CITY OF ROCHESTER
201 4TH STREET SE, ROOM 108
ROCHESTER, MN 55904-3742
********PROPOSAL*********

FOR HIGHWAY CONSTRUCTION
AND MAINTENANCE PROJECTS WITH
BIDS RECEIVED UNTIL 11:00 O'CLOCK A.M. ON **January 29, 2014**

PROPOSAL OF _____
(Name of Firm) (Phone No.)

_____
(Address) (Fax No.)

_____
(City) (State) (Zip)

TO FURNISH AND DELIVER ALL MATERIALS AND TO PERFORM ALL WORK IN ACCORDANCE WITH THE CONTRACT, THE PLANS AND THE APPROVED DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION", 2005 EDITION, EXCEPT AS STATED OTHERWISE IN THE SPECIAL PROVISIONS WHICH ARE PART OF THIS PROPOSAL, FOR

CITY PROJECT NO. **(6216-2-09)** J NO. **(7215)**

STATE PROJECT NO. _____

MINNESOTA PROJECT NO. _____

LOCATION: **1st Street SW, ROCHESTER, MN**

TYPE OF WORK **Reconstruction of Bituminous Roadway, Including Storm Sewer, Watermain, and Sanitary Sewer**

LENGTH **0.4** MILES STARTING DATE: **May 15, 2014**

COMPLETION DATE: **October 30, 2014**

I certify that this Proposal was prepared by me or under my direct supervision, and that I am a licensed professional engineer under the laws of the State of Minnesota.

Russell J. Kelm 01/15/14
Russell J. Kelm, License Number 24667 (Date)

****

BID RIGGING IS A SERIOUS CRIME. IF YOU HAVE ANY INFORMATION CONCERNING COLLUSIVE BIDDING, EVEN A REQUEST TO SUBMIT A COMPLIMENTARY BID, PLEASE CALL THE MINNESOTA ATTORNEY GENERAL'S OFFICE AT TELE. NO. 651-296-1796

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CITY OF ROCHESTER
NOTICE OF BIDS

Notice is hereby given that bids will be received at the office of the City Clerk until **11:00 A.M. on January 29, 2014** for the construction of the following described local improvement, pursuant to Minnesota Statutes, Chapter 429, as amended, in accordance with the plans and specifications for the same which are on file in the Office of the City Clerk of said City:

City No 6201-3-02, J7215
Reconstruct 1st St SW from 6th Ave SW to 11th Ave SW

Immediately following expiration of the time for receiving bids, the City Clerk and two designated City officials will publicly open said bids in the City Hall and tabulate them in advance of the Council meeting. The Common Council will consider the bids in the Council/Board Chambers at the Government Center **at 7:00 P.M.** on **Febuary 3, 2014**.

Said Construction generally consists of **Sanitary, Watermain, Storm Sewer, Service Connections and Street Reconstruction.** The work includes the following approximate quantities of work:

Furnish &Install 8in Alternate Pipe Sewer	**2000**	**L F**
Furnish & Install 12-24" RCP Storm Sewer	**500**	**L F**
Furnish & Install 12in Ductile Iron Pipe Class 52	**2000**	**LF**
Common Excavation (P)	**1500**	**C Y**
Aggregate Base (CV) Class 2 (P)	**2000**	**C Y**
Bituminous	**2000**	**Ton**
Concrete Curb & Gutter Design B624	**4000**	**L F**
Sodding Type Mineral	**1000**	**S Y**

Plan, Specifications and Contract Documents may be examined at the Department of Public Works, 201 4th St. SE, Room 108, Rochester, MN 55904, (507) 328-2400 or the City's website at https://egram.rochestermn.gov/.

Each bid must be sealed and accompanied by a cash deposit, bid bond, cashier's check or a certified check payable to the City of Rochester, Minnesota, for at least **5%** the amount of the bid, which amount shall be forfeited to the City of Rochester, Minnesota, as liquidated damages if the bidder, upon the letting of the contract to him shall fail to enter into the contract so let; the Common Council reserving the right to reject any and all bids.

A Performance and Payment Bond for the full amount of the contract by a surety company authorized to do business in the State of Minnesota will be required with the contract. (Personal bonds will not be accepted.)

All proposals must be addressed to the City Clerk, City of Rochester, 201 4th St. SE, Room 135, Rochester, Minnesota 55904-3742 and shall have endorsed thereon:

City No 6201-3-02, J7215
Reconstruct 1st St SW from 6th Ave SW to 11th Ave SW

Dated at Rochester, Minnesota this **8th day of January, 2014**.

VALORIE LANGSETH, CMC, City Clerk

DIVISION S

S - 1 DESCRIPTION

The Contract stipulations that follow are general in scope and may refer to conditions that will not be encountered on the work covered by the Contract. Any provision of these general requirements that pertains to a nonexistent condition or is not applicable to the work to be performed here under, or that conflicts with any provision of the Special Provisions or with any special instructions to bidders, shall have no meaning in the Contract and shall be disregarded.

S - 2 REFERENCE DOCUMENTATION

Reference Documentation shall be the latest edition, including amendments and published updates, issued prior to the date of advertisement for bids or the date of request for quotations, of the following:

1. Minnesota Department of Transportation (MnDOT) Standard Specifications for Construction, except that Section 1903 shall not apply to any contract pay items.
2. City of Rochester Ordinances.
3. City of Rochester Standard Detail Plates.
4. City of Rochester Standard Specifications for Street & Utility Construction.

S - 3 DESIGNATION OF PARTIES

s 3.1 "City"

"City" shall mean the City of Rochester, 201 4th Street SE, Room 108, Rochester, MN 55904.

s 3.2 "Owner"

"Owner" shall mean the City of Rochester, 201 4th Street SE, Room 108, Rochester, MN 55904 or as named in the contract documents.

s 3.3 "Department"

"Department" shall mean the City of Rochester, 201 4th Street SE, Room 108, Rochester, MN 55904 or as named in the contract documents.

s 3.4 "Engineer"

"Engineer" shall mean the City Engineer or other authorized representative of the Owner as named in the contract documents.

s 3.5 "Inspector"

"Inspector" shall mean the Engineer's authorized representative assigned to make inspections of Contract performance.

s 3.6 "Bidder"

"Bidder" shall mean any individual or entity submitting a Proposal for the advertised work.

s 3.7 "Contractor"

"Contractor" shall mean the individual or entity designated in the Contract documents to construct the project pursuant to plans and specifications.

s 3.8 "Sub-Contractor"

"Sub-Contractor" shall mean the individual or entity acting for or on behalf of the Contractor in performing any part of the Contract.

s 3.9 "MnDOT"

"MnDOT" shall mean the Minnesota Department of Transportation.

S - 4 DEFINITION OF TERMS

s 4.1 Amount of Contract

For the purpose of awarding the Contract and determining the amount of the Bond, the Contract amount shall be the total amount of the bid.

s 4.2 Date of Acceptance

Date of Acceptance shall be the day when final inspection reveals that the work has been completed in strict accordance with the provisions of the Plans and other Contract documents, and with previous inspection documents.

s 4.3 Date of Final Acceptance

Date of Final Acceptance shall be a day, at least two (2) years after the Date of Acceptance, at which time the City determines that the work continues to be in strict accordance with the provisions of the Plans and other Contract and inspection documents. The Date of Final Acceptance denotes the termination of Contractor's maintenance obligation.

s 4.4 Liquidated Damages

Liquidated damages are the amount prescribed in MnDOT Section 1807 to be paid to the Owner, or to be deducted from any payments due or to become due to the Contractor, for each day that work remains uncompleted after expiration of the Contract time as determined and extended in accordance with MnDOT Section 1806.

s 4.5 "Incidental"

Whenever in any section of the Contract documents, Plans or Specifications, any item, material or application is defined as incidental, Payment shall be incidental to the Contract and no direct compensation will be made.

s 4.6 "Or Approved Equal" Clause

Whenever in any section of the Contract documents, Plans or Specifications, any article, material or equipment is defined by describing a proprietary product, or by using the name of manufacturer or vendor, the term "or approved equal" if not inserted, shall be implied.

The specific article, material, or equipment mentioned shall be understood as indicating the type, function, minimum standard of design, efficiency, and quality required and shall not be construed in such a manner as to exclude manufactured products of comparable quality, design, and efficiency. The Engineer shall determine the acceptability of articles, materials, or equipment proposed "as equal".

s 4.7 Standard Documents

Standard Documents are those that are referred to but not included in the Plans, Specifications and Special Provisions. Standard Documents are available to the public and it is the Contractor's sole responsibility to obtain and understand the requirements of any Standard Documents noted in the Plans, Specifications and Special Provisions. Examples of Standard Documents include but are not limited to:

Bid documents (Advertisement, Information to Bidders, Proposal and Bid Security)

Performance and Payment Bond forms

Project Specifications and Special Provisions

City of Rochester, Minnesota, Department of Public Works documents:

Standard Specifications for Street and Utility Construction

Standard Detail Plates

Minnesota Department of Transportation documents:

Standard Specifications for Construction.

Standard Plates Manual.

ASTM Material Specifications.

S - 5 CONTRACT WORDING

Whenever in these Contract documents the words "As Ordered", "As Directed", "As Required", "As Permitted", "As Allowed", or words or phrases of like import are used, it shall be understood that the order, direction, requirement, permission, or allowance of the Owner and Engineer is intended.

Similarly the words "Approved", "Reasonable", "Suitable", "Acceptable", "Properly", "Satisfactory", or words of like effect and import, unless otherwise particularly specified therein, shall mean approved, reasonable, suitable, acceptable, proper, or satisfactory in the judgment of the Owner and Engineer.

S - 6 AWARD AND EXECUTION OF CONTRACT

s 6.1 Payment and Performance Bonds

The successful Bidder, at the time of the execution of the Contract, shall furnish a Payment Bond equal to the Contract amount and a Performance Bond equal to the Contract amount, as required by Minn. Stat. Section 574.26. The bonds shall be issued by sureties satisfactory to the City and authorized to do business in the State of Minnesota.

The Payment Bond and Performance Bond shall guarantee that the Contractor will perform each and every part of the agreement, cover all guarantees called for in these Specifications, including the provisions for maintenance and repair, and insure the prompt payment to all persons furnishing material and labor required in the prosecution of the work. The Performance Bond shall be written in such a manner that it shall remain effective until the Date of Final Acceptance (two (2) years after the Date of Acceptance by the City, provided the work is in accordance with the Specifications and any inspection instructions, and all defects identified during the two (2) year period have been corrected).

In the event the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent, or its right to do business in Minnesota is terminated, or it otherwise ceases to meet the requirements set forth herein, the Contractor shall, within five days thereafter, substitute another Bond and Surety, both of which shall be subject to Owner's acceptance.

If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. Contractor shall furnish proof of such adjustment to the Owner.

s 6.2 Execution of Contract

The Contractor shall not, under any circumstance, assign the Contract or any payments due hereunder without written permission by the City.

The Contract will be made on the forms used by the City of Rochester, and made a part of the General Requirements and Covenants, copies of which are also on file at the office of the City Clerk, Room 135, City Hall, Rochester, Minnesota.

S - 7 CONTROL OF WORK

s 7.1 Drawing and Specification

The Specifications and Plans are intended to supplement, but not necessarily duplicate each other, and together constitute one complete set of Specifications and Plans so that any work exhibited in the one and not in the other, shall be executed as if it has been set forth in both, in order that the work shall be completed according to the complete design or designs as decided and determined by the Engineer.

Should anything be omitted from the Specifications and Plans that is necessary to a clear understanding of the work, or should it appear various instructions are in conflict, the Contractor shall secure written instructions from the Engineer before proceeding with the construction affected by such omissions or discrepancies. It is understood and agreed that the work shall be performed and completed according to the true spirit, meaning, and intent of the Contract, Plans, and Specifications.

All Drawings, Specifications and copies thereof furnished by the City are its property. They are not to be used on other work and, with the exception of the signed Contract, plan sets are to be returned to the City upon request at the completion of the work.

Contractor shall keep and maintain one complete set of all drawings and specifications, addenda, approved shop drawings, change orders and other modifications at the job site that shall be available to the Engineer at all times.

s 7.2 Surveys, Staking and Monument Preservation

The Contractor shall give the Engineer at least 2 working days notice before requiring any stakes to be set or before commencing work on any portion of the Contract, or at any new place, as well as at any place where work has been relinquished or stopped for any reason.

Any work done without being properly located and established by base lines, offset stakes, bench marks, or other basic reference points located, established, or checked by the Engineer, may be ordered removed and replaced at the Contractor's cost and expense.

The Contractor shall carefully protect and preserve any permanent monuments or benchmarks that must of necessity be removed or disturbed in the construction of the work, until they can be properly referenced for relocation.

s 7.3 Other Contracts and Contractors

The Owner reserves the right to award contracts to other Contractors who do additional work at the site of this Project pursuant to MnDOT section 1505.

s 7.4 Testing of Completed Work

Before final acceptance, all parts of the work shall be tested and each part shall be in good condition and working order, or shall be placed in such condition and order at the expense of the Contractor. All tests of completed work required under this Contract shall be made under the direction of the Engineer or others so designated and at the expense of the Contractor, who shall repair at its own expense all damage resulting there from.

S - 8 MEASUREMENT & PAYMENT

s 8.1 Partial Payment

Unless the terms of the contract provide otherwise, progress payments shall be made monthly as the work progresses. Payments shall be based upon estimates of work completed as approved by the City. A progress payment shall not be considered acceptance or approval of any work or waiver of any defects therein.

The City may reserve as retainage from any progress payment an amount not to exceed five percent of the payment. The City may reduce the amount of the retainage and may eliminate retainage on any monthly contract payment if, in the City's opinion, the work is progressing satisfactorily.

For further details refer to MnDOT specification 1906 "Partial Payments".

s 8.2 Acceptance and Final Payment

When final inspection reveals that the work has been completed in strict accordance with the provisions of the Plans, other Contract documents, and previous inspection instructions, the

Engineer shall, within ninety (90) days thereafter, prepare a final estimate which shall be based on accurate measurements of all work performed, and shall submit such estimate together with recommendations to the City Council of the City of Rochester for approval. Payment shall then be made for all work performed under the Contract, less any partial payments already made and any legal deductions or forfeitures for the satisfaction of liens or other claims against the Contract.

s 8.3 Correction of Work After Final Payment

Neither acceptance and occupancy by the Owner, final payment, nor any other provision in the Contract documents, shall relieve the Contractor of its maintenance obligation as hereinafter set forth and as identified in the Specifications.

s 8.4 Maintenance and Repair

The Contractor shall guarantee all work relating to the Specifications for a period of at least two (2) years from the date of written acceptance of the work or project. The Contractor shall make all needed repairs arising out of defective workmanship or materials that, in the judgment of the City, become necessary during such period. Final acceptance and termination of the maintenance obligation shall occur on the date two (2) years after initial acceptance provided that the work is in accordance with the Specifications and any inspection instructions. The maintenance obligation shall otherwise continue until all defects, including defective equipment installed therein, have been corrected.

At any time prior to Final Acceptance (the time during which the maintenance obligation is in effect as provided herein) the City may demand that the Contractor make any noted repairs. If Contractor fails to undertake repairs within ten days after the mailing of a notice of the need to make such repairs, the City may either take action against the performance bond or make the repairs itself and recover the cost from Contractor or the surety under the performance bond.

S - 9 OWNER AND EASEMENTS

The City of Rochester is designated as the Owner. All work shall be located on public right-of-way or on easements to be provided by the Owner. The Contractor shall confine his operations at all times within the limits of the easements. Any repairs or restoration outside the easement limits, required due to the Contractor's carelessness, shall be made with no compensation allowed.

1. **If the Contractor obtains an agreement with a private land owner related to this project the City shall be provided a copy signed by the owner.**

S - 10 CONFLICTS IN DIMENSIONING

In case of conflict between dimensions shown on the plans or detail drawing and those in the specifications, the dimensions on the drawings shall govern. If the conflict is other than dimensions, the specifications shall govern.

S - 11 PRE-CONSTRUCTION CONFERENCE

A pre-construction conference will be scheduled after Engineer's receipt of the Contractor's schedule. The Contractor shall submit to the Engineer a schedule illustrating in bar chart form the anticipated commencement date and duration of each of the major work tasks prior to the pre-construction conference. These tasks shall be broken down by type of work and location as necessary for purposes of planning and coordinating the work of this contract. The schedule should address the phasing of construction in a manner that will provide good project coordination. The Contractor will be required to update or modify the written construction schedule as necessary to accurately reflect the rate and progress on the project.

The conference will be held with the Contractor, City Representative, Engineer and other parties involved in the project. Materials, material sources, construction methods, and scheduling will be reviewed and any questions or procedures will be clarified.

S - 12 CONTACT INFORMATION

Questions regarding this Project shall be directed to:

Russ Kelm
Design Engineer
City of Rochester
(507) 328-2417

S - 13 RESIDENT PREFERENCE IN PUBLIC CONTRACTS

The provisions of MnDOT 1302 are modified to the extent that, in accordance with Minnesota Statutes, section 16.365 (1982) as amended by Minn. Laws 1984, Chapter 440, Section 2, (Resident Preference in Public Contracts), this Contract will be awarded to the lowest responsible bidder, with resident bidders allowed a preference as against a non-resident bidder from a state which gives or requires a preference to bidders from that state, the preference shall be equal to the preferences given or required by the state of the non-resident bidder.

S - 14 (1213) DISQUALIFICATION OF BIDDERS

The provisions of MnDOT 1213 are hereby deleted and replaced with the following:

s 14.1 Either of the following reasons may be considered sufficient cause for disqualification of a bidder and the rejection of his Proposals:

(1) More than one Proposal for the same work from an individual, firm, or corporation under the same or different name. Substitute bid schedules shall be governed by MnDOT 1206.

(2) Evidence of collusion among bidders. Participants in collusion will receive no recognition as bidders on future work until they have been reinstated as responsible bidders.

S - 15 (1302) AWARD OF CONTRACT RESIDENT PREFERENCE IN PUBLIC CONTRACTS

The provisions of MnDOT 1302 are modified to the extent that, in accordance with Minnesota Statutes, section 16.365 (1982) as amended by Minn. Laws 1984, Chapter 440, Section 2, (Resident Preference in Public Contracts), this Contract will be awarded to the lowest responsible bidder, with resident bidders allowed a preference as against a non-resident bidder from a state which gives or requires a preference to bidders from that state, the preference shall be equal to the preferences given or required by the state of the non-resident bidder.

The City shall have up to **60 days** from the bid opening to award the contract during which time the bid unit prices shall prevail.

S - 16 (1305) REQUIREMENT OF CONTRACT BOND

The provisions of MnDOT 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.

S - 17 (1404) MAINTENANCE OF TRAFFIC, (1707) PUBLIC SAFETY, AND (2563) TRAFFIC CONTROL

The provisions of 1404 are supplemented as follows:

s 17.1 Traffic Control

The Contractor shall furnish, install, maintain, and remove all traffic control devices required to provide safe movement of vehicular and/or pedestrian traffic passing through the work zone 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.

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.

The Contractor shall furnish names, addresses, and phone numbers of at least three (3) individuals responsible for the placement and maintenance of traffic control devices. At least one of these individuals shall be "on call" 24 hours per day, seven days per week during the times any traffic control devices, furnished and installed by the Contractor, are in place. The required information shall be submitted to the Engineer at the Pre-construction Conference. The Contractor shall also furnish the names, addresses, and phone numbers of those individuals to the following:

1.	Rochester Public Works Department	(507) 328-2400
2.	Rochester Police Department	(507) 328-2800
3.	Local Fire Department	(507) 328-6300
4.	City/Township Clerk	(507) 328-2900

The Contractor shall, at the pre-construction conference, designate a Work Zone Safety Coordinator who shall be responsible for safety and traffic control management in the Project work zone. The Work Zone Safety Coordinator shall be either an employee of the Contractor such as a superintendent or a foreman, or an employee of a firm which has a subcontract for overall work zone safety and traffic control management for the Project. The responsibilities of the Work Zone Safety Coordinator shall include, but not be limited to:

- Coordinating all work zone traffic control operations of the Project, including those of the Contractor, subcontractors and suppliers.
- Establishing contact with local school district, government, law enforcement, and emergency response agencies affected by construction before work begins.
- Maintaining a record of all known crashes within a work zone. This record should include all available information, such as: time of day, probable cause, location, pictures, sketches, weather conditions, interferences to traffic, etc. These records shall be made available to the Engineer upon request.

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 person performing the inspection 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.

s 17.2 Maintenance and Staging of Traffic Control:

The Contractor is hereby advised that the phasing, construction staging, the work sequencing, and the maintenance of pedestrian and vehicular traffic control and related signage are critical on this project. The Contractor shall fully expect to employ significant measures to control and maintain pedestrian, vehicular traffic throughout the life of the project. The major phases of construction are as follows:

Construction and Traffic Control Phases

ADVANCE SIGNING SHALL BE INSTALLED 7 DAYS BEFORE CONSTRUCTION IS TO BEGIN as approximately located in the plan and as approved by the Engineer. The Contractor shall notify the Engineer at least five (5) working days in advance of his intent to close lanes.

Prior to the start of the work, the contractor shall submit detailed traffic control plans for approval by the engineer. The Traffic Control Plan shall present the traffic control devices and layouts required for each stage of work. The plan shall also indicate maintenance and routing of pedestrian traffic throughout the project corridor.

The contractor is hereby advised that the phasing, construction staging, the work sequencing, and the maintenance of pedestrian and vehicular traffic control and related signage are critical on this project. The contractor shall fully expect to employ significant measures to control and maintain pedestrian and vehicular traffic throughout the life of the project. The **5 major stages** are as follows:

All Stages

1. Contractor shall coordinate vehicle and pedestrian access to private property by providing three (3) days notice to the property owners regarding access disruptions or changes to access. In addition this coordination includes the Contractor post signs notifing the renter/parkers.
2. Contractor shall ensure that vehicle access to private driveways is not restricted for greater than five (5) consecutive calendar days.
3. Contractor shall coordinate special vehicle access accommodations (health support services) as may be required at the request of private property owners.
4. Contractor shall provide and coordinate access accommodations for private garbage collectors vehicles as required. In addition this coordination includes the Contractor to haul garbage to a central pick up point with the collectors.

Stage 1: **6th Ave SW to 7th Ave SW Station (26+50)**

Shall be closed to thru traffic, pedestrian access to private properties shall be allowed.

1. **1st Street/6th Avenue South Bound**
   a. Contractor shall be allowed to close the South bound of 6th Avenue NW and 1st NW at 12 Noon on a Friday to perform work within the intersection. The Contractor shall submit for the Engineers approval, a detour plan which includes providing all the necessary signing for a detour route along 1st St SW to 11th Ave NW to Civic Center Drive.
   b. **ADVANCE SIGNING SHALL BE INSTALLED 7 DAYS BEFORE CONSTRUCTION IS TO BEGIN** as approximately located in the plan and as approved by the Engineer. The Contractor shall notify the Engineer at least five (5) working days in advance of his intent to close lanes.
   c. All work required within the intersection with the exception of sod hall be completed over a period of two (2) full weekends (Saturday-Sunday) and one (1) full five (5) day weeks (Monday-Friday).
   d. Contractor shall open the intersection to unrestricted north-south vehicle and pedestrian traffic prior to 6:00 AM the Monday after the third full weekend.

e. If the Contractor fails to complete the work within the intersection within the time period specified and open the intersection to unrestricted north-south vehicle and pedestrian traffic as specified the Contractor shall be subject Interim Liquidated Damages of **$1,000 per calendar day.**

Prior to Next stage minimum traffic operations shall include:

Stage 1 shall be open to traffic and parking on the finished placement of the Aggregate Base surface.

Stage 2: **7th Ave SW Station (26+50) to Station 21+50**

Shall be closed to thru traffic, pedestrian access to private properties shall be allowed.

Prior to Next stage minimum traffic operations shall include:

Stage 1 Concrete Curb and Gutter and Drive Approaches shall be completed.

Stage 2 shall be open to traffic and parking on the finished placement of the Aggregate Base surface.

Stage 3: **Station 21+50 to 18+00**

Shall be closed to thru traffic, pedestrian access to private properties shall be allowed.

Prior to Next stage minimum traffic operations shall include:

Stage 2 Concrete Curb and Gutter and Drive Approaches shall be completed.

Stage 3 shall be open to traffic and parking on the finished placement of the Aggregate Base surface.

Stage 4: **Station 18+00 to 14+00**

Shall be closed to thru traffic, pedestrian access to private properties shall be allowed.

Prior to Next stage minimum traffic operations shall include:

Stage 3 Concrete Curb and Gutter and Drive Approaches shall be completed.

Stage 4 shall be open to traffic and parking on the finished placement of the Aggregate Base surface.

Stage 5: **Station 14+00 to 11th Ave SW**

Shall be closed to thru traffic, pedestrian access to private properties shall be allowed.

Prior to Next stage minimum traffic operations shall include:

Stage 4 Concrete Curb and Gutter and Drive Approaches shall be completed.

2. 1st Street/11th Avenue Intersection

a. Contractor shall be allowed to close the intersection of 1st Street and 11th Avenue NW at 12 Noon on a Friday to perform work within the intersection. The Contractor shall submit for the Engineers approval, a detour plan which includes providing all the necessary signing for a detour route along 1st St SW to 16th Ave NW to Civic Center Drive.

b. **ADVANCE SIGNING SHALL BE INSTALLED 7 DAYS BEFORE CONSTRUCTION IS TO BEGIN** as approximately located in the plan and as approved by the Engineer. The Contractor shall notify the Engineer at least five (5) working days in advance of his intent to close lanes.

c. All work required within the intersection with the exception of sod hall be completed over a period of two (2) full weekends (Saturday-Sunday) and one (1) full five (5) day week (Monday-Friday).
d. Contractor shall open the intersection to unrestricted north-south vehicle and pedestrian traffic prior to 6:00 AM the Monday after the third full weekend.
e. If the Contractor fails to complete the work within the intersection within the time period specified and open the intersection to unrestricted north-south vehicle and pedestrian traffic as specified the Contractor shall be subject Interim Liquidated Damages of **$1,000 per calendar day.**

At all times throughout this project, the Contractor shall keep all directly affected property owners informed as to the appropriate access route being provided and maintained for them.

