineer.

### **(3126) FINE AGGREGATE FOR PORTLAND CEMENT CONCRETE**

The fine aggregate gradations for the Exposed Aggregate Concrete wear course and the recycled mix shall be modified according to the tables in Section S-60.10 (COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE) of these Special Provisions.

### **(3137) COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE**

The provisions of Mn/DOT 3137 are supplemented and/or modified with the following:

Mn/DOT 3137.2B1 shall be modified with the following:

Class A aggregate may contain no more than 4.0% non-Class A aggregate. This recognizes that some quarries may contain small pockets of non-Class A aggregate within that source. Intentional blending or addition of non-Class A aggregate is strictly prohibited.

Mn/DOT 3137.2B5, paragraph 2 shall be deleted and replaced with the following:

Recycled coarse aggregate (RCA) will be generated from the existing concrete in cell-11 from STA 1174+10 to 1178+35. The RCA should be clean and washed. Aggregate fines less than 4.75 mm (#4) and coarse aggregates greater than 25.4 mm (**1 inch**) used in the concrete mix shall come from virgin aggregate sources creating the 50-50 blend for the coarse aggregates.

The concrete portions of the existing cells may be broken with a guillotine (or similar) crusher, removed, and transported to a crushing location. Concrete shall be crushed with an impact type crusher operating at less than full capacity. Up to 10% of the recycled PCC coarse aggregate may consist of bituminous particles of the total recycled coarse aggregate particles. Additionally, all joint material, reinforcing members, and other inert material (such as wood) shall be separated from the concrete sections before the existing concrete is crushed into coarse aggregate for the RCA mix.

Recycled coarse aggregate shall be delivered to the batching plant for use in the concrete mix in the demonstration slab and in Cells 70 and 71.

Mn/DOT 3137.2C shall be deleted and replaced with the following:

Washing of the crushed concrete coarse aggregate is required.

The extra absorptivity of the recycled coarse aggregates shall be accommodated at the batching plant by adding the appropriate amount of water to the concrete mix to achieve the desired water to cement ratio.

The following pertains (fine and coarse aggregate gradations) for the Recycled Mix shall be added to Mn/DOT 3137 Table 3137-4(a)

FINE AGGREGATE DESIGNATION FOR THE RECYCLED MIX  
Percent by mass (weight) passing square opening sieves

Designation	2.36 mm (# 8)	1.18 mm (# 16)	.300 mm (# 50)	.15 mm (# 100)	.075 (# 200)
Recycled Mix Fine	20-30	13-23	4-14	1-10	1-7

Table 3137-4(b)

COARSE AGGREGATE DESIGNATION FOR THE RECYCLED MIX  
Percent by mass (weight) passing square opening sieves

Designation	37.5 mm (1 ½ in.)	31.5 mm (1 ¼ in.)	25.0 mm (1 in.)	19.0 mm (¾ in.)	16.0 mm (3/8 in.)	12.5 mm (½ in.)	9.5 mm (3/8 in.)	4.75 mm (# 4)
Recycled Mix Coarse	100	87-97	77-87	66-76	60-70	53-63	45-55	31-41

Combined aggregate gradation will conform to an envelope using Fuller’s maximum density curve +/- 5 %, with the exception of the 100 and 200 sieves, which shall not exceed 10 and 7 percent respectively. Fuller’s curve is given by:

$$y = (d/D)^{0.5}$$

y = % passing  
D = maximum particle size  
d = sieve size

Eight (8) cubic yards of recycled coarse aggregate shall be delivered by the Contractor to the MnROAD Stockpile Area for research testing.

For the low-cost mix incorporating gravel aggregate, Mn/DOT 3137.2D1 shall be modified with the following:

- (a) Shale,  
In the fraction retained on the 12.5 mm (1/2 inch) sieve ..... 0.6
- (b) Soft Iron Oxide Particles (paint rock and ochre) ..... 0.5
- (c) Total Spall Materials (includes items a and b percentages of the above, plus other iron oxide particles, unsound cherts, pyrite, and other materials having similar characteristics).  
In fraction retained on the 12.5 mm (1/2 inch) sieve..... 1.5  
Retained on the 4.75 mm (#4) sieve, as a percentage of the total material ..... 2.5
- (d) Soft Particles (exclusive of items a, b, and c above)..... 3.0
- (f) Sum of Materials listed under items c, d, and e above..... 4.0
- (g) Slate ..... 5.0
- (i) Materials passing 75µm (# 200) sieve, on individual fractions ..... 5.0

Mn/DOT 3137.2D1(h) shall be deleted and replaced with the following:

- (h) Flat or Elongated Pieces (maximum thickness less than 25 percent of the maximum width, or maximum length more than 3 times the maximum width)..... 15%



Mn/DOT 3137.2D3 shall not apply to the low-cost mix.