A traffic flow pattern on city streets shall be maintained to provide emergency vehicle access to all property. Fire hydrants, on or adjacent to the work, shall be kept accessible to firefighting equipment at all times. All street closings shall be approved by the city prior to closing. The temporary closing of any streets will require the installation of sufficient barricades, fences, and signs, to adequately deter traffic from entering the sites. If the streets are not closed, one lane of traffic shall be maintained at all times, and signs installed indicating "local traffic only".

Haul routes shall generally be along C.S.A.H. streets or trunk highways, and coordinated with the engineer.

s 17.3 Measurement and Payment

No measurement will be made of the various Items that constitute Traffic Control but all such work will be construed to be included in the single Lump Sum payment under Item 2563.601 (Traffic Control)

Item No.	Item	Unit
2563.601	TRAFFIC CONTROL	L S

S - 18 (1506) SUPERVISION BY CONTRACTOR

The provisions of MnDOT 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 MnDOT 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.

S - 19 (1507) UTILITY PROPERTY AND SERVICE

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

s 19.1 The provisions of MnDOT 1507.1 B are hereby deleted and the following substituted therefore:

B Gopher State One Call

The Contractor shall:

(1) Mark the proposed excavation in accordance with the Minnesota State Statute 216D color code before contacting "Gopher State One Call." The Contractor shall mark proposed excavation area with white paint and

white flags or in lieu of white flags, white stakes may be used. The Contractor must adhere to all requirements of Gopher State One Call in addition to the following:

The white markings must delineate the **actual excavation area** where the locating of underground facilities is required. All flags and stakes shall display the name, and phone number of the Contractor. All areas of proposed excavation shall be considered "practical" for the use of white markings, pursuant to Minnesota Statutes §216D.05 (2).

(2) Call "Gopher State One Call" at least 48 hours (excluding Saturdays, Sundays, and holidays) before starting excavation operations.

(3) The Contractor shall acquire a Positive Response confirmation from MnDOT for all proposed excavations when the Gopher State One Call has indicated MnDOT utilities may be affected. The Contractor may call MnDOT Electrical Services Section (ESS) Dispatch Locating to confirm the status of Utility infrastructure owned by MnDOT. MnDOT Electrical Services Section (ESS) Dispatch Locating can be contacted at the following phone numbers; (651) 366 -5750 or (651) 366-5751. The Contractor shall be responsible for all damage to MnDOT owned Utility infrastructure if a Positive Response confirmation has not been acquired from MnDOT. The Contractor is required to comply with the provisions of Minnesota Statutes chapter 216D when performing Excavation as defined in Minnesota Statutes §216D.01 (subdivision 5), and will be responsible for damages to facilities in accordance with Minnesota Statutes §216D.06.

s 19.2 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."

s 19.3 By bidding on this Contract, the bidder agrees that it shall use the Plan to identify the location of MnDOT drainage facilities as satisfying the requirements of Minnesota Statutes Ch. 216D and Minnesota Rules 7560.0250 with respect to MnDOT's storm water drainage facilities.

s 19.4 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.

Full Name	Company	Description	Business Phone
Steve Hyke	MN Energy Resources	Gas - Yellow	(507) 529-5104
Ron Muller	Charter Communications	Cable-Orange	(507) 285-6164
Wally Carlson	Mayo Clinic Facilities	Other	(507) 266-8142
Kay Klemmer	Northern Natural Gas	Gas - Yellow	(507) 451-7760 3202
Pat Lynch	Zayo Bandwidth	Fiber Optics - Orange	(952) 230-4288
Rick Wellik	Peoples Cooperative Power	Communications - Orange	(507) 288-4004
Brian Engen	Peoples Cooperative Power	Communications - Orange	(507) 288-4004
Doug Feine	Public Works OWEF	Steam - Yellow	(507) 328-7033
Chad O'Connor	Centurylink	Telephone - Orange	(507) 285-2059
Donn Richardson	Rochester Public Utilities	Water Dept - Blue	(507) 280-1509
Mike Engle	Rochester Public Utilities	Electric - Red	(507) 280-1579
Steve Cook	Rochester Public Utilities	Electric - Transmission	(507) 280-1590
Eric Loftus	Rochester Public Works	Sewer - Green	(507) 328-2437

s 19.5 Utilities

s 19.6 The Contractor shall coordinate his/her work and cooperate with the foregoing utility owners and their forces in a manner consistent with the provisions of MnDOT 1507 and the applicable provisions of MnDOT 1505.

s 19.7 The City of Rochester utilities that are affected such as storm sewer, sanitary sewer, and water supply have been included in the Plan for adjustment or relocation. The Contractor shall notify Doug Nelson, Manager of Engineering at telephone (507) 328-2423, in advance of the date he intends to start work and he shall furnish that office with such information as may be necessary to permit the responsible authorities to make suitable arrangements relative thereto.

s 19.8 The Contractor shall verify all underground utility locations and elevations prior to construction. (Gopher State One Call 1-800-252-1166)

S - 20 (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:

In accordance with the MN MUTCD all sign supports shall be crashworthy. Signs installed on barricades, barricade sign combinations, and all other portable supports shall be crashworthy. This includes all new and used Category I and Category II devices.

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.

S - 21 (1717) AIR, LAND AND WATER POLLUTION

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

s 21.1 **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 MnDOT 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).

s 21.2 MnDOT 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 a public water 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 public 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.

s 21.3 MnDOT 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.

F Compensation

The borings indicate that regulated wastes (i.e. construction debris, brick, concrete block, etc) will be encountered when trenching in 2nd Avenue SW. If the material encountered is unsuitable for trench backfill, then the Contractor shall haul and dispose of the material at an approved demolition landfill site. Contractor shall be compensated on a cubic yard loose volume basis (truck measure) for the removal and disposal of said material.

Contractor shall also be compensated on a cubic yard loose volume basis for granular material for backfill for the quantity of debris hauled from the site. The quantity of granular backfill shall be based on the quantity of debris hauled from the site and disposed of at an approved demolition landfill.

S - 22 (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 MnDOT 1717, these Special Provisions, and the following:

s 22.1 By signing the Proposal and completing the NPDES permit application, the Contractor is a co-permitee with the **City** 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.

s 22.2 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 **City of Rochester** 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 section15), 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.

s 22.3 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 Paragraph IV.E, shall be the sole responsibility of the Contractor. The word "Permitee" 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 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 **City of Rochester**, 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.

s 22.4 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 Contact 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 Office must be contacted immediately at 1-800-422-0798 or 1-651-649-5451.

S- The Contractor shall review and abide by the instructions contained in the permit package. The contractor shall hold **City of Rochester** 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.

S- 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 MnDOT'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.

Last revision 2/1/07

NPDES Permit Requirements Cross-Reference within this Contract

NPDES Permit Requirements	Cross-Reference within this Contract
Obtain NPDES Permit; Permit Compliance; Submit Notice of Termination	MnDOT 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	MnDOT 1506, 1717, and 2573; Special Provisions: 1717 (Air, Land &Water Pollution), 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Project / Weekly Schedule (for Erosion/ Sediment Control) Completing Inspection / Maintenance Log/ Records	MnDOT 1717 and 2573; Special Provisions: 1717 (Air, Land &Water Pollution), 1717 (National Pollutant Discharge Elimination System (NPDES) Permit); and
Project Specific Construction Staging	The Plans: MnDOT 1717; Special Provisions: 1717 (Air, Land &Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit) 1806 (Determination and Extension of Contract Time)
Temporary Erosion / Sediment Control	The Plans: MnDOT 2573 and 2575
Maintenance of Devices / Sediment removal Removal or Tracked Sediment Removal of Devices	The Plans: MnDOT 1717 and 2573; Special Provisions: 1514 (Maintenance During Construction) 1717 (Air, Land &Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)
Dewatering	MnDOT 2105.3B and 2451.3 C; Ay also require DNR Permit
Temporary work not shown in the Plans Grading areas (unfinished acres exposed to erosion)	MnDOT 1717, 2573, and 2451C; 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: MnDOT 1717, 2573 and 2575; Special Provisions: 1717 (Air, Land &Water Pollution), and 1717 (National Pollutant Discharge Elimination System (NPDES) Permit)

S - 23 (1803) PROSECUTION OF WORK

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

sl 0.1 SPECIAL PROJECT ADA REQUIREMENTS

All pedestrian facilities and shared trails on this Project must be constructed according to Public Rights-of-Way Accessibility Guidelines (PROWAG) which can be found at: http://www.access-board.gov/prowac/draft.htm. The appropriate pedestrian ramp details for each quadrant are included in the Plan. The Engineer may provide additional details to those provided in the Plan that meet the PROWAG guidelines as the need arises and field conditions dictate.

(A) The Contractor must designate a responsible person familiar with PROWAG to assess proposed sidewalk layouts at each site before work begins. Any time work the Contractor is performing concerns pedestrian facilities, the Contractor's representative shall be on site.

(B) Pedestrian facilities must be constructed to meet the following criteria:

(1) Pedestrian Access Routes (PAR) must be constructed to meet the following:

- Minimum 4 feet width.
- A maximum cross slope of 2.0%.
- Vertical discontinuities must be less than 0.25 inches.
- Must provide positive drainage without allowing any ponding.

(2) Landings are part of the PAR and must be constructed to meet the following:

- 4 feet by 4 feet minimum width.
- Maximum slope of 2.0% in all directions.
- Required at all locations where the PAR changes directions.
- Must be connected to the PAR.

(3) Ramps are part of the PAR and must be constructed to meet either of the following criteria:

- Longitudinal slopes less than 5% in the direction of travel requires no landing at the top of the ramp (unless the PAR changes direction).
- Longitudinal slopes between 5 - 8.3% in the direction of travel require a landing at the top of the ramp.

(C) If the Contractor constructs any pedestrian or shared-use trail facilities that are not per Plan, do not meet the above requirements, or do not follow the agreed upon resolution, the Contractor shall be responsible for correcting the deficient facilities with no compensation paid for the corrective work. To ensure that the pedestrian facilities are constructed in compliance with PROWAG, the Contractor shall follow the following three steps:

(1) The Contractor shall use the appropriate ramp details in the Plan and identify the removal limits for the sidewalk and curb and gutter. If Contractor determines the removal limits are not adequate to meet PROWAG, the Contractor shall stop work immediately and consult the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may finish the removals.

(2) Prior to pouring each curb and gutter segment, the Contractor must verify the zero height curb and curb transitions will be located as shown in the Plans and will provide an adequate detectable edge. The Contractor shall also verify the proposed curb flow lines will provide positive drainage as well as maintain existing gutter inflows/outflows. The curb and gutter shall be constructed as detailed in the Plan with a defined flowline and no vertical discontinuities. The Contractor shall consult with the Engineer to determine a resolution if any of these

conditions cannot be met. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with pouring the curb and gutter.

(3) After the curb has been correctly poured, the Contractor has set the sidewalk forms, and prior to placing the concrete curb ramps/sidewalks, the Contractor shall verify the requirements above will be achieved. If any of these requirements cannot be met the Contractor shall meet with the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with the curb ramp/sidewalk pour.

(D) It shall be the responsibility of the Contractor, or Contractor's Surveyor if applicable, to layout all proposed work at each intersection in accordance with the Plan and requirements listed in this Special Provision. The Contractor may confer with the Engineer for guidance in laying out the proposed work, but it will be the Contractor's responsibility to ensure the proposed work meets all the requirements of this Special Provision. This layout includes, but is not limited to placement of grade breaks, curb transitions, gutter flow lines, truncated dome placement, crosswalk marking placement, flares, landing limits, and ramp limits. It is important that the Contractor layout this work properly to achieve the construction of a compliant pedestrian facility. This layout work shall be incidental with no extra compensation paid.

(E) The Contractor shall utilize measures and methods when working near existing buildings that will avoid damaging the building's face or structure. The contractor will be responsible for any damage to the building's face or structure, both below and above ground. Any damage resulting from Contractor operations will be repaired at the Contractor's expense to the satisfaction of the Engineer.

(F) The Contractor shall round all joints and edges of the walk with a ¼ inch radius edging tool, contraction joints shall extend to at least 30 percent of walk thickness and shall be approximately 1/8 inch wide as per MnDOT 2521. The Contractor shall also have the option of providing saw cuts to construct the sidewalk joints. This work shall be considered incidental and no extra compensation paid.

s 23.2 SPECIAL PROJECT ADA REQUIREMENTS

All pedestrian facilities and shared trails on this Project must be constructed according to Public Rights-of-Way Accessibility Guidelines (PROWAG) which can be found at: http://www.access-board.gov/prowac/draft.htm. The appropriate pedestrian ramp details for each quadrant are included in the Plan. The Engineer may provide additional details to those provided in the Plan that meet the PROWAG guidelines as the need arises and field conditions dictate.

(A) The Contractor must designate a responsible person familiar with PROWAG to assess proposed sidewalk layouts at each site before work begins. This person must be on site at all times that any work concerning pedestrian facilities is being performed.

(B) Pedestrian Access Routes must be constructed meet to the following criteria:

(1) Pedestrian Access Routes (PAR) must be constructed to meet the following:

- Minimum 4 feet width.
- A maximum cross slope of 2.0%.
- Vertical discontinuities must be less than 0.25 inches.
- Must provide positive drainage without allowing any ponding.

(2) Landings are part of the PAR and must be constructed to meet the following:

- 4 feet by 4 feet minimum width.
- Maximum slope of 2.0% in all directions.
- Required at all locations where the PAR changes directions.

- Must be connected to the PAR.

(3) Ramps are part of the PAR and must be constructed to meet either of the following criteria:
- Longitudinal slopes less than 5% in the direction of travel requires no landing at the top of the ramp (unless the PAR changes direction).
- Longitudinal slopes between 5 - 8.3% in the direction of travel require a landing at the top of the ramp.

(C) If the Contractor constructs any pedestrian or shared-use trail facilities that are not per Plan, do not meet the above requirements, or do not follow the agreed upon resolution, the Contractor shall be responsible for correcting the deficient facilities with no compensation paid for the corrective work. To ensure that the pedestrian facilities are constructed in compliance with PROWAG, the Contractor shall follow the following three steps:

(1) The Contractor shall use the appropriate ramp details in the Plan and identify the removal limits for the sidewalk and curb and gutter. If Contractor determines the removal limits are not adequate to meet PROWAG, the Contractor shall stop work immediately and consult the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may finish the removals.

(2) Prior to pouring each curb and gutter segment, the Contractor must verify the zero height curb and curb transitions will be located as shown in the Plans and will provide an adequate detectable edge. The Contractor shall also verify the proposed curb flow lines will provide positive drainage as well as maintain existing gutter inflows/outflows. The curb and gutter shall be constructed as detailed in the Plan with a defined flowline and no vertical discontinuities. The Contractor shall consult with the Engineer to determine a resolution if any of these conditions cannot be met. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with pouring the curb and gutter..

(3) After the curb has been correctly poured, the Contractor has set the sidewalk forms, and prior to placing the concrete curb ramps/sidewalks, the Contractor shall verify the requirements above will be achieved. If any of these requirements cannot be met the Contractor shall meet with the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with the curb ramp/sidewalk pour.

(D) It shall be the responsibility of the Contractor, or Contractor's Surveyor if applicable, to layout all proposed work at each intersection in accordance with the Plan and requirements listed in this Special Provision. The Contractor may confer with the Engineer for guidance in laying out the proposed work, but it will be the Contractor's responsibility to ensure the proposed work meets all the requirements of this Special Provision. This layout includes, but is not limited to placement of grade breaks, curb transitions, gutter flow lines, truncated dome placement, crosswalk marking placement, flares, landing limits, and ramp limits. It is important that the Contractor layout this work properly to achieve the construction of a compliant pedestrian facility. This layout work shall be incidental with no extra compensation paid.

(E) The Contractor shall utilize measures and methods when working near existing buildings that will avoid damaging the building's face or structure. The contractor will be responsible for any damage to the building's face or structure, both below and above ground. Any damage resulting from Contractor operations will be repaired at the Contractor's expense to the satisfaction of the Engineer.

(F) The Contractor shall round all joints and edges of the walk with a ¼ inch radius edging tool, contraction joints shall extend to at least 30 percent of walk thickness and shall be approximately 1/8 inch wide as per MnDOT 2521. The Contractor shall also have the option of providing saw cuts to construct the sidewalk joints. This work shall be considered incidental and no extra compensation paid.

S - 24 (1806) DETERMINATION OF CONTRACT TIME

The contract time will be determined in accordance with the provisions of 1806 and the following:

s 24.1 Construction operations shall be started within eight (8) Calendar Days after the date of Notice of Contract Approval, whichever is later. Construction operations shall not commence prior to Contract Approval.

s 24.2 All work required by these contract documents shall be initiated after **May 15, 2014** completed no later than **October 30, 2014**.

s 24.3 The Contractor shall also reference section (1404) Maintenance of Traffic, (1707) Public Safety, And (2563) Traffic Control Traffic Signals, for critical project timeframes and dates found elsewhere in the proposal.

S - 25 INCIDENTAL WORK

Items of work for which no pay items are included in the bid proposal shall be considered as incidental expense and no separate payment will be made therefore. Incidental items include, but are not limited to the following:

- Abandon and plugging existing lines and structures, other than paid for in the plans
- Disposal of excess excavation.
- Pipe bedding/foundation/encasement material unless in water table
- Erosion Control BMP's:
  - Concrete Washout Operations
  - Street Sweeping
- Maintaining access to private property.
- Trench Excavation for Sanitary, Storm Sewers and Watermains
- Reinforcing bars and dowels.
- Bituminous Tack Coat.
- All additional expenses associated in the Hand Work Zone of the Tree Protection Zone
- Construction operation delays as required by project phasing
- Temporary hydrants for flushing and testing as required by project phasing
- Maintenance of water and sewer services
- Cutting in water valves as required by project phasing
- Finish grading of boulevard and disturbed areas
- Fine grading of subgrade and subgrade preparation
- Preparation of aggregate base for paving
- Shaping of earth berms for erosion control and drainage swales
- Water & Dewatering

S - 26 (1904) EXTRA AND FORCE ACCOUNT WORK

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

s 26.1 The Contractor is required to submit force account work itemized statements of costs in accordance with MnDOT 1904 to the Engineer on MnDOT form TP-21659 (Summary of Daily Force Account). Copies of this form can be obtained from the Engineer.

s 26.2 The following sentence shall be added to the second paragraph of MnDOT 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."

S - 27 (2021) MOBILIZATION

The provisions of MnDOT 2021 are hereby deleted and replaced with the following:

s 27.1 DESCRIPTION

Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the Project site; for the establishment of all Contractor's offices and buildings or other facilities necessary for work on the Project. Mobilization may include bonding, permit, and demobilization costs. When the proposal does not have a lump sum item for Mobilization, all costs incurred by the Contractor for Mobilization shall be incidental to other work.

s 27.2 BASIS OF PAYMENT

Based on the lump sum Contract price for mobilization, partial payments will be made as follows:

Mobilization Partial Payments		
	Pay Lesser of the Two	
% of Original Contract Amount Completed[1]	% of Mobilization	% of Original Contract Amount
5	50	3
15	75	5
25	100	5
95	100	N/A

[1] The Percent of Original Contract Amount Completed = the amount earned by the Contractor, excluding money earned for mobilization and material on hand, divided by the total value of the original contract (all bid items).

The total sum of all payments shall not exceed the original Contract amount bid for the mobilization item, regardless of the fact that the Contractor may have, for any reason, shut down work on the Project or moved equipment away from the Project and then back again.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the Contract.

Item No.	Item	Unit
2021.501	MOBILIZATION	LS

S - 28 (2101) CLEARING AND GRUBBING

Clearing and grubbing operations shall be performed in accordance with the provisions of MnDOT 2101 and the following:

s 28.1 Burning or burying timber, stumps, roots or other debris will not be permitted.

s 28.2 The first paragraph of MnDOT 2101.3D Disposal Limitations, is revised to read as follows:

> The Contractor shall dispose of trees, brush, stumps, roots, and other debris or byproducts by chipping, marketing, ~~or burning~~. The Contractor:

s 28.3 MnDOT 2101.3D(5) under Disposal Limitations, is revised to read as follows:

(5) Shall not bury trees, brush, stumps, roots, and other debris or by-products within the State Right of Way or City Property.

s 28.4 MnDOT 2101.3D6 Burying, is hereby deleted in its entirety.

s 28.5 The first paragraph of MnDOT 2101.4B Area Basis, is revised to read as follows:

When the hectare is the unit, quantities will be determined by measuring (to the nearest 0.02 hectare **(0.05 acre)**) all areas cleared and all areas grubbed, within the limits shown in the Plans or staked by the Engineer. All measurements will be made horizontally to points 3 m (**10 feet**) outside the trunks of qualifying trees or stumps on the perimeter of the area being measured. Separate areas smaller than 0.02 hectare (**0.05 acre**) will be considered to be 0.02 hectare (**0.05 acre**).

s 28.6 The first paragraph of MnDOT 2101.5 Basis of Payment, is revised to read as follows:

Payment for the accepted quantities of clearing and grubbing at the Contract prices per unit of measure will be full compensation for all removal and disposal costs, including the costs of securing outside disposal sites as needed and of carrying out the specified treatment in disposing of elm, oak wilt infected red oaks, pine, and marketable trees.

Item No.	Item	Unit
2101.502	CLEARING	TREE
2101.507	GRUBBING	TREE

S - 29 (2104) REMOVING PAVEMENT AND MISCELLANEOUS STRUCTURES

Section 2104 is hereby supplemented to include the following:

The Owner shall have the option of removing and salvaging all items such as fences, gates, light standards, poles, etc. If the Owner does not remove such items prior to construction, they shall be removed by the Contractor and shall be considered incidental to the Contract unless specific bid items are included.

All debris and excess materials removed from the project shall be disposed of by the Contractor off the project site. No burying of debris will be permitted.

Sewers within the trenching limits shall be removed and sewers outside of the trench limits shall be plugged all as incidental expense.

Abandoning of existing storm sewers shall be filled with granular material and capped watertight. Filling and capping of the abandoned sewer pipe shall be considered incidental work for which no direct payment will be made.

s 29.1 **Item 2104.501 "Remove Concrete Curb and Gutter"** Shall include the removal of existing curb and gutter as noted on the plans. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to remove and dispose of the concrete curb and gutter including full depth saw cut to provide a clean edge.

s 29.2 **Item 2104.501 "Remove Sewer ..."** If no pay item is included then it is incidental to the project otherwise, shall include the removal of existing pipe, apron, or structure, by type, as noted on the plans. Measurement and payment shall be made at the contract unit price per linear foot or each, which shall be compensation in full for all labor, equipment, and materials necessary to remove and dispose of the work and shall include capping or plugging remaining abandoned pipe if any.

s 29.3 **Item 2104.503-5 "Remove Concrete Pavement, Drive, and Sidewalk"** Shall include the removal of existing concrete pavements as noted on the plans. Measurement and payment shall be made based on surface area and shall be compensation for the total depth of the concrete pavements at the contract unit price per square yard, which shall be compensation in full for all labor, equipment, and materials necessary to remove and dispose of the concrete pavements.

s 29.4 **Item 2104.505 "Remove Bituminous Pavement"** Shall include the removal of existing bituminous pavement as noted on the plans. Measurement and payment shall be made based on surface area and shall be compensation for the total depth of the bituminous pavement at the contract unit price per square yard, which shall be compensation in full for all labor, equipment, and materials necessary to remove and dispose of the bituminous pavement.

s 29.5 **Item 2104.505 "Remove Pavement"** Shall include the removal of existing bituminous, brick, and concrete base pavement as noted on the plans. Measurement and payment shall be made based on surface area and shall be compensation for the total depth of the bituminous, brick and concrete base pavement at the contract unit price per square yard, which shall be compensation in full for all labor, equipment, and materials necessary to remove and dispose of the bituminous, brick, and concrete base pavement.

s 29.6 **Item 2104.511/2521.603 "Sawing Concrete Pavement"** If no pay item is included then it is incidental to the project otherwise, shall include saw cutting of concrete paving along the removal line. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to saw cut to provide a clean edge.

s 29.7 **Item 2104.513 "Sawing Bituminous Pavement"** If no pay item is included then it is incidental to the project otherwise, shall include saw cutting of bituminous paving along the removal line. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to saw cut to provide a clean edge.

s 29.8 **Item 2104.509 "Remove Manhole and Catch Basin"** Shall include the removal of the existing storm or sanitary manholes and basins as noted on the plans. Measurement and payment shall be made at the contract unit price per each, which shall be compensation in full for all labor, equipment, and materials necessary to maintain service flow, plug, remove and dispose the entire structure.

s 29.9 **Item 2104.509 "Remove Hydrant"** Shall include the removal of the existing hydrant as noted on the plans. If directed by the Engineer, all removed hydrants shall be delivered to Rochester Public Utilities at 4000 East River Road NE in Rochester, MN. Otherwise contractor shall dispose of hydrant at their expense. Measurement and payment shall be made at the contract unit price per each, which shall be compensation in full for all labor, equipment, and materials necessary remove and dispose the entire structure.

s 29.10 **Item W200.564 "Remove Watermain"** Shall include the removal of existing watermain as noted on the plans, temporary closing or maintaining flows shall be coordinated with the water department. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work

s 29.11 **Item 2104.521 "Salvage Concrete Apron"** Shall include the salvaging of the existing culvert end sections (multi-section if tied together). Measurement and payment shall be made at the contract unit price per each, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work. Any damage to the culvert units shall be repaired or replaced at the expense of the Contractor.

s 29.12 **Item 2104.521 "Salvage Guardrail"** Shall include the salvaging of the guardrail, by type, as noted on the plans. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work. Any damage to the rail units shall be repaired or replaced at the expense of the Contractor.

s 29.13 **Item 2104.521 "Salvage Fence"** Shall include the salvaging of the fence, by type, as noted on the plans. Measurement and payment shall be made at the contract unit price per linear foot, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work. Any damage to the rail units shall be repaired or replaced at the expense of the Contractor.

s 29.14 **Item 2104.523 "Salvage Sign"** Shall include the salvaging of the all the existing signs on a given post. Measurement and payment shall be made at the contract unit price per each post, regardless of the number of signs mounted on a post, which shall be compensation in full for all labor, equipment, and materials necessary to

complete the work. Any damage to the signs or posts shall be repaired or replaced at the expense of the Contractor.

s 29.15 **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 MnDOT 1403.