Mn/DOT 3137.2D2 shall be modified with the following:

Aggregates used in precast concrete panel facings for Mechanically Stabilized Earth (MSE) walls shall be Class A or shall meet the requirements of 3137.2D2.

Mn/DOT 3137.2D2(g) and 3137.2D2(h) shall be deleted and replaced with the following:

- (g) Class C and Class D aggregates with a maximum carbonate by mass (weight) .....30.0%
- (h) Class B aggregate with a maximum absorption .....1.75%

Mn/DOT 3137.2D3 shall be modified to include the following:

Concrete pavement shall include bridge approach panels and concrete pavement rehabilitation.

Mn/DOT 3137.2D3(c) shall be deleted and replaced with the following:

- (c) Class C aggregate with a maximum carbonate by mass (weight).....30.0%

The following pertains to the Exposed Aggregate Concrete Mix shall be added to Mn/DOT 3137

- (a) Aggregates shall be crushed granite or equivalent aggregate and must meet aggregate quality tests noted in this section. The intent of this material is to provide a high quality durable concrete overlay and EAC surface.
- (b) EAC aggregate gradation example is shown in 3137-3 for both the fine and coarse aggregate combination. Possible common aggregate sources could include Bituminous Seal Coat aggregates – 2005 MnDOT spec book table 3127-1

Table 3137-3  
EAC CONCRETE MIX - AGGREGATE DESIGNATION  
Percent by mass (weight) passing square opening sieves

Designation	12.5mm 1/2"	9.5mm (3/8 in.)	6.3mm (1/4 in.)	4.75mm (# 4)	2.36mm (# 8)	1.18mm (# 16)	.300mm (# 50)	.15mm (# 100)	.075mm (# 200)
Min	100	100	75	48	48	48	13	7	5
Max	100	100	65	38	38	38	7	1	1

**(3138) AGGREGATE FOR SURFACE AND BASE COURSES**

The provisions of Mn/DOT 3138 are hereby modified as follows:

The second paragraph of Mn/DOT 3138.2B Gradation Tables 3138-1 and 2, is revised to read as follows:

If Class 7 is substituted for Classes 1, 3, 4, 5, or 6, it shall meet the gradation requirements of the substituted class (Table 3138-1); except that, for Class 5 and 6, up to 5 percent by mass (**weight**) of the total composite mixture may exceed 25.0 mm (**1 inch**) sieve but 100 percent must pass the 37.5 mm (**1.5 inch**) sieve. Surfacing aggregate mixtures containing salvaged materials shall meet the gradation requirements of the materials specified in the Plan. All gradations will be run on the composite mixture before extraction of the bituminous material.

TABLE 3138-1 in Mn/DOT 3138.2B Gradation Tables 3138-1 and 2, is hereby deleted and replaced with the following:

**TABLE 3138-1  
BASE AND SURFACING AGGREGATE  
Total Percent Passing**

Sieve Size	Class 1 (A)	Class 2	Class 3 (A)	Class 4 (A)	Class 5 (A) (B)	Class 6 (A) (B)
75 mm (3 inches)	--	--	--	--	--	--
50 mm (2 inches)	--	--	100	100	--	--
37.5 mm (1½ inches)	--	--	--	--	--	--
25.0 mm (1 inch)	--	--	--	--	100	100
19.0 mm (¾ inch)	100	100	--	--	90-100	90-100
9.5 mm (3/8 inch)	65-95	65-90	--	--	50-90	50-85
4.75 mm (No. 4)	40-85	35-70	35-100	35-100	35-80	35-70
2.00 mm (No. 10)	25-70	25-45	20-100	20-100	20-65	20-55
425 µm (No. 40)	10-45	12-30	5-50	5-35	10-35	10-30
75 µm (No. 200)	8.0-15.0	5.0-13.0	5.0-10.0	4.0-10.0	3.0-10.0	3.0-7.0

- (A) When salvaged materials are substituted for another class of aggregate, it shall meet the gradation requirements of the class being replaced except as amended in 3138.2 B.
- (B) The gradation requirements for aggregates containing 60% or more crushed quarry rock may be amended with the concurrence of the Project Engineer and the Grading and Base Engineer.

The fifth paragraph of Mn/DOT 3138.3 Sampling and Testing, is revised to read as follows:

The stockpile shall be sampled at the rate of one field gradation test per 1,000 metric tons (**tons**) of aggregate used on the Project.