Item No.	Item	Unit
2104.501	REMOVE CURB AND GUTTER	L F
2104.501	REMOVE SEWER PIPE (STORM)	L F
2104.501	REMOVE SEWER PIPE (SANITARY)	L F
2104.503	REMOVE CONCRETE WALK	S F
2104.505	REMOVE PAVEMENT	S Y
2104.505	REMOVE CONCRETE DRIVEWAY PAVEMENT	S Y
2104.505	REMOVE CONCRETE PAVEMENT	S Y
2104.505	REMOVE BITUMINOUS PAVEMENT	S Y
2104.509	REMOVE MANHOLE	EACH
2104.509	REMOVE CATCH BASIN	EACH
2104.509	REMOVE MANHOLE	EACH
2104.513	SAWING BIT PAVEMENT (FULL DEPTH)	L F
2104.523	SALVAGE SIGN	EACH
W200.564	REMOVE HYDRANT ASSEMBLY	EACH
W200.564	REMOVE EXISTING WATERMAIN	L F
W200.564	REMOVE HYDRANT ASSEMBLY	EACH
W200.564	REMOVE EXISTING WATERMAIN	L F
W200.564	REMOVE __IN GATE VALVE AND BOX	EACH

S - 30 (2105) EXCAVATION AND EMBANKMENT

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

s 30.1 MnDOT 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.

s 30.2 The last paragraph in MnDOT 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.

s 30.3 The first and second sentences in the second paragraph in MnDOT 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 um

(#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.

s 30.4 The fifth paragraph in MnDOT 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.

s 30.5 The second sentence in the eighth paragraph of MnDOT 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.

s 30.6 The fourth to last paragraph in MnDOT 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.

s 30.7 The ninth paragraph of MnDOT 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 m3 **(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.

s 30.8 The eleventh paragraph of MnDOT 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).**

s 30.9 Compaction of all embankment construction, including culvert backfills, shall be obtained by the "**Quality Compaction**" method described in MnDOT 2105.3F.

s 30.10 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.

s 30.11 Measurement and Payment

Item No.	Item	Unit
2105.501	COMMON EXCAVATION (P)	C Y

S - 31 (2105) GEOTEXTILE FABRIC TYPE V

This work shall consist of placing geotextile below the Breaker Run layer at the location(s) shown in the Plan. The work shall be accomplished according to MnDOT 2105, these Special Provisions, or as directed by the Engineer. The purpose of the geotextile layer is to provide separation between the fill and underlying softer soils, to prevent mixing, to provide stability during compaction, to provide some reinforcement and to minimize differential movement.

s 31.1 Materials Requirements

Geotextile shall conform to the requirements of MnDOT 3733, Type V.

s 31.2 Construction Requirements

The prepared surface shall be relatively smooth and free of debris or irregularities that would tend to puncture or tear the geotextile. The geotextile shall be placed with the highest strength direction (usually the "machine" or roll direction) oriented in the direction of the greatest expected field stress. (This will usually be at right angles to the centerline of the construction.)

If multiple pieces of geotextile are required, adjacent strips shall be field or factory sewn, with the seams to have a strength as specified in 3733.2B3. All seams shall be sewn using a "double spool" machine capable of sewing a Federal Type 401 locking stitch. Seam type (flat, "J", or butterfly), thread strength (110 Newtons [**25 pound**] minimum), number of rows of stitching (1 or 2) and stitches per 25 mm [**inch**] (typically 5-7), shall be consistent with achieving the required seam strength and as recommended by the geotextile manufacturer.

The geotextile shall be adequately secured so that it is not displaced during subsequent construction. No traffic or construction equipment will be permitted to operate directly on the geotextile. Any damaged geotextile shall be repaired to the satisfaction of the Engineer by patching and sewing or, when appropriate, a 900 mm [**36 inch**] overlap on all sides without sewing.

Fill shall be placed onto the fabric in uniform lifts as required by the applicable specification and approved by the Engineer, but in no case shall lifts in excess of 300 - 450 mm [**12-18 inches**] be used, unless required to bring the fill above water level or provide stability. Fill material shall be as shown in the Plan or as directed by the Engineer. For placement underwater and for 600 mm [**2 feet**] above water level, granular materials shall be used unless otherwise provided in the Plans or approved by the Engineer.

s 31.3 Measurement and Payment

Measurement will be made of the number of square meters [**square yards**] of satisfactorily installed geotextile approved by the Engineer. No allowance will be made for seams. Payment will be made under Item 2105.604 (Geotextile Fabric Type V) at the Contract bid price per square meter [**square yard**], which shall be compensation in full for all work including, but not limited to, geotextile, seaming, placement, anchoring, and any needed repairs.

Item No.	Item	Unit
2105.604	GEOTEXTILE FABRIC TYPE V (P)	S Y

S - 32 (2211 & S100.509) BREAKER RUN PLACED

Breaker Run courses shall be constructed in accordance with the provisions of MnDOT 2211 and S100 except as modified below:

"Breaker Run" shall be defined as a 100% crushed carbonate quarry rock meeting the following gradation requirements:

Sieve Size	% Passing
4"	100

1"	35-75
#4	10-40
#200	0-5

s 32.1 Compaction shall be achieved by the **"Quality Compaction Method"** described in MnDOT 2211.3C.

s 32.2 Basis of Payment

All costs incurred by the Contractor for furnishing and installing Breaker Run shall be incidental to other work.

Item No.	Item	Unit
S100.509	BREAKER RUN PLACED (P)	C Y

S - 33 (2105) SELECT GRANULAR BORROW MODIFIED

Select Granular Borrow Modified shall be in accordance with the provisions of 2105 and 3149 except as follows:

Granular material shall comply with MnDOT section 3149.2B2 except that in addition not more than 50% of the material shall pass the No. 40 sieve.

Item No.	Item	Unit
2105.522	SELECT GRANULAR BORROW MOD(CV) (P)	C Y

S - 34 (2105) (3877) TOPSOIL BORROW

Topsoil Borrow shall be in accordance with the provisions of 2105 and 3138 except as follows:

Acceptance requirements will be based on the approval of the Engineer, and not by Table 3877-1 or 3877-2.

Item No.	Item	Unit
2105.525	TOPSOIL BORROW (CV) (P)	C Y

S - 35 (2211) AGGREGATE BASE

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

s 35.1 **Item 2211.501 "Aggregate Base Class 5"** Shall include the placement of Class 2, 5 or 7C aggregates only. A token quantity has been included in the Contract for the temporary accesses Measurement and payment shall be made at the contract unit price per ton, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work.

s 35.2 **Item 2211.503 "Aggregate Base Class 5"** Shall include the placement of Class 2, 5 or 7C aggregates for the roadway construction. Measurement and payment shall be made at the contract unit price per cubic yard placed, which shall be compensation in full for all labor, equipment, and materials necessary to complete the work.

s 35.3 Compaction shall be achieved by the **"Quality Compaction Method"** described in MnDOT 2211.3C.

s 35.4 The second sentence in MnDOT 2211.1 Description, is revised to read as follows:

> The aggregate base shall be produced and placed under the Contractor's quality control program in accordance with the MnDOT Grading and Base Manual.

s 35.5 The last paragraph in MnDOT 2211. 3C2 Quality Compaction Method, is revised to read as follows:

> The Engineer may elect to perform density tests as shown in the MnDOT Grading and Base Manual, as needed to assist inspection. The actual density obtained by testing the aggregate base must meet or exceed the requirements shown in 2211.3C1 Specified Density or 2211.3C3 Penetration Index Method in order to be acceptable.

s 35.6 The first sentence in MnDOT 2211.3F1 Gradation Control, is revised to read as follows:

The Contractor and/or aggregate producer shall be responsible for maintaining a gradation control program in accordance with the random sampling acceptance method described in the MnDOT Grading and Base Manual.

s 35.7 MnDOT 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.

s 35.8 MnDOT 2211.3F2(j) under Acceptance Testing, is revised to read as follows:

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

s 35.9 The third paragraph after MnDOT 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.

s 35.10 Table 2211-B in MnDOT 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

*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.

s 35.11 The following is added to Table 2211-C in MnDOT 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.

s 35.12 The following is added to Table 2211-D in MnDOT 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.

s 35.13 Basis of Payment

All costs incurred by the Contractor for furnishing and installing Aggregate Base shall be incidental to other work.

Item No.	Item	Unit
2211.501	AGGREGATE BASE CLASS 5	TON
2211.503	AGGREGATE BASE (CV) CLASS 5 (P)	C Y

S - 36 (2301) CONCRETE PAVEMENT

MnDOT 2301 is hereby deleted from the MnDOT Standard Specifications and replaced with the attached **(2301 Concrete Pavement) Specification**:

s 36.1 Adjustment of water valve boxes to finish grade and installing City furnished survey monument castings shall be considered incidental to the paving and no separate payment will be made therefore.

s 36.2 Concrete shall be cured by the use of membrane curing compound meeting the requirements of MnDOT 3754 AMS, and shall be considered incidental.

s 36.3 All Joint sealant shall conform to 3723, Concrete Joint and Crack Sealer (Hot-Poured Elastic Type Sealant). The location of transverse joints may be adjusted in the field by the Engineer. An increase in the number of transverse joints of up to 5% compared to the number shown on the plans, shall be considered incidental to concrete paving.

s 36.4 Immediately following the paver, the surface shall be straight-edged with a minimum of 10 feet long, straight-edge to remove irregularities and score marks.

s 36.5 Transverse metal-tine finishing will not be required.

s 36.6 **Item 2301.501 "Concrete Pavement"** Shall include all labor, equipment and materials to construct the standard concrete pavement included in the plans, including the colored concrete crosswalks. The cost to furnish and supply concrete to the site shall be paid for separately. All other costs associated with the concrete pavement construction shall apply to this bid item. Payment for porous concrete shall be included under a separate bid item.

s 36.7 **Item 2301.513 "Structural Concrete HE"** provides for a token quantity of high-early strength concrete. High-early concrete shall be used at driveways and other areas as directed by the Engineer to minimize disruptions, and not subject to the provisions of 1903. This item provides for the cubic yard volume of high-early strength concrete to be furnished and installed on the project. The actual use of high-early strength concrete will be based on the approved construction staging plan and traffic control plan.

s 36.8 **Item 2301.511 "Structural Concrete"** Shall include the cubic yard volume of standard concrete to be furnished and installed for the other areas of the project, as noted in the plans.

s 36.9 **Item 2301.529 "Reinforcement Bars (Epoxy Coated)"** provides payment for #13 epoxy coated tie-bars used on longitudinal pavement joints, for #18 epoxy coated reinforcing bars used at dead-end joints and payment for #13 epoxy coated reinforcing bars to be used at the colored sidewalk bands, as indicated in the Streetscaping Detail sheets. Payment for typical reinforcement bars around castings, as shown on the plans, shall be considered incidental to the concrete paving, and no separate payment will be made therefor.

s 36.10 **Item 2301.538 "Dowel Bars"** is provided for the doweled transverse joints. Payment for dowel bars at the bid price shall be compensation in full for all costs associated to furnishing and placing dowels at the transverse joints.

s 36.11 MnDOT 2301.2A is hereby deleted and replaced with the following:

A Concrete 2461

A1 Incentives/Disincentives

This Contract **does not include** concrete aggregate quality incentive/disincentive provisions.

s 36.12 MnDOT 2301.2A7a(3) Coarse Aggregate Gradation is replaced as follows:

All coarse aggregate for concrete pavement shall meet the gradation requirements of MnDOT 3137 CA-50.

Item No.	Item	Unit
2301.501	CONCRETE PAVEMENT	S Y
2301.513	STRUCTURAL CONCRETE HE	C Y
2301.529	REINFORCEMENT BARS (EPOXY COATED)	LB
2301.538	DOWEL BAR	EACH

S - 37 (2301) DRILL & GROUT DOWEL BARS (EPOXY COATED)

Construction shall be in accordance with the provisions of MnDOT 2301, 3302 and these Special Provisions:

Furnish and install smooth, 1" diameter dowel bars, 18-inches in length, as shown on the plans. Drill with an approved jig. Place dowel with an approved non-shrink grout. Coat free end with a form coating material meeting Spec. 3902.

Bars shall be installed 9 inches into existing pavement.

Dowel bars shall be per 3302 and be epoxy coated.

Payment will be made under Item DRILL & GROUT DOWEL BAR (EPOXY COATED) and shall include compensation for all labor, materials and equipment necessary to furnish bars and install them into the existing pavement.

Item No.	Item	Unit
2301.602	DRILL & GROUT DOWEL BAR (EPOXY COATED)	EACH

S - 38 (2301) DRILL AND GROUT REINFORCEMENT BARS (EPOXY COATED)

Construction shall be in accordance with the provisions of MnDOT 2301, 3301 and these Special Provisions:

Furnish and install No. 13 reinforcing tie bars, 18-inches in length, as shown on the plans. Place reinforcement with an approved non-shrink grout.

Bars shall be installed 9 inches into existing pavement.

Measurement will be made by the weight of reinforcement bars that are furnished, installed, and grouted in place as specified. Payment will be made under DRILL & GROUT REINF BAR (EPOXY COATED) at the Contract bid price per kilogram [**pound**], which shall be payment in full for all costs incidental thereto.

Item No.	Item	Unit
2301.608	DRILL & GROUT REINF BARS (EPOXY COATED)	LB

S - 39 (2357) BITUMINOUS MATERIAL FOR TACK (2013 VERSION)

The provisions of MnDOT 2357 are hereby deleted and replaced with the following:

s 39.1 Description

This work consists of applying bituminous material (emulsion or cutback asphalt) on a bituminous or concrete pavement prior to paving a new lift of Plant Mixed Asphalt.

s 39.2 Materials

A Bituminous Material.....3151

The bituminous material for tack coat will be limited to one of the following kinds of emulsified asphalt. Use of medium cure cutback asphalt (MC-250) is allowed 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:

AASHTO 208 Dilution of the emulsion to 7 parts emulsion to 3 parts water is only allowed by the supplier. **No field dilution is allowed.** The storage tank for diluted emulsion must have a recirculation system or agitator that will prevent settlement or separation of the material.

Table 2357-1-- Residual Asphalt Content		
	Minimum Residual Asphalt Content	
Emulsion	Undiluted	Diluted (7:3)
CSS-1 or CSS-1h	57%	40%

Cutback Asphalt

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

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

s 39.3 Construction Requirements

A Restrictions

Conduct tack coat operations in a manner that offers the least inconvenience to traffic. Maintain movement in at least one direction at all times without pickup or tracking of the bituminous material.

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

B Equipment

Apply the bituminous material with a distributor meeting the requirements of 2360.3.B.2.d.

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

Apply the bituminous tack coat material to a dry and clean roadway surface. All necessary repairs or reconditioning must have been completed as provided for in the Contract and approved by the Engineer.

Remove all foreign matter on the road surface before applying tack coat and dispose of as approved by the Engineer.

Before placing an abutting bituminous course, provide a uniform coating of liquid asphalt or emulsified asphalt to the contact surfaces of all fixed structures and at the edge of the in-place mixture in all courses at transverse joints and in the final wearing course at longitudinal joints.

D Application of Bituminous Tack Coat Material

Unless otherwise indicated in the Plans or provisions, apply the bituminous tack coat material within the application rates shown below in Table 2357.3-D as based on pavement type or condition and type of bituminous material. **Dilution of asphalt emulsion in the field is not allowed.**

All tack must break, turn from brown to black, before paving the subsequent lift or course. Do not allow vehicles to drive on tack that has not broken.

Apply a uniform tack coat to the existing asphalt or concrete surface and to the surface of each course or lift constructed, except for the final course or lift. Tack each lift when placing multiple lifts in the same day. Uniform application will not have streaks (corn rows), bare spots, puddles, or other irregular patterns. The Engineer will compare the freshly sprayed emulsion to a brown sheet of construction paper or a black sheet of construction paper for broken tack to determine conformance with tack application uniformity.

Using a distance of 1,000 feet [300 meter] perform a yield check at the beginning of each project to verify the application rate is correct. The Engineer may require additional yield checks be performed if the application rate is questioned.

The Engineer may also require the Contractor to verify application is within 10% of the intended application rate by ASTM D 2995 test method A.

Table 2357-2
Tack Coat Application Rates

	Application Rates -- gallons/square yard **[liters/square meter]**		
Surface Type	Undiluted Emulsion	Diluted Emulsion (7:3)[1]	MC Cutback[2]
New Asphalt	0.05 to 0.07**[0.23 to 0.32]**	0.08 to 0.10 **[0.36 to 0.45]**	0.05 to 0.07 **[0.23 to 0.32]**
Old Asphalt[3] and PCC	0.08 to 0.10 **[0.41 to 0.50]**	0.13 – 0.15 **[0.59 to 0.68]**	0.09 to 0.11 **[0.41 to 0.50]**
Milled Asphalt and Milled PCC	0.07 to 0.11 **[0.41 to 0.50]**	0.10 – 0.13 **[0.45 to 0.59]**	0.09 to 0.11 **[0.41 to 0.50]**

1- As provided by the asphalt emulsion supplier
2- Use when approved by the Engineer

3- Older than 1 year

E Bituminous Temperature

The application temperature of the bituminous material will be:

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

F Bituminous Sampling

Sample asphalt emulsion from either the spigot or a nozzle on the distributor according to the schedule of materials control.

G Pedestrian Crossings

Spread sand on newly tacked surfaces at regularly utilized and open for public use pedestrian crossings.

H Acceptance of Tack Material

Assess a monetary deduction of 5% of the mix price for failures related to 3151 or workmanship/application, as determined by the Engineer. The basis of measurement for deficiencies related to material and workmanship/application is full with of the lane by station.

s 39.4 Method of Measurement

A. Bituminous Material

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

s 39.5 Basis of Payment

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

S - 40 (2360) PLANT MIXED ASPHALT PAVEMENT (LOCAL AGENCY) (2013 VERSION (REV. 1/23/13))

MnDOT 2360 is hereby deleted from the MnDOT Standard Specifications and replaced with the attached **2360 (Plant Mixed Asphalt Pavement) Specification.**

s 40.1 Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

Roadways, Trails and Driveways:

TYPE SP 9.5 WEARING COURSE MIX (2,B)	SP WE A 2 30 B
TYPE SP 12.5 NON WEAR COURSE MIX (2,B)	SP NW B 2 30 B

s 40.2 The sentence "In addition to the list the above pavement surface must meet requirements of 2399 (Pavement Surface Smoothness) requirements." is deleted from **2360.3.E Surface Requirements** of the attached **2360 (Plant Mixed Asphalt Pavement) Specification**. The requirements of 2360.3.E Surface Requirements **will** apply.

s 40.3 **2360.3 D Compaction:** All compaction shall be by the **Ordinary Compaction Method** as described in 2360.3.D.2.

s 40.4 The first paragraph of 2360.3.D.1 of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted and replaced with the following:

D.1 Maximum Density

Compact the pavement to at least the minimum required maximum density values in accordance with Table 2360 19, "Required Minimum Lot Density (Mat)".

s 40.5 Table 2360-20 Longitudinal Joint Density Requirement of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted.

s 40.6 2360.3.D.1.h Mat Density Cores of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted and replaced with the following:

D.1.h Mat Density Cores

Obtain four cores in each lot. Take two cores from random locations as directed by the Engineer. Take the third and fourth cores, the companion cores, within 1 ft [0.3 m] longitudinally from the first two cores. Submit the companion cores to the Engineer immediately after coring and sawing. If the random core location falls on an unsupported joint, at the time of compaction, (the edge of the mat being placed does not butt up against another mat, pavement surface, etc.) 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). If the random core location falls on a confined joint (edge of the mat being placed butts up against another mat, pavement surface, curb and gutter, or fixed face), cut with the outer edge of the core barrel 150 mm ± 12.5 mm [6 inches ± 0.5 inch] from the edge of the top of the mat (ex. center of 100 mm [4 inch] core barrel 200 mm ± 12.5 mm [8 ± 0.5 inches] from the edge of the top of the mat). Cores will not be taken within 300 mm [1 foot] of any unsupported edge. The Contractor is responsible for maintaining traffic, coring, patching the core holes, and sawing the cores to the paved lift thickness before density testing.

The Engineer may require additional density lots to isolate areas affected by equipment malfunction, heavy rain, or other factors affecting normal compaction operations.

s 40.7 **2360.3.D.1.j Companion Core Testing** of the attached **2360 (Plant Mixed Asphalt Pavement) Specification** is hereby deleted and replaced with the following:

The Department will select at least one of the two companion cores per lot to test for verification.

s 40.8 **2360.3.D.1.n Longitudinal Joint Density** of the attached **2360 (Plant Mixed Asphalt Pavement) Specification** is hereby deleted.

s 40.9 **2360.3.D.1.p Shoulders** of the attached **2360 (Plant Mixed Asphalt Pavement) Specification** is hereby deleted.

s 40.10 **Table 2360-24 Payment Schedule for Longitudinal Joint Density (SP Non-Wear and SP Shoulders, 4% Void)** of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted.

s 40.11 Table 2360-25 Payment Schedule for Longitudinal Joint Density (SP Non-wear and SP Shoulders, 3% Void) of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted.

s 40.12 2360.3.D.1.r Pay Factor Determination of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is hereby deleted.

s 40.13 Basis of Payment

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

Item No.	Item	Unit
2360.501	TYPE SP 9.5 WEARING COURSE MIX (2,B)	TON
2360.502	TYPE SP 12.5 NON WEAR COURSE MIX (2,B)	TON

S - 41 (S100 & W200) TRENCH EXCAVATION

Trench Excavation and embankment construction shall be performed in accordance with the provisions of T100 except as modified below:

s 41.1 **Bedding and Encasement material (B&E)** shall be according to T100 and the following:

1. in water table areas (B&E) shall be according to City spec T100.206.
2. in non-water table areas (B&E) shall be according to City spec T100.207.
3. All work shall be performed as incidental to the sewer construction, for which no direct payment will be made.

s 41.2 **Rock Excavation.**

A token quantity of Rock Excavation has been provided to be used only as directed by the City and according to the requirements below.

If sandstone is encountered, Trench Excavation of sandstone will not be considered for payment as Solid Rock Excavation unless the Contractor can demonstrate that extraordinary measures are required to complete the trench work. Extraordinary measures would include ripper-tooth on a bulldozer. Excavation by backhoe with a rock-teeth bucket will not be considered an extraordinary measure. The need for a larger backhoe to perform the limestone excavation will not be considered an extraordinary measure.

MN/DOT Class 5 bedding and pipe encasement is required in the rock cut areas as an incidental expense.

s 41.3 **Granular Material for Backfill and Aggregate for Pipe Foundation**

A token quantity of Granular Material for Backfill, and Aggregate for Pipe Foundation have been provided to be placed only as directed by the City to stabilize trenches in the event that unforeseen geology or other stability issues are encountered. Payment for these items shall include disposal of all displaced material.

The cubic yard items shall not be considered subject to 1903.

s 41.4 Trench Box

The Contractor is advised that the use of trench box (or boxes) shall be necessary on parts of this project. Use of trench box (or boxes) is considered incidental to the pipe installation. Contractor will be responsible for removing the trench box in such a way so as to prevent cave-ins of the trench walls before pipe bedding and backfill in the pipe zone has been acceptably placed and compacted. Contractor also must take measures to prevent the inplace pipe from moving or deflecting when the trench box is removed.

s 41.5 **Basis of Payment**

Trench excavation shall be incidental for:

a) Storm Sewers
b) Sanitary Sewers
c) Watermains

Item No.	Item	Unit
S100.507	SOLID ROCK EXCAVATION	C Y
S100.510	GRANULAR MATERIAL FOR BACKFILL (LV)	C Y
S100.511	AGGREGATE FOR PIPE FOUNDATION GRADATION A	C Y
W200.507	SOLID ROCK EXCAVATION	C Y
W200.510	GRANULAR MATERIAL FOR BACKFILL	C Y
W200.511	AGGREGATE FOR PIPE FOUNDATION GRADATION A	C Y

S - 42 (2503-6) SANITARY PIPE SEWER

This work shall consist of furnishing and installing polyvinyl chloride (PVC) pipe and fittings in accordance with the Plans, and in accordance with The City of Rochester Standards for Street Construction.

s 42.1 **Maintenance of Service**

Disruption of sanitary sewer or water service during the construction of this project shall be kept to a minimum. Water and sewer services shall not be disrupted for more than 4 hours.

The City of Rochester and all affected property owners and residents shall be notified by the Contractor, a minimum of 48 hours prior to disruption of service, no exceptions.

s 42.2 **Abandon Pipe Sewer** shall include plugging the remaining pipe ends with concrete and filling the entire line with sand or a lean concrete mix, measured by length along the line of pipe regardless of diameter. Terminal points of measurement will be the point of connection with inplace pipe; the center of manholes; the point of centerline intersections at branch fittings; or the point of juncture with other appurtenances or units as defined.

s 42.3 **Sewer pipe** of each design designation will be measured by length along the line of pipe. Terminal points of measurement will be the point of connection with inplace pipe; the center of manholes; the point of centerline intersections at branch fittings; or the point of juncture with other appurtenances or units as defined

s 42.4 **Disconnect/Reconnect to existing Sanitary Sewer Service**, the need may occur depending on line and grade of other utilities on the project. This work shall be measured by the each and shall include all materials needed to remove and replace the existing sewer service including but not limited to: excavation, bedding, backfill, __" Alternate Pipe Sewer and connections to inplace sewer service line.

s 42.5 **Sanitary Sewer Manholes and Risers** shall be constructed according the City of Rochester Detail Plate.

s 42.6 **Structures** of each design will be measured by number of each constructed complete-in-place, including the base, **waterproofing**, and castings as required, for the depth increments as stated in the proposal. Payment for constructing manholes at the appropriate Contract prices will be compensation in full for all costs of the work.

s 42.7 **Casting Assembly** of each design will be measured by number of each installed. Payment for Casting Assembly at the appropriate Contract prices will be compensation in full for all costs of the work. This work includes, but is not limited to removing the existing casting and adjusting rings, furnishing and installing the new casting with adjusting rings set to the new elevation on the existing structure.

s 42.8 **Manhole Waterproofing** will be measured by number of each installed. Payment for Manhole Waterproofing at the appropriate Contract prices will be compensation in full for all costs of the work as shown on the Detail Plate. This work includes, but is not limited to furnishing the interior or exterior protection around the adjusting rings on the existing structure.

s 42.9 Basis of Payment

Trenching, Bedding, Encasement, Waterproofing, and Backfill material for each type of pipe shall be according to the manufacturers' recommendations for pipe installations in a roadway section or T100, whichever is more stringent. All costs of furnishing and placing the pipe installation materials shall be considered incidental to the installation of the pipe.

ITEM	DESCRIPTION	UNIT
S100.522	FURNISH & INSTALL 8IN ALTERNATE PRESSURE PIPE SEWER	L F
S100.545	CONSTRUCT STRUCTURE TYPE 3 6FT TO 10FT DEEP	STR
S100.545	CONSTRUCT STRUCTURE TYPE 3 10FT TO 13FT DEEP	STR
S100.548	FURNISH & INSTALL CASTING ASSEMBLY	EACH
S100.578	FURNISH & INSTALL MANHOLE WATERPROOFING-INTERIOR	EACH

S - 43 (S100 & 2501-6) STORM SEWER

This work consists of constructing storm sewers in accordance with the applicable MnDOT Standard Specifications and in accordance with The City of Rochester Standards for Street and Utility Construction:

s 43.1 **Sewer pipe and aprons** of each design designation will be measured by length along the line of pipe or each. Terminal points of measurement will be the pipe end at free outlets; the point of connection with inplace pipe; the center of manholes or catch basins; the point of centerline intersections at branch fittings; or the point of juncture with other appurtenances or units as defined

s 43.2 **Casting Assembly** of each design will be measured by number of each installed. Payment for Casting Assembly at the appropriate Contract prices will be compensation in full for all costs of the work. This work includes, but is not limited to removing the existing casting and adjusting rings, furnishing and installing the new casting with adjusting rings set to the new elevation on the existing structure.

s 43.3 **Adjust Drainage Structure** Manholes to be adjusted from existing to proposed street elevation that can be accommodated by the addition or removal of adjusting rings, with a maximum of 12" of adjusting rings allowable, shall be considered under the pay item "Adjust Drainage Structure" and paid for accordingly.

s 43.4 **Adjust Frame and Ring** Catch Basins to be adjusted from existing to proposed street elevation that can be accommodated by the addition or removal of adjusting rings, with a maximum of 12" of adjusting rings allowable, shall be considered under the pay item "Adjust Frame & Ring Casting" and paid for accordingly.

s 43.5 **Reconstruct Drainage Structure** Structures to be adjusted from existing to proposed elevation that cannot be accommodated by the addition or removal of adjusting rings, or those manholes to be adjusted over 12" shall be considered under the pay item "Reconstruct Drainage Structure" and paid for accordingly.

s 43.6 **Construct Drainage Structure Design Spec ___** of each design will be measured by number of each constructed complete-in-place, including the base, casting as required, for the type structure stated in the proposal. Payment for constructing structures at the appropriate Contract prices will be compensation in full for all costs of the work.

s 43.7 **Connect into Existing Drainage Structure** will be made by the number of connections constructed as specified. Payment will be at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to, all materials and labor necessary to connect the proposed drainage structure to the existing storm sewer pipe. Any damage caused to the existing storm sewer pipe shall be repaired at no expense to the Department and to the satisfaction of the Engineer.

s 43.8 **Connect into Existing Sewer** will be made by the number of connections constructed as specified. Payment will be at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to, all materials and labor necessary to connect the proposed sewer. Any damage caused to the existing sewer pipe shall be repaired at no expense to the Department and to the satisfaction of the Engineer.

s 43.9 **Basis of Payment**

Trenching, Bedding, Encasement and Backfill material for each type of pipe shall be according to the manufacturers' recommendations for pipe installations in a roadway section or T100, whichever is more stringent. All costs of furnishing and placing the pipe installation materials shall be considered incidental to the installation of the pipe.

Item No.	Item	Unit
2503.602	CONNECT TO EXISTING STORM SEWER	EACH
2506.602	CONNECT INTO EXISTING MANHOLE	EACH
S100.516	FURNISH & INSTALL 12IN REINFORCED CONCRETE PIPE CLASS 5	L F
S100.516	FURNISH & INSTALL 18IN REINFORCED CONCRETE PIPE CLASS 3	L F
S100.545	CONSTRUCT STRUCTURE TYPE 1 0FT TO 6FT DEEP	STR
S100.545	CONSTRUCT STRUCTURE TYPE 4 (48IN) 0FT TO 6FT DEEP	STR
S100.548	FURNISH & INSTALL CASTING ASSEMBLY	EACH

S - 44 (W200 & 2504) WATERMAIN

This work shall consist of providing all labor, equipment, and materials to construct the watermain. All work shall be done in accordance with The City of Rochester Standards for Street Construction.

s 44.1 Maintenance of Service

Disruption of watermain flows during the construction of this project shall be kept to a minimum and considered incidental to the project.

All watermain disruptions shall be coordinated with City of Rochester Public Utilities.

Services shall not be disrupted for more than 4 hours. All service connection work will be accomplished and coordinated with the residences and businesses served. This may require temporary service connections in these areas.

The City of Rochester Public Utilities and all affected property owners and residents shall be notified by the Contractor, a minimum of 48 hours prior to disruption of service, no exceptions.

s 44.2 Temporary Water System

The Contractor is required to provide a temporary water system during and incidental to the project. The temporary water system shall be phased in such a way that the residents will not remain on temporary water for the duration of the project.

All temporary piping shall meet the requirements of the Minnesota Department of Health and the National Sanitation Foundation Standard 61.

The Contractor is not allowed to provide temporary water service by connecting houses together with garden hoses. The temporary water system shall pass a bacteriological test in accordance with AWWA C 651, prior to the system being put into service each time it is set up. The temporary water system shall be connected to the houses via hose bibs. The residents should have new shut off valves inside their houses that can be turned off. If house doesn't have new shut off valve, contact RPU to resolve. If the hose bib has a back flow preventer, the Contractor shall remove and replace the hose bib.

s 44.3 **Hydrants** shall be constructed according to section W200 and the detail plate. Hydrant installation will be measured by the number of hydrants installed complete with gate valve and housing as specified. Payment will be made at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto including, but not limited to any additional water leads, drain pits, concrete blocking, extensions, risers or fittings necessary to complete the new installation.

s 44.4 **4-12" Gate Valve and Box** shall be constructed according to section W200 and the detail plate. Measurement will be made by the number of valves and boxes installed as specified. Payment will be made at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto to install the valve and box complete and inplace.

s 44.5 **4-12" Watermain** shall be constructed according to section W200 and the detail plate. Measurement shall be by the linear foot. This work includes, but is not limited to all materials necessary maintain service, excavation, bedding and backfill necessary to install the watermain.

s 44.6 Basis of Payment

Trenching, Bedding, Encasement and Backfill material for each type of pipe shall be according to the manufacturers' recommendations for pipe installations in a roadway section or T100, whichever is more stringent. All costs of furnishing and placing the pipe installation materials shall be considered incidental to the installation of the pipe.

Item No.	Item	Unit
W200.514	FURNISH & INSTALL __IN POLYSTYRENE INSULATION	S F
W200.528	FURNISH & INSTALL __IN DUCTILE IRON PIPE CLASS 52	L F
W200.550	FURNISH & INSTALL __IN GATE VALVE AND BOX	EACH
W200.560	FURNISH & INSTALL HYDRANT	EACH
W200.562	FURNISH & INSTALL WATER MAIN FITTINGS	LB
W200.572	CONNECT TO EXISTING WATERMAIN	EACH

S - 45 (C150) SERVICE CONNECTIONS

This work shall consist of providing all labor, equipment, and materials to construct the service connection. All work shall be done in accordance with The City of Rochester Standards for Street Construction.

s 45.1 **Maintenance of Service**

1. **Sanitary**

   Disruption of Sanitary flows during the construction of this project shall be kept to a minimum and considered incidental to the project.

   Services shall not be disrupted for more than 4 hours. All service connection work will be accomplished and coordinated with the residences and businesses served. This may require temporary bypasses in these areas. If the Contractor sequences the project so bypassing pumping is required the following provisions shall be followed. The Contractor shall submit a plan detailing the necessary bypasses needed for each stage of construction. Bypass pumping and piping, temporary wiring, and all other items are the responsibility of the Contractor. Contractor shall be responsible for setting up and maintaining bypass pumping operations. Contractor shall coordinate bypassing plan with Owner.

   The City of Rochester and all affected property owners and residents shall be notified a minimum of 48 hours prior to disruption of service.

2. **Water**

   Disruption of watermain flows during the construction of this project shall be kept to a minimum and considered incidental to the project.

   All watermain disruptions shall be coordinated with City of Rochester Public Utilities.

   Services shall not be disrupted for more than 4 hours. All service connection work will be accomplished and coordinated with the residences and businesses served. This may require temporary service connections in these areas.

The City of Rochester Public Utilities and all affected property owners and residents shall be notified by the Contractor, a minimum of 48 hours prior to disruption of service, no exceptions.

s 45.2 **Materials**

All materials for sanitary sewer services shall be as indicated on the plans or standards.

Bedding and encasement requirements shall conform to gradation CA3 in areas of high water table, and to MnDOT Class 5 in all other areas. When in water table, geotextile fabric shall be furnished and installed over the bedding and encasement as an incidental item.

s 45.3 **Construction Requirements**

All copper tubing shall be cut with a tubing cutter that is in good condition. Cuts shall be square and the inside of the pipe shall be reamed.

Embedment or encasement limits shall conform to that specified for sanitary sewer. See City specification T-100.307. Compacted Trench Backfill shall be required.

The Contractor shall verify all service connections, or reconnections with the Owners of the adjacent property and City to ensure all service connections are replaced or properly abandoned, before beginning service connection work.

The Contractor shall be required to coordinate service line work with any other private plumbing contractors who may need to enter the site to perform work from the boulevard to the house.

s 45.4 **Disconnect/Reconnect to existing Sanitary Sewer Service**, the need may occur depending on line and grade of other utilities on the project. This work shall be measured by the each and shall include all materials needed to remove and replace the existing sewer service including but not limited to: excavation, bedding, backfill, __" Alternate Pipe Sewer and connections to inplace sewer service line.

s 45.5 **Item C150.503 "__in Sanitary Sewer Service Connection"** shall be replaced from the main to the boulevard, as shown in the typical section. The new services shall include all necessary bends, and eccentric adapters (to match flow lines) to make the complete connection. Measurement and payment shall be made at the contract **unit price per each**, which shall be compensation in full for all labor, equipment, and materials necessary to disconnect/reconnect, maintain service flow, plug, remove and dispose the entire connection.

Where indicated in the plans for service connections extending past the boulevard, or of special alignments of excess lengths beyond the bid each item. Measurement and payment shall be made at the contract **unit price per Lin Ft** in addition to the bid each item. A determination must be made by the City for construction by the linear foot.

s 45.6 **Item C150.504 "__in Water Service Connection"** shall be replaced from the main through the curb box, as shown in the typical section. The new services shall include all necessary corporation stop copper pipe, curb box, and all necessary fittings and adaptors to make the complete connection. Measurement and payment shall be made at the contract **unit price per each**, which shall be compensation in full for all labor, equipment, and materials necessary to disconnect/reconnect, maintain service flow, plug, remove and dispose the entire connection.

Where indicated in the plans for service connections extending past the boulevard, or of special alignments beyond the bid each item. Measurement and payment shall be made at the contract **unit price per Lin Ft** in addition to the bid each item. A determination must be made by the City for construction by the linear foot.

Where indicated in the plans for service connections in Tree Protection Zones, the service shall be **Directional Drilled**. Measurement and payment shall be made at the contract **unit price per Lin Ft** in addition to the bid each item. A determination must be made by the City for construction by the linear foot.

The linear foot items shall not be considered subject to 1903.

s 45.7 Measurement and Payment

Item No.	Item	Unit

C150.503	4-6 IN SANITARY SEWER SERVICE CONNECTION	L F
C150.504	¾-1 IN WATER SERVICE CONNECTION	L F
C150.504	¾- 1 IN WATER SERVICE CONNECTION (DIRECTIONAL DRILL)	L F
C150.550	¾-1 IN CURB STOP AND BOX	EACH
C150.568	REBUILD EXISTING SEWER SERVICE CONNECTIONS	EACH
C150.568	REBUILD EXISTING WATER SERVICE CONNECTIONS	EACH
C150.569	RECONNECT EXISTING SEWER SERVICE CONNECTIONS	EACH
C150.569	RECONNECT EXISTING WATER SERVICE CONNECTIONS	EACH

S - 46 **(2521) CONCRETE WALK (2012 VERSION (REV 1/18/12))**

Concrete walk shall be performed in accordance with the provisions of MnDOT Section 2521 Rochester Detail Plate 2-13&14, and the following:

s 46.1 **Aggregates** for Concrete Walk and pedestrian ramps

The Contractor shall place a minimum of **4 inches** of compacted CA-3 or aggregate base Class 2, 5 or 7C (in compliance with MnDOT 3137, and/or 3138), under all concrete walks constructed as an incidental expense to the walk.

s 46.2 **Item 2521.501 "__" Concrete Walk"** is provided for all sidewalk along the project corridor, excluding pedestrian ramps, driveways, exposed aggregate, and colored sidewalk areas.

s 46.3 **Item 2521.501 "__" Concrete Walk-Exposed Aggregate"** when called for, Concrete Mix No. 3A36EX shall be used.

s 46.4 MnDOT 2521.3C3 is hereby modified to include the following provision:

After completing final finishing operations, cure all exposed concrete surfaces. Use one of the following curing methods:

(1) Place the membrane curing compound conforming to 3754 or 3755 within 30 minutes of concrete placement or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2521.3.E.1.a. Place the membrane curing compound on the edges within 30 minutes after permanent removal of the forms or curing blankets, unless the Contract requires otherwise.

(2) Place plastic curing blankets or completely saturated burlap curing blankets as soon as practical without marring the surface in accordance with 2521.3.E.1.b.

Failure to comply with these provisions will result in the Engineer applying a monetary deduction in accordance with 1503. When there is not a separate Contract unit price for Structural Concrete, the Department will apply a monetary deduction of $50.00 per cu. yd [$65.00 per cu. m] or 50 percent of the Contractor-provided invoice amount for the concrete in question, whichever is less.

Whenever weather conditions are such as to cause unusual or adverse placing and finishing conditions, expedite the application of a curing method or temporarily suspend the mixing and placing operations, as the conditions require.

If necessary to remove the coverings to saw joints or perform other required work, and if the Engineer approves, remove the covering for the minimum time required to complete that work.

C3a Curing Methods

C3a(1) Membrane Curing Method

Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane curing compounds from freezing before application. Handle and apply the membrane curing compound in accordance with the manufacturer's recommendations.

Apply the curing compound with an approved airless spraying machine in accordance with the following:

(1) At a rate of 1 gal per 150 sq. ft (1 L per 4 m^2) of surface curing area.

(2) Apply homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). Some MnDOT approved curing compounds may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, provide a uniform solid opaque consistency meeting the intent of the above requirement.

(3) If the curing compound is damaged during the curing period, immediately repair the damaged area by re-spraying.

The Engineer will approve the airless spraying machine for use if it is equipped with the following:

(1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,

(2) Separate filters for the hose and nozzle, and

(3) Multiple or adjustable nozzle system that provides for variable spray patterns.

If the Engineer determines that the initial or corrective spraying may result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department.

C3a(2) Curing Blanket Method

After completion of the finishing operations and without marring the concrete, cover the concrete with curing blankets. Install in a manner that envelops the exposed concrete and prevents loss of water vapor. After the concrete has cured, apply membrane curing compound to the concrete surfaces that will remain exposed in the completed work.

C3b Protection Against Rain

Protect the concrete from damage due to rain. Have available, near the site of the work, materials for protection of the edges and surface of concrete. Should any damage result, the Engineer will suspend operations until the Contractor takes corrective action and may subject the rain-damaged concrete to 1503 and 1512.

C3c Protection Against Cold Weather

If the national weather service forecast for the construction area predicts air temperatures of 36 °F [1 °C] or less within the next 24 h and the Contractor wishes to place concrete, submit a cold weather protection plan.

Protect the concrete from damage including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the damaged concrete to 1503 and 1512.

C3c(1) Cold Weather Protection Plan

Submit proposed time schedule and plans for cold weather protection of concrete in writing to the Engineer for acceptance that provides provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the cold weather protection plans.

s 46.5 MnDOT 2521.3E is hereby deleted and replaced with following:

E Backfilling

Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 hours. Perform vibratory operations and backfilling 72 hours after placing the concrete or after the concrete reaches a compressive strength of at least 3,000 psi [**20.7 Mpa**]. The Engineer will cast, cure, and test the concrete control specimens in accordance with 2461.3G5. If damage results from any of these operations the Engineer will suspend all operations until corrective action is taken and a new method is approved. The Engineer may subject damaged concrete to 1503 and 1512.

The Contractor may hand operate concrete consolidation equipment and walk behind vibratory plate compactors 24 hours after placing the concrete, and other equipment as approved by the Engineer in conjunction with the Concrete Engineer.

After curing, backfill or perform embankment construction to the elevations shown on the plans, without damaging the concrete. Use suitable grading materials from the excavation for backfill material in accordance with 2105, unless otherwise required by the Contract. Place and compact the backfill material in accordance with 2105.

Dispose of surplus excavated materials in accordance with 2105.

s 46.6 Measurement for concrete walk will be made by the top surface area in square feet as specified. The measurement will be taken from the outer most edge of the concrete walk. Payment will be made under Item 2521.501 (__" CONCRETE WALK) at the Contract bid price per square foot, which shall be payment in full for all costs involved.

ITEM	DESCRIPTION	UNIT
2521.501	4" CONCRETE WALK	S F
2521.501	6" CONCRETE WALK	S F

S - 47 (2531) CONCRETE CURBING (2012 VERSION)

The provisions of MnDOT 2531 are supplemented and/or modified with the following:

The spacing of contraction joints for curb and gutter shall be controlled by the proposed spacing of the transverse joints in the bituminous pavement. A contraction joint shall be provided at each transverse joint and intermediate joints shall be placed to provide intervals not greater than 10-ft (2.7m) nor less than 5-ft (1.5m).

Transverse expansion joints for curb and gutter shall be provided at 300-ft (90m) intervals as well as at structures and changes in alignment.

Metal reinforcement at catch basins shall be placed in accordance with Rochester Detail Plate 2-06. Furnishing and placing metal reinforcement shall be considered as incidental expense and no separate payment will be made therefore

s 47.1 The last paragraph of MnDOT 2531.3C shall be deleted and replaced with the following:

Longitudinal construction joints between a concrete median or gutter section and a concrete pavement shall not be sawed or sealed.

s 47.2 MnDOT 2531.3G is hereby modified to include the following provision:

After completing final finishing operations, cure all exposed concrete surfaces. Use one of the following curing methods:

(1) Place the membrane curing compound conforming to 3754 or 3755 within 30 minutes of concrete placement or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2521.3.E.1.a. Place the membrane curing compound on the edges within 30 minutes after permanent removal of the forms or curing blankets, unless the Contract requires otherwise..

(2) Place plastic curing blankets or completely saturated burlap curing blankets as soon as practical without marring the surface in accordance with 2521.3.E.1.b.

Failure to comply with these provisions will result in the Engineer applying a monetary deduction in accordance with 1503. When there is not a separate Contract unit price for Structural Concrete, the Department will apply a monetary deduction of $50.00 per cu. yd [$65.00 per cu. m] or 50 percent of the Contractor-provided invoice amount for the concrete in question, whichever is less.s.

Whenever weather conditions are such as to cause unusual or adverse placing and finishing conditions, expedite the application of a curing method or temporarily suspend the mixing and placing operations, as the conditions require.

If necessary to remove the coverings to saw joints or perform other required work, and if the Engineer approves, remove the covering for the minimum time required to complete that work.

G1 Curing Methods

G1a Membrane Curing Method

Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane curing compounds from freezing before application. Handle and apply the membrane curing compound in accordance with the manufacturer's recommendations.

Apply the curing compound with an approved airless spraying machine in accordance with the following:

(1) At a rate of 1 gal per 150 sq. ft (1 L per 4 m^2) of surface curing area.

(2) Apply homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). Some MnDOT approved curing compounds may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, provide a uniform solid opaque consistency meeting the intent of the above requirement.

(3) If the curing compound is damaged during the curing period, immediately repair the damaged area by re-spraying.

The Engineer will approve the airless spraying machine for use if it is equipped with the following:

(1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,

(2) Separate filters for the hose and nozzle, and

(3) Multiple or adjustable nozzle system that provides for variable spray patterns.

If the Engineer determines that the initial or corrective spraying may result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department.

G1b Curing Blanket Method

After completion of the finishing operations and without marring the concrete, cover the concrete with curing blankets. Install in a manner that envelops the exposed concrete and prevents loss of water vapor. After the concrete has cured, apply membrane curing compound to the concrete surfaces that will remain exposed in the completed work.

G2 Protection Against Rain

Protect the concrete from damage due to rain. Have available, near the site of the work, materials for protection of the edges and surface of concrete. Should any damage result, the Engineer will suspend operations until the Contractor takes corrective action and may subject the rain-damaged concrete to 1503 and 1512.

G3 Protection Against Cold Weather

If the national weather service forecast for the construction area predicts air temperatures of 36 °F [1 °C] or less within the next 24 h and the Contractor wishes to place concrete, submit a cold weather protection plan.

Protect the concrete from damage including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the damaged concrete to 1503 and 1512.

G3a Cold Weather Protection Plan

Submit proposed time schedule and plans for cold weather protection of concrete in writing to the Engineer for acceptance that provides provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the cold weather protection plans.

s 47.3 MnDOT 2531.3J is hereby deleted and replaced with the following:

J Backfilling

Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 hours. Perform vibratory operations and backfilling 72 h after placing the concrete or after the concrete reaches a compressive strength of at least 3,000 psi **[20.7 Mpa]**. The Engineer will cast, cure, and test the concrete control specimens in accordance with 2461.3G5. If damage results from any of these operations the Engineer will suspend all operations until corrective action is taken and a new method is approved. The Engineer may subject damaged concrete to 1503 and 1512.

The Contractor may hand operate concrete consolidation equipment and walk behind vibratory plate compactors 24 hours after placing the concrete, and other equipment as approved by the Engineer in conjunction with the Concrete Engineer.

After curing, backfill or perform embankment construction to the elevations shown on the Plans , without damaging the concrete. Use suitable grading materials from the excavation for backfill material in accordance with 2105, unless otherwise required by the Contract. Place and compact the backfill material in accordance with 2105.

Dispose of surplus excavated materials in accordance with 2105.

s 47.4 Measurement and Payment

ITEM	DESCRIPTION	UNIT
2531.501	CONCRETE CURB & GUTTER DESIGN B624	L F

S - 48 (2531) CONCRETE DRIVEWAY PAVEMENT

Concrete walk shall be performed in accordance with the provisions of MnDOT Section 2531 except as modified below:

s 48.1 The Contractor shall place a minimum of **4 inches** crushed rock base under all driveways and associated sidewalk section through the driveway. Furnishing and placing the crushed rock base will be considered incidental to the pavement construction and no separate payment will be made therefore.

s 48.2 Saw cutting shall be considered incidental to concrete pavement.

Item No.	Item	Unit
2531.507	__" CONCRETE DRIVEWAY PAVEMENT	S Y

S - 49 (2531) TRUNCATED DOME SYSTEMS

This work consists of furnishing and installing Truncated Dome Systems (detectable warning surfaces) at pedestrian curb ramps in compliance with the Public Rights-of-Way Accessibility Guidelines (PROWAG). This work shall be performed in accordance with the applicable MnDOT Standard Specifications, these Special Provisions, the details in the Plan, and the following:

s 49.1 Construction Requirements

The Contractor shall select a truncated dome product from the approved products list at http://www.dot.state.mn.us/products/miscmaterials/truncateddomes.html. The truncated domes shall be placed in concrete and shall be pressed firmly into the concrete to the point that concrete fills the vent holes on the truncated dome plates. No cutting of truncated domes will be allowed unless approved by the Engineer. Any swelling of the concrete that occurs around the truncated domes must be screeded off and the surrounding concrete shall be finished flush with the truncated dome plate edge.

s 49.2 The Contractor will be allowed to interchange 9 foot 5 inch and 10 foot radial truncated domes when either is called for in the Plan. If the Contractor does make a substitution, the Contractor will be required to modify the curb line radius to match the truncated domes and meet the detectable edge requirements listed in Section S-2531 (CONCRETE CURB AND GUTTER (ADA)) of these Special Provisions

s 49.3 Method of Measurement

The truncated dome area will be measured by the square foot.

s 49.4 Basis of Payment

Payment will be made under Item 2531.618 (Truncated Domes) at the Contract bid price per square foot, which shall be compensation in full for furnishing and installation of truncated domes.