**(3301) REINFORCEMENT BARS**

The third to the last paragraph of Mn/DOT 3301.2 is hereby deleted and replaced with the following:

When epoxy coated reinforcement bars are specified, coating shall be in conformance with AASHTO M 284M/M 284-06. Application of epoxy coating shall be made in a fusion bonded epoxy coating plant that has been granted "Certification" by the Concrete Reinforcing Steel Institute, or an organization approved by the Materials Engineer.

**(3302) DOWEL BARS**

Mn/DOT 3302 is hereby deleted and replaced with the following:

Dowel bars shall be fabricated from Grade 40 or 60 steel in accordance with AASHTO M31, M42 or M53 and be epoxy coated in conformance with AASHTO M284M/M 284-06. The ends of the dowel bars may be epoxy coated at the discretion of the fabricator. Application of epoxy coating shall be made in a fusion bonded epoxy coating plant that has been granted "Certification" by the Concrete Reinforcing Steel Institute, or an organization approved by the Materials Engineer.

The plant's quality control office shall maintain documentation containing the data required by certification. This documentation shall contain test data and measurements taken at times and locations approved by the Engineer, ensuring that monitoring, by personnel not directly involved in production, is sufficient for compliance with approved procedures.

All dowel bars shall be stored and protected in accordance with 2472.

Shearing will be permitted provided the coating is not damaged and subject to permissible deformation. Any deformation larger than true shape shall not exceed 1 mm (**0.04 inch**) increase in diameter or thickness and shall not extend more than 10 mm (**0.40 inch**) from the dowel end .

Dowel bars shall be spayed with a Mn/DOT Approved form release agent before paving.

**(3721) PREFORMED ELASTOMERIC COMPRESSION JOINT SEALS FOR CONCRETE**

The provisions of Mn/DOT 3721 are hereby modified with the following:

The following is hereby inserted into Mn/DOT 3721.2A3 after Compression-Deflection Characteristics:

17.5 mm ( <b>11/16 inch</b> ) Seal:	
Force @ 14 mm,	0.70 N/mm min..... Mn/DOT Method (C)
<b>Force @ 0.55 inch pounds/linear inch</b>	<b>[4 min]</b> ..... Mn/DOT Method (C)
Force @ 10 mm,	3.50 N/mm max. .... Mn/DOT Method (C)
<b>Force @ 0.40 inch pounds/linear inch</b>	<b>[20 max]</b> ..... Mn/DOT Method (C)

Table 3721-2 is hereby deleted from Mn/DOT 3721.3C3 and replaced with the following:

**TABLE 3721-2  
SPECIFIED SPECIMEN SIZE AND TEST DEFLECTIONS**

Nominal Width of Seal mm (inches)	Column A Specimen Length ± 5 mm (± 0.2 inch)	Column B Test Width for Min. Pressure mm (inches)	Column C Test Width for Max. Pressure mm (inches)
17.5 mm (11/16 inch)	100 mm (4 inch)	14mm (0.55 inch)	10 mm (0.40 inch)
20 mm (13/16 inch)	100 mm (4 inch)	16.5mm (0.65 inch)	10 mm (0.41 inch)
32 mm (1-1/4 inch)	100 mm (4 inch)	25.0 mm (1.00 inch)	11 mm (0.44 inch)
50 mm (2 inch)	150 mm (6 inch)	41.0 mm (1.62 inch)	17 mm (0.69 inch)
90 mm (3-1/2 inch)	150 mm (6 inch)	75.0 mm (3.00 inch)	35 mm (1.38 inch)

**(3754) MEMBRANE CURING COMPOUND**

The provisions of Mn/DOT 3754 are supplemented and/or modified with the following:

Mn/DOT 3754.2A shall be deleted and replaced with the following:

Only Mn/DOT approved membrane curing compounds will be allowed for use for test cell 70 (HMA/PCC). Cells 71-72 curing compound was covered in spec 2301. Curing compound is specified in Mn/DOT shall pre-approve all curing compounds. The most current approved lots and batches with product expiration dates are available from the Mn/DOT Products website. All curing compounds shall comply with the requirements of the Mn/DOT Curing Compound Manufacturer Approval Program, including pre-testing of all materials by the manufacturer.

All membrane curing compound materials shall conform to ASTM C309 for the type specified in the Contract. The concrete curing compound furnished shall be white pigmented Type 2, Class B. A Type 1-D curing compound shall be used on any colored concrete or architectural concrete where a finished white surface is not desired. The use of Type 1-D curing compound may be allowed in other concrete applications by special provisions or at the discretion of the Engineer.

These membrane curing compounds must be protected from freezing prior to application. This material shall be tested at an application rate of 5 m<sup>2</sup> per per liter (**200 square feet per gallon**).