Item No.	Item	Unit
2531.618	TRUNCATED DOMES	S F

S - 50 (2545) ELECTRIC UTILITY CONDUIT SYSTEM (RPU)

This work shall consist of furnishing labor, and materials for construction of a conduit and handhole system in accordance with the applicable provisions of MnDOT 2471, MnDOT 2545, current edition of the National Electric Code, the Plans, and the following:

s 50.1 General

A. RPU shall be responsible for disconnecting power to the existing street light system, salvaging poles and removing existing wiring at the locations indicated in the Plans. RPU will then pull new conductors and make all field connections. The Contractor shall be responsible for installing all conduit and handholes required for the new conduit system. All connections to existing conduit or handholes shall be the responsibility of The Contractor. The Contractor shall coordinate all activities with the Engineer and with RPU.

B. "As Built Plans"

The Contractor shall furnish "as built Plans" that contain any **changes** in the following:

--- Conduit locations.
--- Handhole locations.

The "as built Plans" shall be in a form that is satisfactory to the Engineer. The Contractor furnished "as built Plans" shall be considered incidental work.

C. Locating Underground Utilities

The Contractor must adhere to all requirements of Gopher State One Call including the following:

The Contractor is responsible for marking the proposed excavation area by utilizing white markings. The white markings must delineate the **actual excavation area** where the locating of underground facilities is required.

s 50.2 Materials

A. Conduit

The Contractor shall furnish and install non-metallic conduit (N.M.C.) at the locations indicated in the Plans. The size of the conduit shall be as indicated in the Plan. All conduit shall be in accordance with the following:

Non-Metallic Conduit:

Shall be in accordance with MnDOT 3803, except as follows:

a. Shall be Schedule 80 conduit and fittings for all installations.

b. For HDPE continuous type conduit, all conduit fittings shall be appropriate for use with HDPE continuous length conduit.

c. Shall be capable of being installed by plowing, trenching, or directional boring methods.

d. Shall be either "GREY" or "RED" in color.

e. Shall be marked on the outside of conduit indicating manufacturer's name, size of conduit, type of conduit (HDPE, etc.), ASTM F 2160, UL Listing, and any other markings required by the N.E.C.

f. Before the cables and conductors are installed, non-metallic conduit bell ends **(appropriately sized for the HDPE type conduit)** shall be installed to prevent damage to the cables and conductors

All conduit from concrete foundations to the nearest handhole shall be rigid non-metallic conduit (N.M.C.). **HDPE continuous length conduit is not allowed for use between concrete foundations and the nearest handhole.**

B. Handholes

New Handholes shall be MnDOT approved Handholes and Handhole Covers listed on the MnDOT Approved/Qualified Products Lists WEB site for Signals:

http://www.dot.state.mn.us/products/index.html

s 50.3 Construction Requirements

A. Conduit Installation

Conduit shall be installed in accordance with MnDOT 2565.3D, except as follows:

Continuous Type HDPE Non-Metallic Conduit:

--- except for under existing pavements, underground Continuous Type HDPE Conduit shall be placed by trenching, stitching, plowing, or other method approved by the Engineer. Under existing pavements, Continuous Type HDPE Non-Metallic Conduit shall be placed as specified in 2565.3D2b.

Rigid Non-Metallic Conduit Joints:

--- the Contractor shall install appropriate sized long line couplings when installed under existing roadway surfaces

--- the applied PVC joint cement shall be allowed to set-up for six (6) hours before pulling the conduit through a directional bored channel.

Conduit in Handholes:

--- If the Contract requires the installation of a handhole within an armored cable run, a 2 inch N.M.C. stub out shall be installed for each cable entering the handhole. The 2 inch N.M.C. stub out shall be a minimum of 36 inches in length with non-metallic bell ends installed on each open end of the conduit stub out to prevent damage to the armored cable.

Exact location of conduit and handholes to be approved by the Engineer.

s 50.4 Method of Measurement and Basis of Payment:

Payment for __" NMC Conduit at the contract price per linear foot shall be compensation in full for all work, materials, and costs involved in performing the work as specified above.

ITEM	DESCRIPTION	UNIT
2545.523	1.5" NON-METALLIC CONDUIT	L F

S - 51 (2564)TRAFFIC SIGNS AND DEVICES

Traffic signs shall be constructed in accordance with the provisions of MnDOT 2564, except as modified below:

s 51.1 Install Sign

Measurement will be made by the number of sign posts installed (regardless of the number of signs on the post) complete in place as specified.

s 51.2 Materials:

A Sign Face and Sign Legend Materials

Sign Sheeting for Rigid Permanent Signs, Delineators and Markers shall be approved by the Engineer and be consistent with current MNDOT standards.

The retroreflective sheeting types and qualified products used for rigid permanent signs, markers and delineators can be found at: http://www.dot.state.mn.us/trafficeng/products/MnDOTapproved productlist.xls.

B Sign Posts

Per request from the City, the 3# U-channel sign posts typically used are to be replaced with sign posts which are to be approved by the City. Sign posts are incidental to the cost of the sign panel and to the install sign panel pay items.

s 51.3 Construction Requirements

The Contractor shall install Department furnished warning stickers on new Type C and Type D sign panels in accordance with MnDOT 2564.3H.

A New Type C signs

All new signs and salvaged signs shall be installed with new sign posts and use new mounting hardware. Sign locations in the plan are approximate and may be adjusted by the Engineer.

B New Type D signs

The 4 new ground mounted type D signs are to be located 3 feet behind the guardrail shown in the plan on new sign posts.

D Signs and markers used with guard rail

Signs, markers, and delineators needed to complete guardrail installation are incidental to the guardrail pay item and not included with the rest of the signing on the project.

s 51.4 Method of Measurement and Basis of Payment:

Payment for sign panels type __ at the contract price per SQUARE FOOT shall be compensation in full for all work, materials, and costs involved in performing the work as specified above and in the Plan, including furnishing and installing extruded panel sections.

ITEM	DESCRIPTION	UNIT
2564.531	SIGN PANELS TYPE C	S F
2564.602	INSTALL SIGN	EACH

S - 52 (2571-2) TREE PROTECTION AND RESTORATION OF VEGETATION

This work shall consist of providing protection for existing trees in accordance with the provisions of Mn/DOT 2571 and 2572, Section 1009 Tree Planting, Preservation, and Protection, Rochester Detail plates and the following:

s 52.1 The Contractor shall furnish, install, maintain, and remove snow fencing or other approved fencing at locations as directed by the Engineer.

s 52.2 The fencing shall be [**4 foot**] high (nominal) fencing placed 4 times the diameter from the base of the trees, or as directed by the Engineer. The Tree Protection shall be in place before any work is performed in the vicinity of the trees to be protected.

1009.2 Definition of Terms

A. Tree Protection Zone:

A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Tree Protection Zone by type shall be determined by the City Forester.

Minimum area specified shall be 4 times the diameter, measured 4'-6" above the ground.

B. Hand Work Zone:

A circumscribed square area around the Tree Protection Zone in which only hand held operating tools shall be used for removal or construction activities.

1009.3 Engineering Requirement

Trees and other vegetation worth preserving are to be protected and preserved to the maximum extent feasible during construction. Only those trees and other vegetation that have been evaluated as being necessary to be removed to allow for new construction will be removed. Trees and other vegetation that have been evaluated as

worth saving and designated to remain will be properly protected during construction to maximize their survival rate. In order to achieve an appropriate balance between protecting trees and allowing necessary construction, the practices that follow will be employed.

All trees to be preserved on the property and all trees adjacent to the property shall be protected and maintained against damage during construction. The Engineer and Owner are to survey the job site before work is scheduled. Limits of disturbance are to be determined by the Engineer and Owner before work begins. Storage sites for soil, sand, pipe, hardware and equipment are to be determined by the Owner. Vehicle access routes are to be determined. All workers on the site shall be educated in tree preservation practices. Tree protection devices shall be placed before material deliveries, excavation, or grading begins and is to be maintained in good repair for the duration of the construction work, unless otherwise directed. Tree protection shall remain until the landscape restoration work begins

1009.4 Construction Requirement

Protection of trees during construction (including remodeling and demolition): Prior to any site work, all trees to be preserved must be protected, signed, and maintained, in accordance with the Tree Preservation and Protection Standards. The level of tree protection by type will be as determined by the City Forester.

Tree Protection

Trees in the area of disturbance and in the vehicle access route are to it are to be protected by fencing in the following manner:

No material shall be stored or construction operation shall be carried on within the tree protection fencing.

No protective devices, signs, utility boxes or other objects shall be nailed to the trees to be retained on the site.

Tree protection fencing shall be erected and approved by the Engineer at least 24 hours before construction begins.

Grade Changes

Grade cuts of 6" or more, shall be reduced or eliminated within the drip line and no cuts are allowed in the tree protection zone.

When fill of 4" or more is necessary within the drip line of a tree, a tree well shall be required and no fills are allowed in the tree protection zone.

Areas under tree drip lines disturbed by construction activity shall be mulched with a 2-3" deep layer of shredded bark mulch. Mulching shall be done within 4 hours of disturbance.

Trenching and Tunneling

Trenching shall be done outside the tree protection zone. Trenchless techniques hall be employed within the tree protection zone.

Pruning of branches shall be done under the requirements and direction of the City Forester.

s 52.3 Method of Measurement and Basis of Payment will be made of the type placed. Payment will be made under Item 2571.602 (Tree Protection Type _) at the Contract bid price per each, which shall be compensation in full for furnishing, installing, maintaining and removing fencing and any additional expenses associated with the hand work zone.

ITEM	DESCRIPTION	UNIT
2571.602	TREE PROTECTION TYPE __	EACH

S - 53 (2571) PLANT INSTALLATION (2013 VERSION)

MnDOT 2571 is hereby deleted from the MnDOT Standard Specifications and replaced with the attached Specification "2571 -- PLANT INSTALLATION AND ESTABLISHMENT" **Revised 01/23/2013.**

The species of tree shall be a half and half mixture of 2" ginkgo or Accolade Elm.

s 53.1 The Department will pay for plant installation and establishment on the basis of the following schedule:

ITEM	DESCRIPTION	UNIT
2571.502	DECIDUOUS TREE 2" CAL BR	TREE

S - 54 (2573) EROSION CONTROL SUPERVISOR

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

s 54.1 The second paragraph of MnDOT 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 stormwater 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:

s 54.2 MnDOT 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 sideslopes of the basins must be mulched and/or seeded within the time periods as set forth in 1717, or as directed by the Engineer.

s 54.3 The second paragraph of MnDOT 2573.3 A5, Vehicle Tracking on to 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.

s 54.4 The first sentence of MnDOT 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.

s 54.5 The first paragraph of MnDOT 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.

s 54.6 Section 2573.4S is deleted and replaced by the following:

No measurement will be made of the various duties that the Erosion Control Supervisor performs or of the number of hours required, but all such work will be construed to be included in the single Lump Sum Payment. Upon satisfactory completion of at least half of the anticipated Project duration time, the Engineer may authorize partial payment not exceeding 50 percent of the Contract bid price. Project duration time is estimated as the time

between the actual Project start date and the Project completion date. The remaining percentage will be paid upon completion of the Project.

Item No.	Item	Unit
2573.550	EROSION CONTROL SUPERVISOR	LS

S - 55 (2573) TEMPORARY EROSION CONTROL AND TURF ESTABLISHMENT

Temporary Erosion Control and Turf Establishment shall be performed in accordance with the provisions of MnDOT Section 2573 except as modified below:

s 55.1 **Perimeter Control:** shall be installed prior grubbing to control sediment from leaving the project limits, and entering a critical resource. This work shall include furnishing, installing, and removing silt fence, or biorolls (installation of biorolls shall include staking or weighting with sandbags to prevent movement) in accordance with the details shown in the Plans and the applicable MnDOT Standard Specifications.

s 55.2 **Inlet Protection:** shall be furnished and installed on all inlets discharging to surface water. Inlets in rough graded areas need protection to keep any sediment from being transported to a Water of the State, or filling up the pipes with sediment. Inlet protection is shown in the plans by type; see specification 3891. Devices approved by the MN/Department's Erosion Control Engineering Unit and on file on the web under the Materials Engineering Section's Approved Products List can be furnished as meeting this specification requirement.

s 55.3 **Temporary Rock Construction Entrance** shall be installed prior to construction, to control sediment from leaving the project limits. This work shall include furnishing, installing, maintaining, and removing the entrance in accordance with the details shown in the Plans and the applicable MnDOT Standard Specifications.

s 55.4 **Inlet Protection**: shall be furnished and installed on all inlets discharging to surface water. Inlets in rough graded areas need protection to keep any sediment from being transported to a Water of the State, or filling up the pipes with sediment. Inlet protection is shown in the plans by type; see specification 3891. Devices approved by the MN/Department's Erosion Control Engineering Unit and on file on the web under the Materials Engineering Section's Approved Products List can be furnished as meeting this specification requirement.

Bidders are advised that payment for furnishing and installing temporary erosion control set forth in the foregoing area is for the initial installation and removal only. Any replacement components as may be necessary to maintain the temporary erosion control devices in a functional condition, to the satisfaction of the Engineer, during the tenure of this Contract shall be furnished, installed, maintained, and removed at the Contractor's expense.

Item No.	Item	Unit
2573.530	STORM DRAIN INLET PROTECTION	EACH
2573.602	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH

S - 56 (2575) PERMANENT EROSION CONTROL AND TURF ESTABLISHMENT

The provisions of MnDOT 2575 are supplemented and/or modified with the following:

s 56.1 **Disturbed areas**, as shown in the plans, shall be sodded or seeded and mulched as soon as practical after completion of the grading operations, but within the period specified for germination of seed.

s 56.2 **Topsoil:** Topsoil should be at a minimum of 6 inches on seeded areas and 3 inches thick on sodded areas. This material should have been retained on the project included in the common excavation item.

s 56.3 **Sod**:

Sodding around storm aprons, shall be according to MnDOT Detail Plate 9102D and shown on the Plans; According to the requirements of MnDOT 3878.2, B **"Erosion Control Sod"**.

Sodding around other areas shall be as shown on Plans; According to the requirements of MnDOT 3878.2, D **"Mineral Sod"**.

s 56.4 **Watering:**

The Contractor shall make, at no cost to the Owner, whatever arrangements may be necessary to insure an adequate supply of water to meet the needs of this Contract. The Contractor shall also furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required to complete the work as specified and water used for this purpose shall be incidental to the cost of the turf establishment.

s 56.5 **Basis of Payment**

Item No.	Item	Unit
2575.505	SODDING TYPE MINERAL	S Y

S - 57 (2582) PERMANENT PAVEMENT MARKINGS (EPOXY WR) (2013 VERSION (REV. 3/7/13))

The provisions of MnDOT 2582 are hereby modified and/or supplemented with the following:

s 57.1 The language below applies to the permanent pavement markings for this Project that are to be Wet Reflective/Recoverable pavement markings, utilizing Epoxy Paint (WR). These markings are to be recessed in accordance with MnDOT Technical Memorandum No. 08-10-T-02.

s 57.2 The wet reflective/recoverable pavement marking material utilized for this Project must be listed within **Epoxy Paint – Recoverable** category on the MnDOT Approved/Qualified Products Lists.

s 57.3 The provisions of MnDOT 2582.2 are hereby deleted and replaced with the following:

A Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals) 3590

B Drop-On Glass Beads 3592

Qualified materials can be found on MnDOT's Qualified Products List (QPL) on the Office of Traffic, Safety and Technology website. The Wet Reflective Pavement Marking Materials QPL can be found at http://www.dot.state.mn.us/products/pavementmarkings/index.html. Other materials may be used on a provisional basis as detailed in the QPL process and as approved by the Engineer. Type of material used will be as specified by Contract Documents.

s 57.4 MnDOT 2582.3A2 is hereby deleted.

s 57.5 GROOVING BITUMINOUS *and/or* CONCRETE PAVEMENT SURFACES FOR WET REFLECTIVE/RECOVERABLE PAVEMENT MARKINGS

The wet reflective/recoverable pavement markings are to be grooved into the pavement surfaces. **GRINDER-TYPE CUTTING HEADS CANNOT BE USED.** The goal of the grooving process is to protect the pavement marking from snowplow damage and ultimately extend the service life of the pavement markings. Grooving operations are incidental to permanent pavement marking operations.

s 57.6 The following is hereby added to MnDOT 2582.3B, Application:

The Contractor has the option to dry or wet groove the pavement while the roadway is open or closed to traffic. The grove must be cleaned completely prior to pavement marking application, using an air compressor with at least 185 CFM air flow and 120 PSI air pressure. The compressor must be equipped with a moisture and oil trap, and cannot have more than 50 feet of 3/4 inch ID hose between the compressor and the air nozzle. The air nozzle must have an inside diameter of 1/2 inch or greater.

(A) Grooving Equipment

The grooving shall be performed by a self-propelled machine equipped with gang stacked diamond cutting blades mounted on a floating head with controls capable of providing uniform depth and alignment.

The cutting heads shall consist of stacked 3 mm to 9 mm [1/8 inch to 3/8 inch] wide diamond tipped cutting blades. The spacers between each blade must be such that the raise in the bottom of the finished groove between the blades is less than 25% of the groove depth. The resulting bottom of the groove shall have a fine corduroy finish. If a coarse tooth pattern is present, the Contractor shall increase the number of blades and/or decrease the thickness of the spacers on the cutting head.

The equipment shall be capable of grooving the total width of the groove in one pass or be capable of grooving uniform depths with multiple passes. The maximum number of passes is detailed below. If multiple passes are used, the ridge between passes shall be mechanically removed prior to groove cleaning and pavement marking application.

The equipment shall be capable of grooving double lines simultaneously or parallel lines to a uniform depth with two passes.

The equipment shall be self-vacuuming and leave the cut groove ready for pavement marking installation. Dry cut grooving without a vacuum will only be allowed if markings run perpendicular to the roadway, such as Stop Bars. The pavement marking manufacturer shall approve the equipment and method used.

(B) Grooves

The grooving shall be performed within the following tolerances. Failure to meet these tolerances will result in the suspension of work until the Contractor can demonstrate that these tolerances can be met to the satisfaction of the Engineer. **The pavement marking system shall be applied so that it is centered within the groove.**

GROOVE WIDTH AND MAXIMUM NUMBER OF PASSES		
MARKING WIDTH	GROOVE WIDTH	MAX NUMBER OF PASSES
100 mm **[4 inches]**	130 mm ± 3 mm **[5" ± 1/8"]**	1
150 mm **[6 inches]**	180 mm ± 3 mm **[7" ± 1/8"]**	1
200 mm **[8 inches]**	230 mm ± 3 mm **[9" ± 1/8"]**	1
300 mm **[12 inches]**	330 mm ± 3 mm **[13" ± 1/8"]**	2
600 mm **[24 inches]**	635 mm ± 3 mm **[25" ± 1/8"]**	3

The groove depth shall be 70 mil ± 10 mil.

Since pavements are irregular, the depth of groove across the width may vary. To compensate for this, the depth of the groove shall be measured from the bottom of the groove to a straight edge extended over the groove from the pavement surface opposite the pavement joint.

FULL DEPTH GROOVE LENGTHS	
Full Depth Groove Length (Broken Line)	3 m ± 75 mm **[10 feet ± 3 inches]**
Tapers At End of Each Line	150 mm ± 230 mm **[6 inches to 9 inches]**
Space Between Double lines	100 mm ± 6 mm **[4 inches ± 1/4 inch]**

The groove shall be placed 50 mm ± 25 mm **[2 inches ± 1 inch]** from the edge of joints or seams along edge or centerline, unless otherwise indicated in the Plan.

Grooving alignment deviations from the control guide or existing lines specified by the Engineer shall not exceed 50 mm **[2 inches]**.

All pavement markings to be grooved in shall be placed in accordance with pavement marking or element manufacturer's instructions. New bituminous pavement shall not be grooved within a minimum 10 days of the placement of the final course of pavement, unless otherwise directed by the Engineer.

If the Epoxy (WR) markings are to be installed in the same location where there are existing pavement markings, including interim or temporary, the removal of the existing pavement markings shall be incidental to and included within the Epoxy (WR) pay item. The Contractor may cut the groove and remove the existing marking in a simultaneous operation.

s 57.7 The provisions of MnDOT 2582.5 are hereby deleted and replaced with the following:

s 57.8 Basis of Payment

Payment for pavement markings installed at Contract prices per unit of material shall be compensation in full for all costs incurred in materials, traffic control, installation, surface preparation, use of primers, in accordance to Contract documents or as approved by the Engineer.

ITEM	DESCRIPTION	UNIT
2582.602	PAVT MSSG (SHARROW) EPOXY (WR)	EACH
2582.603	4" SOLID LINE WHITE-EPOXY (WR)	L F
2582.603	4" BROKEN LINE YELLOW-EPOXY (WR)	L F
2582.618	CROSSWALK MARKING-EPOXY (WR)	S F

S - 58 (3137) COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE

MnDOT 3137 shall be deleted and replaced with the following:

3137.1 SCOPE

Provide coarse aggregate for use in portland cement concrete.

3137.2 REQUIREMENTS

A General

Provide coarse aggregate consisting of clean, sound, durable particles, uniform in quality, and free from wood, bark, roots, and other deleterious material.

The Engineer, in conjunction with the Concrete Engineer, may consider the following as the basis for acceptance of coarse aggregate for portland cement concrete:

(1) Results of laboratory tests,

(2) Behavior under natural exposure conditions,

(3) Behavior of other portland cement concrete with aggregate from the same or similar geological formations or deposits, and

(4) Any other tests or criteria as deemed appropriate by the Engineer, in conjunction with the Concrete Engineer.

B Classification

Provide coarse aggregate meeting the requirements of one of the following classifications:

(1) Class A: Crushed quarry rock including quartzite, gneiss, and granite, or mine trap rock including basalt, diabase, gabbro, and other igneous rock types. Class A aggregate may contain no greater than 4.0 percent non-Class A aggregate. The Department will not allow the intentional blending or adding of non-Class A aggregate.

(2) Class B: All other crushed quarry or mine rock types including carbonates, rhyolite, and schist.

(3) Class C: Natural or partly crushed gravel obtained from a natural gravel deposit.

(4) Class D: Mixture of at least two classes of coarse aggregate. The Engineer, in conjunction with the Concrete Engineer, will determine the suitability of the Class D aggregate for the proposed use including proportioning.

(5) Class R: Aggregate obtained from recycling concrete. The Engineer, in conjunction with the Concrete Engineer, will determine the suitability of the Class R aggregate for the proposed use including proportioning.

C Washing

Wash Class B, Class C, Class D, and Class R coarse aggregate. Wash Class A aggregate as needed to comply with the requirements of Table 3137-1.

D Quality

Quality requirements are based on each individual aggregate fraction unless otherwise allowed by the Engineer, in conjunction with the Concrete Engineer with the exception of the following:

(1) When 100 percent of the fractions from a single source pass the 1 in [**25 mm**] sieve, quality requirements are based on the composite value of the combined aggregates.

(2) When less than 100 percent of the fractions from a single source pass the 1 inch [**25 mm**] sieve:

(a) Those fractions passing the 1 inch [**25 mm**] sieve are combined and based on the composite value;

(b) The fractions greater than or equal to 1 inch [**25 mm**] are based on each individual aggregate fraction.

D1 Coarse Aggregate for General Use

Provide coarse aggregate for general use concrete in accordance with Table 3137-1.

Table 3137-1 Coarse Aggregate for General Use		
	Quality Test	**Maximum Percent by Weight**
(a)	Shale:	
	Fraction retained on the ½ in [**12.5 mm**] sieve	0.4
	Fraction retained on the No. 4 [**4.75 mm**] sieve, as a percentage of the total material	0.7
(b)	Soft iron oxide particles (paint rock and ochre)	0.3
(c)	Total spall materials*:	
	Fraction retained on the ½ in [**12.5 mm**] sieve	1.0
	Fraction retained on the No. 4 [**4.75 mm**] sieve, as a percentage of the total material	1.5
(d)	Soft particles‖	2.5
(e)	Clay balls and lumps	0.3
(f)	Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps†	3.5
(g)	Slate	3.0
(h)	Flat or elongated pieces‡	15.0
(i)	Quantity of material passing No. 200 [**75 µm**] sieve:	
	Class A and Class B aggregates#	1.5
	Class C and Class D aggregates§	1.0
(j)	Los Angeles Rattler, loss on total sample	40.0
(k)	Soundness of magnesium sulfate**	15.0

* Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.

‖ Exclusive of shale, soft iron oxide particles, and total spall materials.

† Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 [**4.75 mm**] sieve.

‡ Thickness less than 25 percent of the maximum width. Length greater than 3 times the maximum width.

\# Each individual fraction at the point of placement consists of dust from the fracture and free of clay or shale.

§ For each individual fraction at the point of placement.

** Loss at 5 cycles for any fraction of the coarse aggregate. Do not blend materials from multiple sources to obtain a fraction meeting the sulfate soundness requirement.

D2 Coarse Aggregate for Bridge Superstructure

Provide coarse aggregate in accordance with 3137.2D1 except as modified by Table 3137-2 for use in the following:

(1) Bridge superstructure (deck, railing, posts, curbs, sidewalks, and median strips);

(2) Approach panels; and

(3) Precast concrete panel facings for Mechanically Stabilized Earth walls.

Table 3137-2
Coarse Aggregate for Bridge Superstructure

	Quality Test	Maximum Percent by Weight
(a)	Shale:	
	Fraction retained on the ½ in [**12.5 mm**] sieve	0.2
	Fraction retained on the No. 4 [**4.75 mm**] sieve as a percentage of the total material	0.3
(b)	Soft iron oxide particles (paint rock and ochre)	0.2
(c)	Total spall materials*:	
	Fraction retained on the No. 4 [**4.75 mm**] sieve as a percentage of the total material	0.5
(d)	Soft particles‖	2.5
(e)	Clay balls and lumps	0.3
(f)	Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps, use the percent in the total sample retained on the No. 4 [**4.75 mm**] sieve	3.0
(g)	Absorption for Class B aggregate	1.75
(h)	Carbonate in Class C and Class D aggregates by weight	30.0

* Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.

‖ Exclusive of shale, soft iron oxide particles, and total spall materials.

† Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 [**4.75 mm**] sieve.

D3 Coarse Aggregate for Concrete Pavement

Provide coarse aggregate in accordance with 3137.2D1, except as modified by Table 3137-3, for use in the following:

(1) Concrete pavement, and

(2) Concrete pavement rehabilitation.

Table 3137-3 Coarse Aggregate for Concrete Pavement		
Quality Test		**Maximum Percent by Weight**
(a)	Absorption for Class B aggregate	1.75
(b)	Carbonate in Class C aggregate by weight	30.0

E Gradation

Provide coarse aggregate in accordance with Table 3137-4 including all sizes within the specified limits. The Department defines coarse aggregate as the uniform product of the producing plant, unless some sizes are removed to meet the gradation requirements. Do not use broken or noncontinuous gradations.

If the coarse aggregate has less than 100 percent passing the 1 in **[25 mm]** sieve, proportion the coarse aggregate using at least two fractions. Gradation requirements are based on the composite value of the combined coarse aggregates.

Table 3137-4
Coarse Aggregate Designation for Concrete,
percent by weight passing square opening sieves

Aggregate	2 in [50 mm]	1½ in [37.5 mm]	1¼ in [31.5 mm]	1 in [25.0 mm]	¾ in [19.0 mm]	⅝ in [16.0 mm]	½ in [12.5 mm]	⅜ in [9.5 mm]	No.4 [4.75 mm]
CA-00	—	—	—	100	95 – 100	—	—	—	0 – 10
CA-15	100	95 – 100	—	—	35 – 65	—	—	5 – 25	0 – 7
CA-25	100	95 – 100	—	—	50 – 80	—	—	20 – 40	0 – 7
CA-35	—	100	95 – 100	—	55 –85	—	—	20 – 45	0 – 7
CA-45	—	—	100	95 – 100	65 – 95	—	—	25 – 55	0 – 7
CA-50	—	—	—	100	85 – 100	—	—	30 – 60	0 – 12
CA-60	—	—	—	—	100	85 – 100	—	40 – 70	0 – 12
CA-70	—	—	—	—	—	100	85 – 100	50 – 100	0 – 25
CA-80*	—	—	—	—	—	—	—	100	55 – 95

* Do not allow greater than 5 percent to pass the No. 50 [300 µm] sieve.

If producing Class R aggregate, remove reinforcing steel from the concrete and any concrete material passing the No 4 **[4.75 mm]** sieve.

3137.3 SAMPLING AND TESTING

Sample and test coarse aggregate fractions separately in accordance with Table 3137-5.

Table 3137-5 Preliminary Coarse Aggregate Testing	
Aggregate	**Notification and Testing Requirement**
New source	Notify the Engineer at least 1 month before use. Perform new source concrete

	aggregate testing in accordance with the procedure on the Department's website.
Previously tested aggregate	Notify the Engineer at least 2 weeks before use. Perform additional testing as directed by the Engineer, in conjunction with the Concrete Engineer.

Sample and test coarse aggregate in accordance with Table 3137-6.

Table 3137-6
Coarse Aggregate Test Methods

Test	Testing Method
Sampling	MnDOT Concrete Manual
Sieve analysis	MnDOT Concrete Manual
Shale test	MnDOT Laboratory Manual 1207
Quantity of material passing the No. 200 [**75 µm**] sieve	MnDOT Concrete Manual
Specific gravity and absorption	MnDOT Laboratory Manual 1204
Density	AASHTO T 19 or MnDOT Laboratory Manual 1211
Los Angeles Rattler loss	AASHTO T 96
Void content	AASHTO T 19* or MnDOT Laboratory Manual 1211
Deleterious materials	MnDOT Laboratory Manual 1209
Soundness; magnesium sulfate	MnDOT Laboratory Manual 1219
Soft particles	MnDOT Laboratory Manual 1218
Flat or elongated pieces	ASTM D 4791
Clay balls or lumps	MnDOT Concrete Manual

* Base the void content on an oven-dry and compacted-by-rodding condition of the aggregate and a value of 62.4 lb per cu. ft [**1,000 kg per cu. m**] for water.

S - 59 (3138) AGGREGATES FOR SURFACE AND BASE COURSES

The provisions of MnDOT 3138 are hereby modified as follows:

s 59.1 If crushed carbonate quarry rock (limestone or dolostone) is used, the minus 75 µm [**#200**] sized portion of the rock insoluble residue shall not exceed 10% by weight for Base Course and Shoulder Aggregate only. The insoluble residue test procedure is on file in the MnDOT Materials Laboratory.

s 59.2 Blending of sources and/or beds with an insoluble residue up to 15% is allowed to meet the 10% insoluble residue requirement. Individual beds thinner than 150 mm [**6 inches**] up to 5% of the total face height, are exempt from the 15% maximum insoluble residue requirement. However, the aggregate producer shall practice good quality control at all times and exclude poor quality stone to the extent practical, regardless of the bed thickness and/or pocket size and location.

s 59.3 No carbonate quarry rock from the Platteville Geological Formation is allowed.

s 59.4 The second paragraph of MnDOT 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.

s 59.5 TABLE 3138-1 in MnDOT 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 (3/4 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.

s 59.6 The fifth paragraph of MnDOT 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.

S - 60 **(3139) (D6) GRADED AGGREGATE FOR BITUMINOUS MIXTURES (2012 VERSION)**

MnDOT 3139 is hereby deleted and replaced with the following:

3139 Graded Aggregate for Bituminous Mixtures

3139.1 Scope

Provide graded aggregate for use in bituminous mixtures.

3139.2 PLANT MIXED ASPHALT Requirements

A Composition

Provide graded aggregate composed of any combination of the following sound durable particles as described in 3139.2B.

Do not use graded aggregate containing objectionable materials including:

(1) Metal,
(2) Glass,
(3) Wood,
(4) Plastic,
(5) Brick, or
(6) Rubber.

Provide coarse aggregate free of coatings of clay and silt.

Do not add soil materials such as clay, loam, or silt to compensate for a lack of fines in the aggregate.

Do not blend overburden soil into the aggregate.

Feed each material or size of material from an individual storage unit at a uniform rate.

Do not place blended materials from different sources, or for different classes, types, or sizes together in one stockpile unless approved by the Engineer as a Class E aggregate.

B Classification

B.1 Class A

Provide crushed igneous bedrock consisting of basalt, gabbro, granite, gneiss, rhyolite, diorite, and andosite. Rock from the Sioux Quartzite Formation may contain no greater than 4.0 percent non-Class A aggregate. Do not blend or add non-Class A aggregate to Class A aggregate.

B.2 Class B

Provide crushed rock from other bedrock sources such as carbonate and metamorphic rocks (Schist).

B.3 Class C

Provide natural or partly crushed natural gravel obtained from a natural gravel deposit.

B.4 Class D

Provide 100 percent crushed natural gravel produced from material retained on a square mesh sieve with an opening at least twice as large as Table 3139-2 allows for the maximum size of the aggregate in the composite asphalt mixture. Ensure the amount of carryover, material finer than the selected sieve, no greater than 10 percent of the Class D aggregate by weight.

B.5 Class E

Provide a mixture consisting of at least two of the following classes of approved aggregate:

(1) Class A,
(2) Class B, and
(3) Class D.

B.6 Steel Slag

Steel slag cannot exceed 25% of the total mixture aggregate and be free from metallic and other mill waste. The Engineer will accept stockpiles if the total expansion is no greater than 0.5 percent as determined by ASTM D 4792

B.7 Taconite Tailings

Obtain taconite tailings from ore mined westerly of a north-south line located east of Biwabik, Minnesota (R15W-R16W) or from ore mined in southwestern Wisconsin.

B.8 Recycled Asphalt Shingles (RAS)

Provide recycled asphalt shingles manufactured from waste scrap asphalt shingles (MWSS) or from tear-off scrap asphalt shingles (TOSS). Consider the percentage of RAS used as part of the maximum allowable Recycled Asphalt Pavement (RAP) percentage. See Table 3139-3.

B.8.A .....RAS Gradation
..... MnDOT Laboratory Procedure 1801

Provide RAS in accordance with the following gradation requirements:

Table 3139-1
RAS Gradation

Sieve size	Percent passing
½ in [12.5 mm]	100
No. 4 [4.75 mm]	90

B.8.B Binder Content

Determine the binder content using chemical extraction meeting the requirements of MnDOT Lab Procedure 1851 or 1852.

B.8.C Bulk Specific Gravity

The Contractor may use an aggregate bulk specific gravity (Gsb) of 2.650 in lieu of determining the shingle aggregate Gsb in accordance with MnDOT Lab Procedure 1205.

B.8.D Waste Materials

Do not allow extraneous materials including metals, glass, rubber, nails, soil, brick, tars, paper, wood, and plastics greater than 0.5 percent by weight of the graded aggregate as determined by material retained on the No. 4 [4.75 mm] sieve as specified in MnDOT Laboratory Procedure 1801.

B.8.E Stockpile

Do not blend an RAS stockpile with other salvage material. Do not blend MWSS and TOSS. The Contractor may blend virgin sand material with RAS to minimize agglomeration if the Contractor accounts for the blended sand in the final mixture gradation.

B.8.F Certification

Ensure the processor provides RAS certification on the following Department form "Scrap Asphalt Shingles from Manufacture Waste" or "Tear-Off Scrap Asphalt Shingles" at www.dot.state.mn.us/materials/bituminous.html

B.9 Crushed Concrete and Salvaged Aggregate

The Contractor may incorporate no greater than 50 percent of crushed concrete and salvaged aggregate in non-wear mixtures. Do not use crushed concrete in wearing courses.

B.10 Ash

Sewage sludge ash and waste incinerator ash are allowed as an aggregate source at a maximum of 5% of the total weight of the mixture. Sewage sludge ash for use as an aggregate source in wear or non-wear courses must be approved by examination with the Hazard Evaluation Process by MnDOT's Office of Environmental Stewardship.

B.11 Recycled Asphalt Pavement (RAP)

B.11.A Aggregate Angularity

Provide combined RAP and virgin aggregates that meet the composite coarse and fine aggregate angularity for the mixture being produced.

B.11.B Objectionable Material

Do not use RAP containing objectionable materials including metal, glass, wood, plastic, brick, or rubber.

B.11.C Asphalt Binder Content

Determine the asphalt binder content using the MnDOT Lab Manual Method 1851 and 1852.

B.11.D Bulk Specific Gravity

Determine the bulk specific gravity in accordance with MnDOT Laboratory Procedure 1205 or 1815.

C Quality

C.1 ..... Los Angeles Rattler Test
..... MnDOT Laboratory Procedure 1210

Ensure a coarse aggregate loss no greater than 40 percent.

C.2 ..... Soundness (Magnesium Sulfate)
..... MnDOT Laboratory Procedure 1219

Maximum loss after 5 cycles on the coarse aggregate fraction (material retained on No. 4 [4.75 mm] sieve for any individual source within the mix) as follows:

(1) Percent passing the ¾ in [19 mm] sieve to percent retained on the ½ in [12.5 mm] sieve, ≤ 14%,

(2) Percent passing the ½ in [12.5 mm] sieve to percent retained on the ⅜ in [9.5 mm]sieve, ≤18%,

(3) Percent passing the ⅜ in [9.5 mm] sieve to percent retained on the No. 4 [4.75 mm] sieve, ≤ 23%,

(4) For the composite if all three size fractions are tested, the composite loss ≤ 18%, and acceptance will be granted if:

(4.1) If the Contractor meets the composite requirement, but fails to meet at least one of the individual components, the Engineer may accept the source if each individual component is no greater than 110 percent of the requirement for that component.

(4.2) If the Contractor meets each individual component requirement, but fails to meet the composite, the Engineer may accept the source if the composite is no greater than 110 percent of the requirement for the composite.

Coarse aggregate that exceeds the requirements in this section for material passing the No. 4 [4.75 mm] sieve cannot be used.

C.3 ..... Spall Materials and Lumps
..... MnDOT Laboratory Procedure 1219

Stop asphalt production if the percent of spall or lumps measured in the stockpile or cold feed exceeds the values listed in Table 3139-3. Determine lump compliance by dry batching.

C.4 ..... Insoluble Residue Test
..... MnDOT Laboratory Procedure 1221

If crushed carbonate quarry rock (limestone or dolostone) is used the minus 75 µm [**#200**] sized portion of the rock insoluble residue shall not exceed 10% by weight. The insoluble residue test procedure is on file in the MnDOT Materials Laboratory.

Blending of sources and/or beds with an insoluble residue up to 15% is allowed to meet the 10% insoluble residue requirement. Individual beds thinner than 150 mm [**6 inches**] up to 5% of the total face height, are exempt from the 15% maximum insoluble residue requirement. However, the aggregate producer shall practice good quality control at all times and exclude poor quality stone to the extent practical, regardless of the bed thickness and/or pocket size and location.

No carbonate quarry rock from the Platteville Geological Formation is allowed.

D Gradation

Ensure the aggregate gradation broad bands meet the following requirements in accordance with AASHTO T-11 (passing the No. 200 [75 µm] wash) and AASHTO T-27.

Table 3139-2
Aggregate Gradation Broad Bands (percent passing of total washed gradation)

Sieve size	A	B	C	D
1 in [25.0 mm]	—	—	100	—
¾ in [19.0 mm]	—	100*	85 – 100	—
½ in [12.5 mm]	100*	85 – 100	45 – 90	—
⅜ in [9.5 mm]	85 – 100	35 – 90	—	100
No. 4 [4.75 mm]	60 – 90	30 – 80	30 – 75	65 – 95
No. 8 [2.36 mm]	45 – 70	25 – 65	25 – 60	45 – 80
No. 200 [0.075 mm]	2.0 – 7.0	2.0 – 7.0	2.0 – 7.0	3.0 – 8.0

* The Contractor may reduce the gradation broadband for the maximum aggregate size to 97 percent passing for mixtures containing RAP, if the oversize material originates from the RAP source. Ensure the virgin material meets the requirement of 100 percent passing the maximum aggregate sieve size.

Table 3139-3 Mixture Aggregate Requirements				
Aggregate Blend Property	Traffic Level 2	Traffic Level 3	Traffic Level 4	Traffic Level 5
20 year Design ESAL's	<1 million	1 - 3 million	3 - 10 million	10 – 30 million
Min. Coarse Aggregate Angularity (ASTM D5821) (one face / two face), %- Wear (one face / two face), %- Non-Wear	30/- 30/-	55 / - 55 / -	85 / 80 60/ -	95 / 90 80 / 75
Min. Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %-Wear %-Non-Wear	40 40	42 40	44 40	45 40
Flat and Elongated Particles, max % by weight, (ASTM D 4791)	-	10 (5:1 ratio)	10 (5:1 ratio)	10 (5:1 ratio)
Min. Sand Equivalent (AASHTO T 176)	-	-	45	45
Max. Total Spall in fraction retained on the #4 [4.75mm] sieve – Wear Non-Wear	5.0 5.0	2.5 5.0	1.0 2.5	1.0 2.5
Maximum Spall Content in Total Sample – Wear Non-Wear	5.0 5.0	5.0 5.0	1.0 2.5	1.0 2.5
Maximum Percent Lumps in fraction retained on the #4 [4.75mm] sieve	0.5	0.5	0.5	0.5
Class B Carbonate Restrictions				
Maximum% -#4 [-4.75mm] Final Lift/All other Lifts	100/100	100/100	80/80	50/80
Maximum% +#4 [+4.75mm] Final Lift/All other Lifts	100/100	100/100	50/100	0/100

Max. allowable scrap shingles– MWSS(1) Wear/Non Wear	5/5	5/5	5/5	5/5
Max. allowable scrap shingles – TOSS(1) Final Lift/All other Lifts	5/5	5/5	0/5	0/0

(1) MWSS is manufactured waste scrap shingle and TOSS is tear-off scrap shingle.

3139.3 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB) Requirements

A Restrictions

Do not use recycled materials including glass, concrete, bituminous, shingles, ash, and steel slag.

B Gradation

The Gradation limits are also considered the Job Mix Formula (JMF) limits.

B.1 PASB

Table 3139-4
PASB Aggregate Gradation

Sieve Size	Percent Passing
1 ½ inch [37.5 mm]	100
1 inch [25.0 mm]	95 - 100
¾ inch [19.0 mm]	85 – 95
3/8 inch [9.5 mm]	30 – 60
No. 4 [4.75 mm]	10 – 30
No. 8 [2.36 mm]	0 – 10
No. 30 [600 µm]	0 – 5
No. 200 [75 µm]	0 – 3

B.2 PASSRC

Table 3139-5 PASSRC Aggregate Gradation	
Sieve Size	Percent Passing
5/8 inch [16.0 mm]	100
1/2 inch [12.5 mm]	85 – 100
3/8 inch [9.5 mm]	50 – 100
No. 4 [4.75 mm]	0 – 25
No. 8 [2.36 mm]	0 – 5

C Quality

Requirements will meet all of 3139.2.C.

D Mixture Quality Requirements

Table 3139-6 **Mixture Aggregate Requirements for PASSRC & PASB**	
Aggregate Blend Property	
Coarse Aggregate Angularity (ASTM D5821) (one face/two face) % PASSRC (1) PASB (1)	 95/- -/65
Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %	NA
Flat and Elongated Particles, max(2) % by weight, (ASTM D 4791)	NA
Clay Content (2) (AASHTO T 176)	NA
Total Spall in fraction retained on the 4.75mm [**#4**] sieve	3.0
Maximum Spall Content in Total Sample	5.0
Maximum Percent Lumps in fraction retained on the 4.75mm [**#4**] sieve	0.5

(1) Carbonate Restrictions: If Class B (as defined in 3139.2.B.2), crushed carbonate quarry rock (limestone or dolostone), is used in the mixture, or if carbonate particles in the material retained on the 4.75 mm [**No. 4**] sieve exceeds 55 percent, by weight, the minus 0.075 mm [# **200**] sieve size portion of the insoluble residue shall not exceed 10 percent.

3139.4 Ultra Thin Bonded Wearing Course (UTBWC) Requirements.

A. Restrictions

Do not use recycled materials including glass, concrete, bituminous, shingles, ash, and steel slag.

B. Coarse Aggregate

Provide a Class A aggregate, as defined in 3139.2.B.1, in accordance with the following requirements:

Table 3139-7 UTBWC Coarse Aggregate Requirements		
Tests	**MnDOT Laboratory Manual Method**	**Limit, %**
Flat and elongated ratio at 3:1	1208	≤ 25
Los Angeles Rattler Test (LAR)	1210	≤ 40
Bulk Specific Gravity	1204	

C. Fine Aggregate

Provide fine aggregate, passing the No. 4 [4.75 mm] sieve in accordance with the following requirements:

Table 3139-8 Fine Aggregate Requirements		
Tests	**Method**	**Limit, %**
Sand equivalent*	AASHTO T 176	≥ 45
Uncompacted void content	MnDOT Laboratory Manual 1206	≥ 40
Bulk Specific Gravity	MnDOT Laboratory Manual 1205	

3139.5 SAMPLING AND TESTING

Perform sampling, sieve analysis, lumps, crushing, and shale testing meeting the requirements of the MnDOT Laboratory Manual.

S - 61 (3590) EPOXY RESIN PAVEMENT MARKINGS (FREE OF TOXIC HEAVY METALS) (2013 VERSION)

The provisions of MnDOT 3590.3 are hereby deleted and replaced with the following:

3590.3 Specific Requirements

A Epoxy Resin Material

The material shall be composed of epoxy resins and pigments only. No solvents are to be given off to the environment upon application to a pavement surface.

The composition shall be within the tolerance permitted for the product tested and approved by MnDOT. Type II material shall be completely free of TMPTA (Tri-Methyol Propane Tri-Acrylate) and other multi-functional monomers.

All materials shall be free of lead, cadmium, mercury, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.

Color:

The color of the white epoxy shall be a pure flat white, free of tints. The color of the yellow epoxy shall closely match Color Number 33538 of Federal Standard 595 and shall conform to the following CIE Chromaticity limits using illuminant "C":

x | 0.470 | 0.485 | 0.520 | 0.480

y | 0.440 | 0.460 | 0.450 | 0.420

Daylight Directional Reflectance (Y), white, minimum 83

Daylight Directional Reflectance (Y), yellow, minimum 50

Testing will be according to:

Daylight Directional Reflectance .....ASTM D 2805

Color.....ASTM D 2805

Adhesion Capabilities:

When the adhesion of the material to portland cement concrete (the concrete shall have a minimum of 2 070 kPa [**300 psi.**] tensile strength) is tested according to American Concrete Institute Committee 403 testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32°C [**0°F**] when the material is applied, after which the material shall be allowed to cure for 72 hours at 23 ± 2°C [**73 ± 36° F**].

Abrasion Resistance:

When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The wear index is the weight in milligrams that is abraded from the sample under the test conditions).

Hardness:

The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested according to ASTM D2240 after the material has cured for 72 hours at 23 ± 2°C [**73 ± 36° F**].

Tensile Strength:

The tensile strength of the material, when tested according to ASTM D 638, shall not be less than 41 370 kPa [**6,000 psi.**] after 72 hours cure at 23 ± 2°C [**73 ± 36° F**].

Compressive Strength:

The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 82,700 kPa [**12,000 psi.**] after 72 hours cure at 23±2°C [**73 ± 36° F**].

Thickness:

The epoxy pavement marking wet film thicknesses shall be a minimum of 508 µm [**20 mil**] on all pavement surfaces. For the Spec 2360 SUPERPAVE wearing courses the epoxy pavement marking wet film thicknesses shall be increase from a minimum of 508 µm [**20 mil**] to a minimum thickness of 635 µm [**25 mil**] wet film.

B Glass Beads

Glass beads shall meet the requirements of AASHTO M247, Type I, and:

a. Coatings -- the beads shall be treated according to the manufacturers recommendations and meet the requirements of Section 4.4.2 of M247, and

b. Roundness-- the beads shall have a roundness of at least 80%.

For 508 µm [**20 mil**] applications, glass beads shall be applied at a rate of at least 3.0 kg/L [**25 pounds per gallon**]. A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.

Time to No-Track:

Type I material shall be in "no-tracking" condition in 15 minutes or less and within 45 minutes for Type II material. The "no-tracking" condition shall be determined on an application of specified thickness to the pavement and covered with glass beads at the rate of at least 3.0 kg/L [**25 pounds per gallon**]. The lines for this test shall be applied with striping equipment operated so as to have the material at manufacturer's recommended application temperature. This maximum "no-tracking" time shall not be exceeded when the pavement temperature varies from 10 to 49° C [**50 to 120° F**] and under all humidity conditions, providing the pavement is dry. The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 40 to 55 km/hr [**25 to 35 mph**] in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 15 m [**50 feet**] shall be considered as showing "no-tracking" and conforming to this requirement for time to "no-track."

S - 62 (3592) DROP-ON GLASS BEADS

The provisions of MnDOT 3592.3 are hereby deleted and replaced with the following:

3592.3 SPECIFIC REQUIREMENTS

Glass beads shall meet the requirements of AASHTO M247, Type I, "standard gradation" except the beads will have a minimum of 80 percent true spheres. The dual treated beads will meet the moisture resistant requirements of AASHTO M 247 Section 4.4.2 and pass the adherence treatment Dansyl Chloride Test. The moisture resistant silicone treated beads will meet AASHTO M 247 Section 4.2.2.

S - 63 (3891) STORM DRAIN INLET PROTECTION

The provisions of MnDOT 3891 are supplemented and/or modified with the following:

s 63.1 MnDOT 3891.3A Rock Log, is revised to read as follows:

Rock logs shall meet the requirements of 3897.2 Filter Log Type Rock Log.

s 63.2 MnDOT 3891.3B Compost Log, is revised to read as follows:

Compost logs shall meet the requirements of 3897.2 Filter Log Type Compost Log

S - 64 FINAL ESTIMATE AND FINAL PAYMENT (2013 VERSION)

The following provisions shall apply to preparation of the Final Estimate and execution of Final Payment under this Contract:

s 64.1 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.

s 64.2 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) and/or veteran-owned small business."