All membrane curing compound materials shall be formulated so as to maintain the specified properties for a minimum of 1 year from date of manufacture. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.

Mn/DOT 3754.2B shall be modified with the following:

The curing compound meeting the requirements of 3754.2B shall be used on concrete bridge applications unless otherwise directed by the Special Provisions of the Contract or by the Engineer.

### **(3861) PLANT STOCK**

The provisions of Mn/DOT 3861 are supplemented and/or modified with the following:

The third to last paragraph of Mn/DOT 3861.3 Sampling and Inspection, is revised to read as follows:

During the spring planting season, coniferous plants that have candled out (put out new growth) while being stored in a holding bin may be planted, however, coniferous plants that are dug after candling out will be rejected. Coniferous trees not fully branched from bottom to top will be rejected. Only coniferous trees with buds or new growth at the terminal ends of branches shall be accepted, provided the tree meets the dimensional requirements defined in the current edition of the "Inspection and Contract Administration Manual for Mn/DOT Landscape Projects". Sheared or previously de-budded conifers may have enlarged trunk growth that is out of balance with a typical transplanted root system that is now too small. Therefore, previously sheared or de-budded coniferous trees will be subject to the minimum trunk caliper to root ball size relationship for deciduous trees as defined in the current edition of the "Inspection and Contract Administration Manual for Mn/DOT Landscape Projects". Pine trees shall have a terminal leader bud and terminal leaders shorter than 500 mm (**18 inches**) in length. A new central leader must be trained in conifers delivered with multiple or missing leaders.

### **(3876) SEED**

The provisions of Mn/DOT 3876 are supplemented and/or modified with the following:

The first sentence in the first paragraph of Mn/DOT 3876.2A General Requirements, is revised to read as follows:

All seed shall conform to the latest seed law of the State, including those governing labeling and weed seed tolerances. Tolerances for Germination and Purity, as determined by the Department of Agriculture, shall only apply to seed that has been previously tested and approved by the Department of Agriculture as a seed lot.

The second to last paragraph of Mn/DOT 3876.2A General Requirements, is revised to read as follows:

All native grass, sedge, rush and forb seed shall be either origin certified or wild-type. Origin Certified Seed, designated as MCIA yellow tag species shall be used in all native seed mixes (mixes numbered 300 and above). Wild type may be substituted for yellow tag species only by obtaining approval of the Engineer and the Erosion Control Engineering Unit from the Office of Environmental Services. Wild type and named varieties of native species listed in Table 3876-1 may be used in 100 and 200 series seed mixtures. Origin shall be clearly identified on the seed label for all seed, including native forbs.

### **(3889) TEMPORARY DITCH CHECKS**

The provisions of Mn/DOT 3889 are supplemented and/or modified with the following:

Mn/DOT 3889.2B Type 2: Bioroll, is revised to read as follows:

Type 2 ditch checks shall consist of 3897 Filter Log Type; Straw Bioroll or Wood Fiber Bioroll.

Mn/DOT 3889.2C Type 3: Bioroll Blanket System, is revised to read as follows:

Type 3 ditch checks shall consist of two components; Filter Log Type; Straw Bioroll or Wood Fiber Bioroll in accordance with 3897, staked on top of a Category 3, specification 3885 erosion control blanket. The blanket shall form a minimum width of 3.7 m (**12 feet**) perpendicular to the ditch gradient.

**(3891) STORM DRAIN INLET PROTECTION**

The provisions of Mn/DOT 3891 are supplemented and/or modified with the following:

Mn/DOT 3891.3A Rock Log, is revised to read as follows:

Rock logs shall meet the requirements of 3897.2 Filter Log Type Rock Log.

Mn/DOT 3891.3B Compost Log, is revised to read as follows:

Compost logs shall meet the requirements of 3897.2 Filter Log Type Compost Log

**FINAL ESTIMATE AND FINAL PAYMENT**

The following provisions shall apply to preparation of the Final Estimate and execution of Final Payment under this Contract:

**FINAL ESTIMATE**

State Law provides that the final estimate will be made within 90 days after completion of all work required under this Contract. If, however, the total value of the Contract exceeds \$2,000,000.00, the 90 day requirement will not apply and the time allowed for making such final estimate shall be 180 days after the work under this Contract has been, in all things, completed to the satisfaction of the Commissioner.

**FINAL PAYMENT**

If this Contract contains a "Disadvantage Business Enterprise or Targeted Group Business" goal, the following requirement shall apply:

"Before final payment is made, the Contractor shall also complete an affidavit showing the total dollar amounts of work performed by disadvantaged business enterprise (DBE) and targeted group business (TGB)."