STORM WATER POLLUTION PREVENTION PLAN (SWPP)

FOR

CITY PROJECT NO. **(6216-2-09)** J NO. **(7215)**

STATE PROJECT NO. _____

MINNESOTA PROJECT NO. _____

LOCATION: **1st Street SW, ROCHESTER, MN**

TYPE OF WORK **Reconstruction of Bituminous Roadway, Including Storm Sewer, Watermain, and Sanitary Sewer**

LENGTH **0.4** MILES STARTING DATE: **May 15, 2014**

COMPLETION DATE: **October 30, 2014**

To comply with the General Stormwater Permit for Construction Activity (MN R100001)

STORM WATER POLLUTION PREVENTION PLAN CONTACTS

CONTACT INFORMATION		
Owner of the Site, and Party Responsible for Long Term Operations and Maintenance of the Permanent Storm Water Management System		
Business of Firm Name **City of Rochester**		
Last Name First Name Title **Kelm, Russ**	E-mail **rkelm@rochestermn.gov**	Telephone (*include area code*) **507-328-2417**
Mailing Address **201 4th Street SE, Rm 108**	City **Rochester**	State Zip Code **MN, 55904**
Alternate Contact Last Name First Name **Kelm, Russ**	E-mail **rkelm@rochestermn.gov**	Telephone (*include area code*) **507-328-2417**
Contractor (Person who will oversee implementation of the SWPPP)		
Business of Firm Name		
Last Name First Name Title	Last Name First Name Title	Last Name First Name Title
Mailing Address	Mailing Address	Mailing Address
Alternate Contact Last Name First Name	Alternate Contact Last Name First Name	Alternate Contact Last Name First Name

FIGURE 1 – PROJECT LOCATION QUADRANGLE MAP

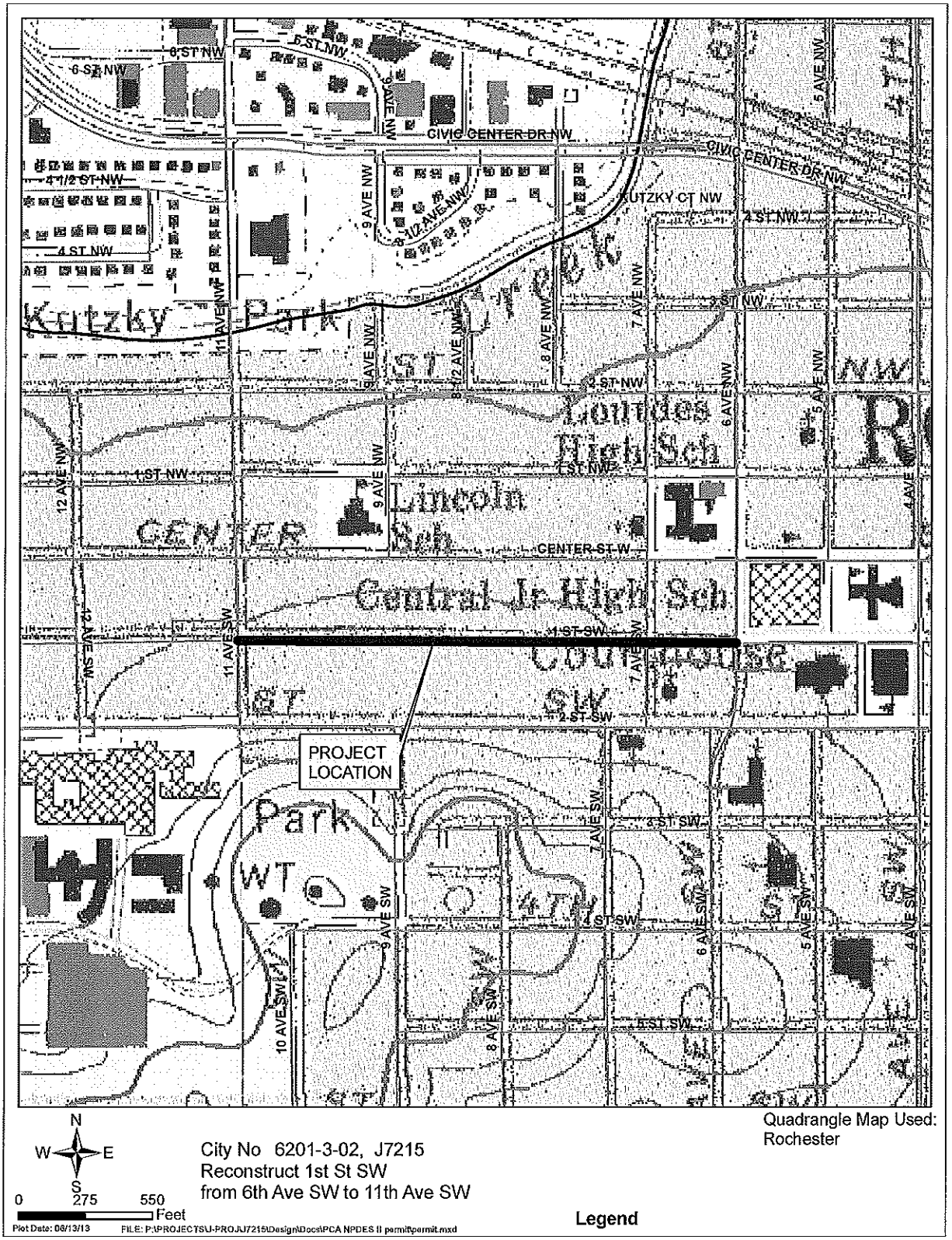


FIGURE 2 –OLMSTED COUNTY GEOLOGIC ATLAS SOIL TYPES MAP

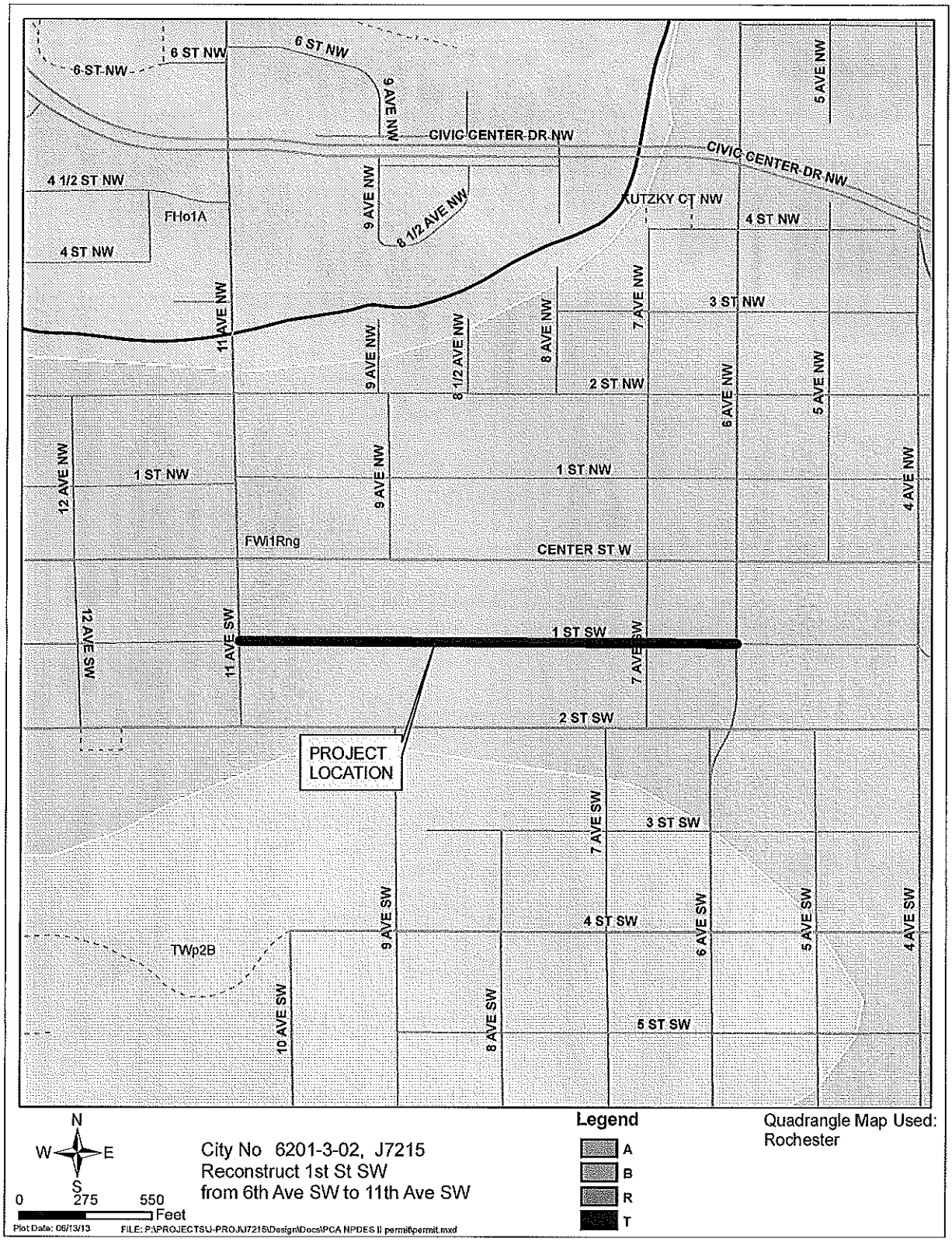
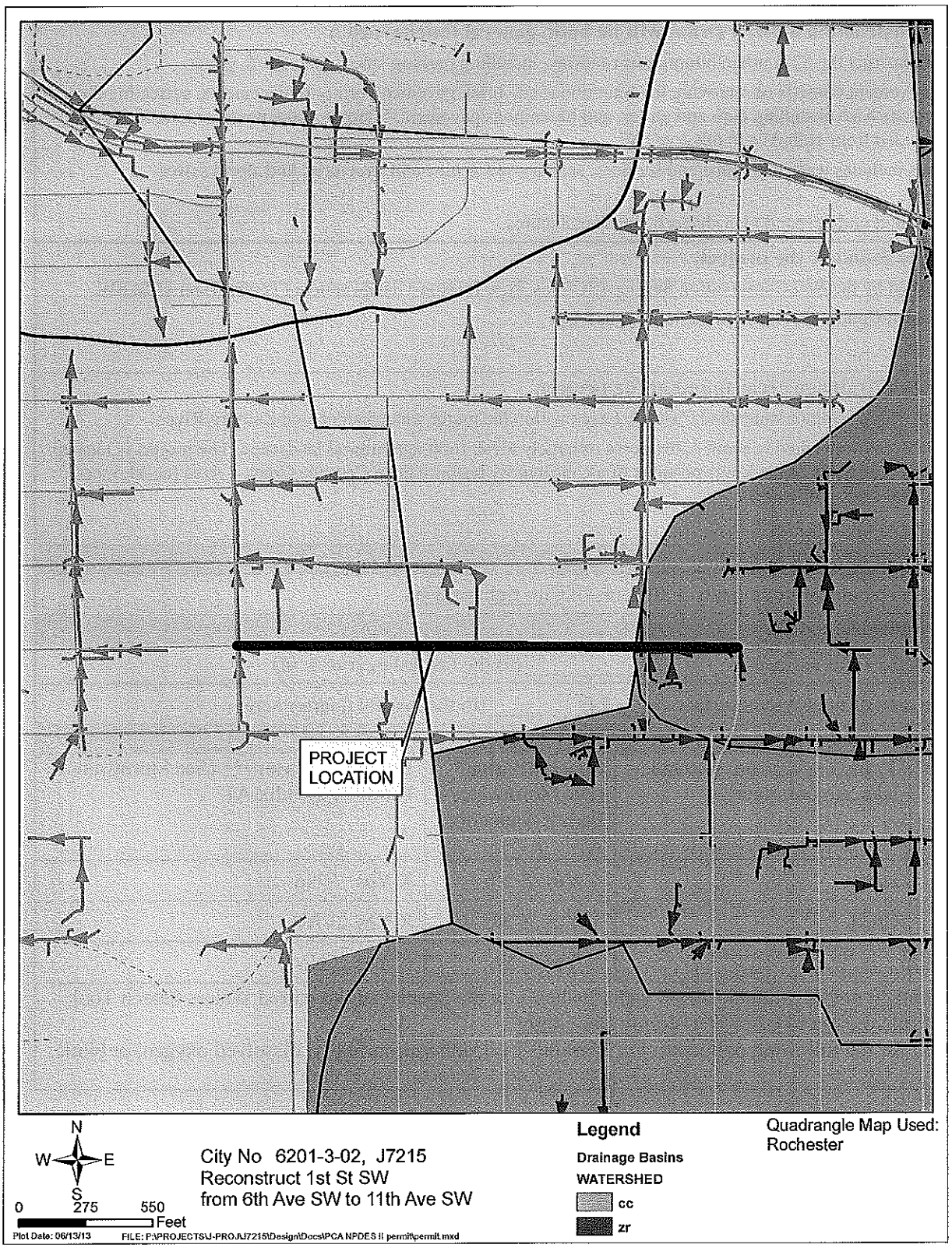


FIGURE 3 – DEPARTMENT OF NATURAL RESOURCES (DNR) WATERSHEDS MAP



Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

CONSTRUCTION PROJECT INFORMATION (III.A)

1. Describe the construction activity (what will be built, general timeline, etc.)

The project will reconstruct the 32 ft urban bituminous roadway, including parking lanes, and curb & gutter.

The proposed improvement consists of removing the bituminous and brick pavement, utility replacements, correcting the subgrade and aggregate base, installing curb and gutter, and bituminous pavement. Sharrow route pavement markings and signage will be included from 16th Ave to 6th Ave SW.

Utility replacements includes watermain pipe and services, sanitary sewer pipe and structures, and storm sewer improvements.

See also the grading and underground plan sheets for project features.

Describe soil types found at the project.

The soils are classified by the Soil Conservation Service (SCS) as Type R (Non-Glacial source (Terrace)) on 1st St SW.

See Figure 2 –Olmsted County Geologic Atlas Soil Types Map.

Describe watershed/drainage areas found at the project.

The roadway exists within 1 minor watershed Cascade Creek within the major watershed named Zumbro River.

The entire Cascade Creek watershed is about 4,261 acres of largely level, rural agricultural landscape. The project is located within approximately 3.30 acres of the lower portions of a contributory basins named Cascade Creek – Area (cc-a4.5, cc-a4.7), which has a total area of 406 acres.

Project Size (number of acres to be disturbed)

Construction limits contain approximately 3.30 acres of City right of way.

Cumulative Impervious Surface

Existing area of impervious surface 2.0 (to the nearest quarter acre)

Post construction area of impervious surface 2.0 (to the nearest quarter acre)

Receiving Waters

Name of Water Body	**Type** (ditch, pond, wetland, lake, stream, river)	**Special Water?** (See Stormwater Permit Appendix A)	**Impaired Water?**** (See Stormwater Permit Appendix A)
Zumbro River	River	☐ Yes X No	X Yes ☐ No
Cascade Creek	Creek	☐ Yes X No	X Yes ☐ No
		☐ Yes ☐ No	☐ Yes ☐ No

*Water Body ID might not be available for all water bodies. Use the Special and Impaired Waters Search Tool at: www.pca.state.mn.us/water/stormwater/stormwater-c.html

** Impaired water for the following pollutant(s) or stressor(s): phosphorus, turbidity, dissolved oxygen, or biotic impairment

GENERAL SITE INFORMATION (III.A)
Describe the location and type of all temporary and permanent erosion prevention and sediment control BMPs. Include the timing for installation and procedures used to establish additional temporary BMPs as necessary. (III.A.4.a) In addition to Division S section (2575) Permanent Erosion Control and Turf Establishment: In areas within 200 feet of surface waters, MnDOT rapid stabilization method 3 will be used. Areas within 10 feet of the pavement will be seeded and immediately mulched and anchored.
Refer to the Estimated Quantities plan sheet for the anticipated quantities for the life of the project for all erosion prevention and sediment control BMPs (III. A. 4.b)
Refer to the plans for the following features (III.A.3.b – f): • Existing and final grades, including dividing lines and direction of flow for all pre and post-construction stormwater runoff drainage areas located within the project limits. • Locations of impervious surfaces and soil types. • Locations of areas not to be disturbed. • Location of areas of phased construction. • All surface waters and existing wetlands within 1-mile from the project boundaries that will receive stormwater runoff from the site (identifiable on maps such as USGS 7.5 minute quadrangle maps, see Figure 1 – Project Location Quadrangle Map). Where surface waters receiving runoff associated with construction activity will not fit on the plan sheet, they must be identified with an arrow, indicating both direction and distance to the surface water. • Methods to be used for final stabilization of all exposed soil areas.
Were stormwater mitigation measures required as the result of an environmental, archaeological, or other required local, state, or federal review of the project? If yes, describe how these measures were addressed in the SWPPP. (III.A.6.) No.
Is the project located in a karst area such that additional measures would be necessary to protect drinking water supply management areas as described in Minn. R. chapters 7050 and 7060? If yes, describe the additional measures to be used. (III.A.7.) No.
Does the site discharge to a calcareous fen listed in Minn. R. 7050.0180, subp. 6.b.? If yes, a letter of approval from the Minnesota Department of Natural Resources must be obtained prior to application for this permit. (Part I B.6 and Part III.A.8) No.
Does the site discharge to a water that is listed as impaired for the following pollutant(s) or stressor(s): phosphorus, turbidity, dissolved oxygen or biotic impairment? Use the Special and Impaired Waters Search Tool at: www.pca.state.mn.us/water/stormwater/stormwater-c.html. If no, skip to next box. Does the Impaired water have an approved TMDL with an Approved Waste Load Allocation for construction activity? If yes: a. List the receiving water, the areas of the site discharging to it, and the pollutant(s) identified in the TMDL b. List the BMPs and any other specific construction stormwater related implementation activities identified in the TMDL. If the site has a discharge point within one mile of the impaired water and the water flows to the impaired water but no specific BMPs for construction are identified in the TMDL, the additional BMPs in Appendix A (C.1 and C.2) must be added to the SWPPP and implemented. (III.A.7). The additional BMPs only apply to those portions of the project that drain to one of the identified discharge points. Yes, The Zumbro is impaired under assessment unit 07040004-507 Fecal Coliform; Turbidity. The Cascade is impaired under assessment unit 07040004-581: Turbidity.

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TRAINING (III.A.3)

Training is required for all permitted projects after February 1, 2010. It must be provided by entities with expertise in erosion prevention, sediment control or permanent stormwater management. Training must be focused on the individual's job duties as they relate to the permit requirements (Part III.A.2). Who must be trained?

Individual(s) preparing the SWPPP for the project

Individual(s) overseeing the implementation of, revising and amending the SWPPP and individuals performing inspections required by the permit

Individuals performing or supervising the installation, maintenance or repair of BMPs

Names of the personnel trained; dates of training; name of instructor(s) and entity providing training; content of training course or workshop (including number of hours of training)

Part III A 2 (c) Training documentation: Names and certification of the personnel associated with the project through the University of Minnesota, Minnesota Erosion Control Association,

ED 3001 Design of Construction Stormwater Pollution Prevention Plans. This two-day course is for personnel involved with the design of construction stormwater pollution prevention plans.

Name	Expire Date
Feine, Cal	May 31, 2016
Kelm, Russ	May 31, 2016
Horstmann, Al	May 31, 2016
Wallace, Ron	May 31, 2015

EM 2001 Construction Site Management. This two-day course is designed for those who supervise, run, or direct construction site operations, grading work, culvert replacement work, and bridge construction work.

Name	Expire Date	Name	Expire Date
Josh Fjetland	5/31/2016	Brian Monosmith	5/31/2014
Mike Glenzinski	5/31/2015	Dave Moore	5/31/2016
Tim Klein	5/31/2015	Kyle Schlink	5/31/2016
Mike Kraszewski	5/31/2014	Dave Trotter	5/31/2014
Dan Lybeck	5/31/2015	Dan Weber	5/31/2015

Certified Professional in Erosion and Sediment Control. A CPESC is a recognized specialist in soil erosion and sediment control. CPESCs have educational training, demonstrated expertise, experience in controlling erosion and sedimentation, and meet certification standards, exam given through EnviroCert International, Inc

Name	Company	Cert Date
Kraszewski, Mike	City of Rochester	Mar 21, 2014

SELECTION OF A PERMANENT STORMWATER MANAGEMENT SYSTEM (III.C)

Will the project create a new cumulative impervious surface greater than or equal to one acre? □ Yes X No

If yes, a water quality volume of ½ inch of runoff from this area must be treated before leaving the site or entering surface waters (1 inch if discharging to special waters).

Describe which method will be used to treat runoff from the new impervious surfaces created by the project (III.C):

- Wet sedimentation basin
- Infiltration/Filtration
- Regional ponds
- Combination of practices

Include all calculations and design information for the method selected. See Part III.C of the permit for specific requirements associated with each method.

Water quality volume calculations:

If it is not feasible to meet the treatment requirement for the water quality volume, describe why. This can include proximity to bedrock or road projects where the lack of right of way precludes the installation of any permanent stormwater management practices. Describe what other treatment, such as grasses swales, smaller ponds, or grit chambers, will be implemented to treat runoff prior to discharge to surface waters. (III.C)

If proposing an alternative method to treat runoff from the new impervious surfaces, describe how this alternative will achieve approximately 80% removal of total suspended solids on an annual average basis (III.C.5). NOTE: If proposing an alternative method, you must submit your SWPPP to MPCA at least 90 days prior to the starting date of the construction activity.

Records Retention (III.D)

Describe your record retention procedures (must be kept at the site) (III.D). Records must include:

- Copy of SWPPP and any changes
- Training documentation (III.A.2.)
- Inspection and maintenance records
- Permanent operation and maintenance agreements
- Calculations for the design of temporary and permanent stormwater management systems.

An inspection log will be kept on-site and will include the results of all inspections. The schedule for the inspections is a minimum of once every 7 days and within 24 hours of a rainfall exceeding 0.5" in 24 hours.

Erosion Prevention Practices (IV.B)

Describe construction phasing, vegetative buffer strips, horizontal slope grading, and other construction practices to minimize erosion. Delineate areas not to be disturbed (e.g., with flags, stakes, signs, silt fence, etc.) before work begins.

See Construction Erosion Control/Turf Establishment Plans. All disturbed soils will be seeded, mulched, anchored, and fertilized within 7 days as per NPDES Permit Appendix A Section C.1.

General Sequencing:

1. Install silt fence, inlet protection, or Biorolls at locations around the perimeter as shown on the plans.

2. Keep abutting property owners informed in advanced when areas are going to be disturbed.
3. Install Tree Protection
4. Clear and grub, utility removals.
5. Install temporary sediment basin/sediment trap outlet if trench dewatering discharge as necessary and according to the discharge permit.
6. Trench excavate and backfill for installation of utilities. The Contractor shall conduct extreme care for the excavation of soils on this project to maintain soil separation of the naturally occurring soil Horizon or Layers. This is to allow for the soils in the different horizons to be restored to their native layers. In addition at least 6 inches of topsoil shall be salvaged and reinstalled as a top dressing in seeding areas and 3 inches in sodded areas.
7. Construct embankment.
8. Construct curb and gutter
9. Pave.
10. right of way areas will be hydro-seeded with a Commercial Seed mix No 260 or sod, Ditch areas will receive erosion control sod, stabilization mats, erosion control blankets depending on slope, and seed mix no 310.
11. Other residential roadway right-of-way and Out lot areas disturbed on the project will be will be restored with Sod.
12. Restore driveways, pedestrian facilities, and boulevards.
13. Complete final vegetation restoration, hydro-seeding, and sod.

Describe temporary erosion protection or permanent cover used for exposed soil. All exposed soil areas must be stabilized as soon as possible but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently (part IV.B.2)

All disturbed soils will be seeded, mulched, anchored, and fertilized within 7 days. Some areas will be sodded and fertilized. For disturbed soil within 200 lineal feet of a surface water, rapid stabilization method 2 or 3 will be used. Rapid stabilization methods entail hydroseeding, mulching, and fertilizing within 7 days of soil disturbance.

For drainage or diversion ditches, describe practices to stabilize the normal wetted perimeter within 200 lineal feet of the property edge or point of discharge to surface water. The remaining portions of the temporary or permanent ditch or swale must be stabilized within 14 days after connecting to surface waters and construction in that portion of the ditch has temporarily or permanently ceased.

Describe other erosion prevention practices (list and describe).

Construction Staging is required to reduce exposed areas.

Sediment Control Practices (IV.C)

Describe sediment control practices used to minimize sediments from entering surface waters, including curb and gutter systems and storm drain inlets. At a minimum, these sediment control practices must include:

- Sediment controls for temporary or permanent drainage ditches and sediment basins that are designed as part of a treatment system
- Installation of check dams or other grade control practice to ensure sheet flow and prevent rills (for slope lengths greater than 75 feet with a grade of 3:1 or steeper).
- Sediment control practices on all down gradient perimeters prior to land disturbing activities.
- Storm drain inlet protection for all inlets.

- Silt fencing or other sediment control surrounding temporary soil stockpiles.
- Minimize vehicle tracking of sediments (e.g., stone pads, concrete or steel wash racks, or equivalent systems).
- Street sweeping of tracked sediment.
- Temporary sedimentation basins (see Part III.B).

Biorolls will provide sedimentation along the ditches; silt fence will encompass the remaining project to control sediment within the project area.

Inlet protection will control sediment at structures. Stabilized vehicle entrances will be constructed as shown on plans. Vegetation restoration and sodding will stabilize soils surfaces.

Timing:

1. Install silt fence prior to clear and grub operations.
2. Install inlet protection.
3. Water for dust control as needed.
4. Install Rapid Stabilization Method 3 within 7 days of finish grading by the Contractor.
5. Install permanent turf establishment within 7 days of finish paving operations.
6. Inform abutting property owners of care for permanent turf establishment.

DEWATERING AND BASIN DRAINING (IV.D)

Will the project include dewatering or basin draining? ☐ Yes X No

If yes, describe BMPs used so the discharge does not adversely affect the receiving water or downstream landowners.

The project **will not** include dewatering for the entire project. The Contractor shall be responsible for obtaining a Water Appropriation Permit from the Department of Natural Resources (DNR) if necessary. The Contractor will also be responsible for obtaining all other necessary permits and approvals, as well as all fees and documentation associated with the permits.

Additional BMPs for Special Waters and Discharges to Wetlands (Appendix A, Parts C and D)

Special Waters. Does your project discharge to special waters? X Yes ☐ No If no, skip to Wetlands section below.

If proximity to bedrock or road projects where the lack of right of way precludes the installation of any of the permanent stormwater management practices, then other treatment such as grassed swales, smaller ponds, or grit chambers is required prior to discharge to surface waters. Describe what other treatment will be provided.

Inlet protection and limited disturbed area involved in staging and maintenance of traffic.

Describe erosion and sediment controls for exposed soil areas with a continuous positive slope to a special waters, and temporary sediment basins for areas that drain 5 or more acres disturbed at one time.

Inlet protection and limited disturbed area involved in staging and maintenance of traffic

Describe the undisturbed buffer zone to be used (not less than 100 linear feet from the special water).

Describe how the permanent stormwater management system will ensure that the pre and post project runoff rate and volume from the 1, and 2-year 24-hour precipitation events remains the same.

No new impervious area is included in this reconstruction of an existing road, the impervious roadway actually become narrower with the traffic calming features

Describe how the permanent stormwater management system will minimize any increase in the temperature of trout stream receiving waters resulting in the 1, and 2-year 24-hour precipitation events.

No temperature changes are a result of the project.

Wetlands. Does your project discharge stormwater with the potential for significant adverse impacts to a wetland (e.g., conversion of a natural wetland to a stormwater pond)? ☐ Yes X No

If Yes, describe the wetland mitigation sequence that will be followed in accordance with Part D of Appendix A.

There are no wetlands on the project.

INSPECTIONS AND MAINTENANCE (IV.E)

Describe procedures to routinely inspect the construction site:

- Once every seven (7) days during active construction and,
- Within 24 hours after a rainfall event greater than 0.5 inches in 24 hours, and within seven (7) days after that.

Inspections must include stabilized areas, erosion prevention and sediment control BMPs, and infiltration areas.

Inspection and maintenance practices:

In addition to complying with the requirements of the NPDES permit, the Erosion Control (EC) Supervisor shall inspect erosion control measures on a weekly basis and after each 1/2" rain event. Inspections are required to be documented by the EC Supervisor. The City of Rochester shall create a job/permit on a website provided by the City (PermiTrack). Further, the City will provide the EC Supervisor with a permit number and access code for the job on the website.

The EC Supervisor shall:

a. Within ten (10) working days of receipt of the permit number and access code, enter the website and create a list of site erosion control practices that are proposed on the approved plan.
b. Within ten (10) working days of actual start of work – enter the website and document that the practices that have been installed in accordance with the approved plan.
c. Provide weekly and event driven erosion inspection documentation of the condition of the practices and note any repairs needed and actions taken.
d. Within ten (10) working days of completion of the project, enter the project and note that the project has been terminated and a notice of termination (NOT) has been submitted to the Minnesota Pollution Control Agency.
e. Upon written or verbal notice by an agent at the City of Rochester to the supervisor or the supervisor's designated representative regarding an erosion control action or repair needed to bring the site into compliance the supervisor shall have not less than 24 nor more than 72 hours to bring the project site into compliance and document those actions on the website. The time allotted to bring the site into compliance shall be noted on the notice.

Pollution Prevention Management Measures (IV.F)

Describe practices to properly manage and dispose of solid waste, including trash (IV.F.1)

As per NPDES Permit Part IV.F.1 all collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes will be disposed properly and comply with MPCA disposal requirements and MnDOT Specification 1717.A4.

Described practices to properly manage hazardous materials (IV.F.2).

As per NPDES Permit Part IV.F.2 Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with MPCA regulations.

Describe practices for external washing of trucks and other construction vehicles (IV.F.3)

As per NPDES Permit Part IV.F.3 External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff must be contained and waste properly disposed of. No engine degreasing is allowed on site.

Describe how are you going to provide a safe, leak proof, concrete washout on site (IV.F.4):

To be completed by contractor. Or follow:

1. External washing of trucks and construction vehicles will be limited to a defined staging area. Runoff will be contained and properly disposed of.
2. Engine degreasing is not allowed on site.
3. Concrete trucks are to wash out or discharge surplus concrete or drum wash water within a designated location away from stormwater drains and waterways.

Describe your spill prevention plan.

To be completed by contractor.

Describe measures to address sanitary and septic waste.

Sanitary and septic waste disposal will comply with the MPCA Septage Management Guidelines incorporating 40 CFR part 503.

Final Stabilization (IV.G)

Describe how you will achieve final stabilization of the site (IV.G).

See Erosion Control/Turf Establishment Plan sheets. Final stabilization will be achieved by,sodding and fertilizing. In other areas seeding, mulching, anchoring, and fertilizing will occur.

All soil disturbing activities at the site have been completed and all soils must be stabilized by a uniform perennial vegetative cover with a density of 70% over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions. All sediment must be removed from conveyance systems and ditches must be stabilized with permanent cover.

Prior to submission of the Notice of Termination (NOT), all temporary synthetic and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed on the portions of the site for which the Permittee is responsible. BMPs designed to decompose on site (such as some compost logs) may be left in place.

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

NOTICE TO CONTRACTOR
Storm Water Permit Application

The enclosed **Application for General Storm Water Permit for Construction Activity** must be completed (**Questions #4 and 15**) and mailed to:

Minnesota Pollution Control Agency
Metro District, Community and Area-wide Programs
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

The application fee of **$400.00**, payable to Minnesota Pollution Control Agency, must also be included with the Application.

NPDES Declaration

The enclosed **NPDES Declaration** must be completed and mailed with a copy of the above application, and your Contracts and Bonds, to the addresses below:

Russell Kelm, PE
Department of Public Works
201 4th St SE, Rm 108
Rochester, MN 55904-3740
Direct: (507) 328-2417

Mr. Steven Kirsch – DSAE
MnDOT – D6
Box 6177
2900 48th St. NW
Rochester, MN 55903-6177

This **National Pollution Discharge Elimination Declaration** shall be executed by the bidder:

STATE OF MINNESOTA)
) ss.
CITY OF AUSTIN)

I, _____, do state under penalty of perjury
(*name of the person signing this declaration*)
under 28 U.S.C. 1746 of the laws of the United States:

(1) that I am the authorized representative of _____

_____,
(*name of the person, partnership or corporation submitting this proposal*)
and that I have the authority to make this declaration for and on behalf of said bidder;

(2) that in connection with this proposal, the said bidder has completed the required **Application For General Storm Water Permit for Construction Activity** (aka National Pollution Discharge Elimination (NPDES) permit);

(3) that the application fee and completed application have been sent to the Minnesota Pollution Control Agency;

(4) that I have fully informed myself regarding the accuracy of the statements in this declaration.

Signed: _____ _____
(bidder or authorized representative) *Date*

APPLICATION FOR GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY (MN R100001):

Permit No: MN R100001

Complete your application online!

Minnesota Pollution Control Agency

Application for General Stormwater Permit for Construction Activity (MN R100001)

National Pollutant Discharge Elimination System / State Disposal System (NPDES/SDS)

Please submit to: Minnesota Pollution Control Agency
Construction Stormwater Permit Program
520 Lafayette Road North, St. Paul, MN 55155-4194

PLEASE READ: This form is for new permit applications only. Use the Notice of Termination/Permit Modification form to transfer permit coverage for a project or a portion of a project to a new owner/contractor. Forms are available at the MPCA's Construction Stormwater Web site: www.pca.state.mn.us/water/stormwater/stormwater-c.html. Complete your application online!

Please refer to the application instructions and the NPDES/SDS General Stormwater Permit for Construction Activity (MN R100001) as you complete this form. Brackets '[ ]' refer to specific parts of the permit. For assistance, call the Stormwater Program at 651-757-2119 or toll-free at 800-657-3804.

Are you ready to apply?

1. Stormwater Pollution Prevention Plan (SWPPP)

a. Has a Stormwater Pollution Prevention Plan been developed for this project and incorporated into the project's plans and specifications [Part III.A] — ☒ Yes ☐ No

b. If an environmental review was required for this project or a common plan of development or sale that includes this project, has the environmental review been completed and all stormwater mitigative requirements been incorporated in the SWPPP as required in Part III.A.6 of the permit? — ☐ Yes ☐ No ☒ NA

2. Discharges to Special or Impaired Waters

a. If any portion of the project has a discharge point within 1 mile of a special water or a water that is impaired for sediment or a sediment related parameter (see Appendix A.B), does the SWPPP contain the additional requirements found in Appendix A, Part A-C? If the project does not have a discharge point within 1 mile of a special water or a water that is impaired for sediment or a sediment related parameter of the permit indicate "NA" — ☒ Yes ☐ No ☐ NA

b. If this project is discharging to a Calcareous fen, has an approval letter been obtained from the DNR as required in Part III.A.8 of the permit? — ☐ Yes ☐ No ☒ NA

STOP if you responded 'No' to any question above. A SWPPP must be developed prior to submitting a permit application. Complete the above requirements and check 'Yes' before submitting this application. Continue if you responded 'Yes' or 'NA' to all questions above.

3. Additional Application Review:

a. Will the project include alternative treatment methods? [Part III.C.5] If yes, this application and the alternative treatment plans must be submitted a minimum of 90 days before construction starts. — ☐ Yes ☒ No

b. If yes, are the plans attached? — ☐ Yes ☐ No

c. Will the project disturb 50 acres? AND Is there a discharge point within one mile of an impaired or special water whose discharge may reach an impaired or special water listed in Appendix A of the permit? [Part II.B.1.b] If yes, this application and the SWPPP must be submitted a minimum of 30 days before construction starts. — ☐ Yes ☒ No

d. If 'Yes,' is the SWPPP attached? — ☐ Yes ☐ No

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Permit No: MN R100001

4. Application Fee:

Is the required $400 Application Fee (payable to the MPCA) enclosed? ☐ Yes

Construction Activity Information

5. Project name: J7215 Reconstruct 1st St SW from 6th Ave SW to 11th Ave SW

6. Project location:

a. Briefly describe where the construction activity occurs (For example: "Intersection of 45th St. and Irving Ave.") Include address if available: 1st St SW from 6th Ave SW to 11th Ave SW

b. All cities where project will occur: Rochester

c. All counties where project will occur: Olmsted

d. All townships where project will occur: Rochester

e. Project ZIP Code: 55904

f. Latitude and longitude of approximate centroid of project:

Latitude: 44.0225 ° N (decimal) *Preferred* *Longitude:* 92.4745 ° W (decimal) *Preferred*

__°__'__ N (degrees, minutes, seconds) __°__'__ W (degrees, minutes, seconds)

g. Method used to collect latitude and longitude:

☐ GPS

☐ USGS Topographic map — Map scale: _____

☒ Other

7. Project size:

Number of acres to be disturbed to the nearest quarter acre: 3.30

8. Project map:

A map must be included with the application for all projects disturbing 50 acres or more. Is a project map included? ☐ Yes ☐ No

9. Project type:

☐ Residential ☐ Residential / Road construction ☐ Other:

☐ Commercial / Industrial ☐ Commercial / Road construction

☒ Road construction ☐ Commercial / Residential / Road construction

10. Cumulative impervious surface:

a. Existing area of impervious surface in acres: 2.0

b. Post-construction area of impervious surface in acres (If additional new impervious surface created by the project is less than one acre, skip to Question 12): 2.0

Permit No: MN R100001

11. Permanent stormwater management:

- ☐ Wet sedimentation basin
- ☐ Infiltration / filtration
- ☐ Regional ponding
- ☐ Other (Use only if there is no feasible way of installing the treatment systems listed above for reasons such as lack of right-of-way or proximity to bedrock)
- ☐ Alternative methods (If using alternative methods, construction cannot commence until receiving approval from the MPCA.)

12. Receiving waters:

Identify surface waters within one mile of project boundary that will receive storm water from the site or discharge from permanent Stormwater management system. Include waters shown on USGS 7.5 minute quad or equivalent, all Special Waters and Impaired waters identified in Appendix A of the permit (To find Special or Impaired Waters, use the Special and Impaired Waters Search tool at www.pca.state.mn.us/water/stormwater/stormwater-c.html.

The Impaired Waters* list, also known as the Section 303(d) list can be found at http://www.pca.state.mn.us/water/tmdl/index.html Use additional paper if necessary.

* Impaired waters for the purpose of this permit are those identified as impaired for the following pollutant(s) or stressor(s): phosphorus, turbidity, dissolved oxygen, or biotic impairment

Name of water body	Type of water body (Ditch, pond, wetland, stream, river)	Special Water? See Stormwater Permit, Appendix A	Impaired Water? See Stormwater Permit, Appendix A
Zumbro River	River	☐ Yes ☒ No	☒ Yes ☐ No
Cascade Creek	Creek	☐ Yes ☒ No	☒ Yes ☐ No
		☐ Yes ☐ No	☐ Yes ☐ No
		☐ Yes ☐ No	☐ Yes ☐ No

13. Dates of construction

a. Start date: 07 / 08 / 13

b. Estimated Completion date: 10 / 28 / 13

STOP This form will not be accepted if the Owner and Contractor contact information sections, below, are BOTH not completed and signed. If the owner is also the contractor, or a contractor hasn't yet been selected, the owner must also fill out the contractor information section and sign again.

Permit No: MN R100001

Responsible parties — BOTH PARTIES MUST SIGN

Owner

City of Rochester			
Business or firm name			
Kelm	Russell	Design Engineer	
Last name	First name	Title	
rkelm@rochestermn.gov	507-328-2417		
E-mail	Phone (include area code)		
201 4th St SE, Rm 108	Rochester	MN	55904
Mailing address	City	State	ZIP Code
Nelson, Doug	dnelson@rochestermn.gov	507-328-2423	
Alternate contact name	E-mail	Phone (include area code)	

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or the persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the NPDES/SDS General Stormwater Permit Construction Activity (MN R100001) that authorizes stormwater discharges associated with the construction site identified on this form.

X Authorized signature: Russell J. Kelm Date: 06/14/13

This Application must be signed by:

- *Corporation: a principal executive officer of at least the level of vice-president or the duly authorized representative or agent of the executive officer if the representative or agent is responsible for the overall operation of the facility that is the subject of the permit application.*
- *Partnership or Sole Proprietorship: a general partner or the proprietor.*
- *Municipality, State, Federal or Other Public Agency: principal executive officer or ranking elected official.*

Contractor

Business or firm name			
Last name	First name	Title	
E-mail	Phone (include area code)		
Mailing address	City	State	ZIP Code
Alternate contact name	E-mail	Phone (include area code)	

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or the persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the NPDES/SDS General Stormwater Permit Construction Activity (MN R100001) that authorizes stormwater discharges associated with the construction site identified on this form.

X Authorized signature: _____ Date: _____

This Application must be signed by:

- *Corporation: a principal executive officer of at least the level of vice-president or the duly authorized representative or agent of the executive officer if the representative or agent is responsible for the overall operation of the facility that is the subject of the permit application.*
- *Partnership or Sole Proprietorship: a general partner or the proprietor.*

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ATTACHMENTS TO THE SPECIAL PROVISIONS

(2301) CONCRETE PAVEMENT (2013 VERSION)

MnDOT 2301 shall be deleted and replaced with the following:

2301.1 DESCRIPTION

This work consists of constructing portland cement concrete pavement on a prepared base.

The Department defines paving concrete to include concrete mainline, ramps, loops, integrant curb, shoulders, and curb and gutter placed adjacent to the concrete mainline with the same mixture used in the paving. Integrant curb is a curb constructed monolithically with the pavement.

For the purposes of concrete pavement, the Department defines a concrete plant as the following:

(1) A paving plant using dump or agitator trucks to haul concrete, or
(2) A certified ready-mix plant using truck mixers to haul concrete.

For concrete pavement incentives and disincentives, the Department defines a concrete plant as the following:

(1) A primary concrete plant providing the majority of the concrete to a paving project, and
(2) A secondary concrete plant providing any minor work or fill-ins not provided by the primary concrete plant.

Only one primary concrete plant per project is allowed unless otherwise approved by the Engineer. The Contractor may use a paving plant or a certified ready-mix plant as the primary concrete plant.

2301.2 MATERIALS

A Concrete 2461

A.1 Slipform Placement ..... Mix No. 3A21

A.2 Fixed Form Placement ..... Mix No. 3A41

B Coarse and Fine Aggregate Requirements

Test each aggregate fraction proposed for use in accordance with Table 2301-1:

Table 2301-1 Aggregate Testing Requirements	
Aggregate	**Testing Required**
Tested by Department in the last 3 years	No additional testing *
Not tested by the Department in the last 3 years	Preliminary aggregate testing in accordance with 2301.2.B.1, "Required Preliminary Aggregate Testing."
New source	New source concrete aggregate testing in accordance with 3126, "Fine Aggregate for Portland Cement Concrete," and 3137, "Coarse Aggregate for Portland Cement Concrete."
* Perform additional testing as required by the Engineer in conjunction with the Concrete Engineer.	

B.1 Required Preliminary Aggregate Testing

After the Department awards the Contract and as soon as coarse and fine aggregates are available for testing, contact the Engineer to coordinate preliminary sampling of aggregate for concrete paving. The Engineer, in conjunction with the Concrete Engineer, will sample and test the aggregate to verify specific gravity, absorption data, and aggregate quality. The Department will perform other tests as determined necessary by the Engineer, in conjunction with the Concrete Engineer.

B.2 Aggregate Alkali Silica Reactivity (ASR) Requirements for Concrete Mixes

The Department will test the designated fine aggregate for alkali silica reactivity (ASR) with Holcim, St. Genevieve, Type I/II portland cement and Lafarge, Davenport, Type I/II portland cement in accordance with ASTM C 1260 MnDOT Modified. If the fine aggregate contains an intermediate size aggregate such as "buckshot" or "pea rock" as determined by the Concrete Engineer, the Department will perform testing in accordance with ASTM C 1260.

The Concrete Engineer, in conjunction with the Engineer, will review the 14-day fine aggregate expansion test results to determine the acceptability of the proposed fine aggregate and cement combination in accordance with the 14-day fine aggregate expansion limits in Table 2301-2:

Table 2301-2 Fine Aggregate ASR Mitigation Requirements	
14-day Fine Aggregate Expansion Limits	**Mitigation Requirement**
≤ 0.150	The Department will accept the fine aggregate with or without a mitigator
$> 0.150 - 0.250$	Mitigate the fine aggregate with 35 percent slag or at least 20 percent fly ash
$> 0.250 - 0.300$	Mitigate the fine aggregate with 35 percent slag or 30 percent fly ash in accordance with 3115, "Fly Ash for Use in Portland Cement Concrete," modified with at least 66.0 percent $SiO_2 + Fe_2O_3 + Al_2O_3$ on a dry weight basis and at least 38.0 percent SiO_2
> 0.300	The Department will reject the fine aggregate

For fine aggregate and cement combinations previously tested by the Department, the Concrete Engineer will use the previous test results to determine necessary mitigation. The Contractor may contact the Department to access the list of previously tested fine aggregate sources.

If the fine aggregate and cement combination were not previously tested, the Concrete Engineer will use the higher expansion result of the two fine aggregate and cement combinations to determine necessary mitigation.

Add "buckshot" or "pea rock" as a separate aggregate in accordance with the quality requirements of 3137, "Coarse Aggregate for Portland Cement Concrete," except the Department will determine the shale content in accordance with AASHTO T 113 MnDOT Modified, "Lightweight Pieces in Aggregate," fine aggregate procedure. If this aggregate is from the same source as the ¾ in+ [19 mm+] or ¾ in– [19 mm–] aggregate, the Concrete Engineer will waive the requirements specified in 3137.2.D.3(b), "Carbonate in Class C Aggregate by Weight. If this aggregate is from sources other than the ¾ in+ [19 mm+] or ¾ in– [19 mm–] aggregate, approval is at the discretion of the Concrete Engineer.

The Concrete Engineer may reject the fine aggregate if mortar bar specimens exhibit an indication of external or internal distress not represented by the expansion results. The Concrete Engineer will make the final acceptance of the aggregate.

C Cementitious Materials

Design the concrete paving mixes in accordance with the following requirements for cementitious material:

(1) Total alkalis no greater than 0.60 percent in the portland cement (Na2O + 0.658 K2O)
(2) Total alkalis no greater than 5.0 lb per cu. yd [3.0 kg per cu.m] in the combined cementitious material
(3) At least 530 lb per cu. yd [315 kg per cu. m] minimum cementitious,
(4) At least 400 lb per cu. yd [237 kg per cu. m] of portland cement when using fly ash or at least 385 lb per cu. yd [228 kg per cu. m] when using slag as a portland cement replacement,
(5) Provide additional cementitious material to meet requirements in accordance with this section at no additional cost to the Department,
(6) Total cementitious material no greater than 600 lb per cu. yd [356 kg per cu. m] except for high-early strength mixes.
(7) Maximum of 33 percent substitution of Class C or Class F Fly Ash for concrete pavement, on a one for one basis, by weight of the designed portland cement;
(8) Maximum of 35 percent substitution of slag, on a one for one basis, by weight of the designed portland cement; and
(9) Ternary mixes (portland cement and two other supplementary cementitious materials) are allowed when approved by the Engineer, in conjunction with the Concrete Engineer, or required by or allowed in the Contract.

The Department defines high-early strength concrete as concrete with a cementitious content of greater than 600 lb per cu. yd [356 kg per cu. m].

The Contractor may use 100 percent portland cement for the cementitious material for high-early mixes, except if using quartzite or gneiss coarse aggregate provide high-early mixes in accordance with 2301.2.C.1, "Special Cementitious Requirements for Quartzite and Gneiss."

C.1 Special Cementitious Requirements for Quartzite and Gneiss

If providing coarse aggregate from sources identified by the Department as quartzite or gneiss and if the coarse aggregate does not meet the 0.04 percent expansion limit when tested in accordance with ASTM C 1293, replace the portland cement with the following:

(1) 30 % of a fly ash from the Approved/Qualified Products List in accordance with 3115, "Fly Ash for Use in Portland Cement Concrete," except provide fly ash in the concrete mixture with at least 66 percent $SiO_2 + Fe_2O_3 + Al_2O_3$ on a dry weight basis for at least 12 consecutive months and at least 38 percent SiO_2 content, or

(2) 35 % of a ground granulated blast furnace slag from the Approved/Qualified Products List.

D Concrete Mix Design Requirements

Design the concrete mix based on an absolute volume of 27 cu. ft ± 0.10 cu. ft [1.000 cu. m ± 0.003 cu. m] in accordance with the following:

(1) Fine aggregates complying with the requirements of 3126, "Fine Aggregate for Portland Cement Concrete," for aggregate quality,

(2) Coarse aggregates complying with the requirements of 3137, Coarse Aggregate for Portland Cement Concrete," for aggregate quality,

(3) Air content of 7.0 percent ±1.5 percent at the point of placement, and

(4) High-early concrete placed at a water-cementitious ratio not greater than 0.38.

Submit the concrete mixes using the MnDOT Contractor Mix Design Submittal Worksheet available on the Department's website at least 21 calendar days before the initial placement of concrete using the concrete mix design. For mix design calculations, the Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data.

The Concrete Engineer, in conjunction with the Engineer, will review the mix design submittal and approve the materials and mix design for compliance with the Contract.

The Contractor assumes full responsibility for the mix design and performance of the concrete.

The Engineer determines final acceptance of concrete for payment based on satisfactory field placement and performance.

D.1 Concrete Pavement < 3,500 cu. yd [2,900 cu. m]

If the estimated quantity of concrete pavement in the Contract is less than 3,500 cu. yd [2,900 cu. m], calculated by multiplying the planned pavement area by the planned pavement thickness, provide a mix design meeting the following requirements:

(1) Grade A paving concrete placed at a water/cement ratio no greater than 0.42;

(2) Fine aggregates with a gradation in accordance with Table 3126-3, "Fine Aggregate Gradation Requirements;"
(3) CA-15, CA-35, or CA-50 coarse aggregates with a gradation in accordance with Table 3137-4, "Coarse Aggregate Designation for Concrete;"
(4) Instead of item (2) and (3) of this list, provide a Job Mix Formula in accordance with 2301.2.D.3, "Job Mix Formula;" and
(5) The incentive/disincentives for aggregate quality, well-graded aggregate, and water/cement ratio as specified in 2301.2.D.4, "Concrete Pavement Incentives and Disincentives," shall not apply.

D.2 Concrete Pavement ≥ 3,500 cu. yd [2,900 cu. m]

If the estimated quantity of concrete pavement in the Contract is equal to or greater than 3,500 cu. yd [2,900 cu. m], calculated by multiplying the planned pavement area by the planned pavement thickness, provide a mix design meeting the following requirements:

(1) Grade A paving concrete placed at a water/cement ratio no greater than 0.40;
(2) Submit a Job Mix Formula in accordance with 2301.2.D.3, "Job Mix Formula;"
(3) For concrete produced at a secondary concrete plant or as otherwise allowed by the Engineer, the Contractor has the option to design a mix in accordance with 2301.2.D.1, "Concrete Pavement < 3,500 cu. yd [2,900 cu. m];" and
(4) The incentive/disincentives for aggregate quality, well-graded aggregate, and water/cement ratio as specified in 2301.2.D.4, "Concrete Pavement Incentives and Disincentives," shall apply to the primary concrete plant only,

D.3 Job Mix Formula

Use at least two fractions of coarse aggregate that include the ¾ in+ [19 mm+] and ¾ in− [19 mm−] fractions.

A Job Mix Formula (JMF) contains proportions of materials and individual gradations of each material plus a composite gradation. The Engineer will base the JMF on the combination of coarse and fine aggregate in accordance with Table 2301-3. The Department will waive the gradation requirements of 3126, "Fine Aggregate for Portland Cement Concrete," and 3137, "Coarse Aggregate for Portland Cement Concrete."

Table 2301-3
Job Mix Formula Working Range

Sieve Sizes	Working Range, %*
2 in [50 mm]	±5
1½ in [37.5 mm]	±5
1 in [25 mm]	±5
¾ in [19 mm]	±5
½ in [12.5 mm]	±5
⅜ in [9.5 mm]	±5
No.4 [4.75 mm]	±5
No.8 [2.36 mm]	±4
No.16 [1.18 mm]	±4
No.30 [600 µm]	±4
No.50 [300 µm]	±3
No.100 [150 µm]	±2

No.200 [75 μm]	≤ 1.6
* Working range limits of the composite gradation based on a moving average of 4 tests (N=4).	

Add fill-in sieves as needed during the testing process to prevent overloading. Provide combined aggregates with 100 percent passing the 2 in [50 mm] sieve and no greater than 1.6 percent passing the No. 200 [75 μm] sieve. In addition, each coarse aggregate fraction must comply with the Material Passing the No. 200 [75 μm] sieve requirement in row (i) of Table 3137-1.

Include working ranges based on the composite gradation of the sieves specified in Table 2301-3 with the JMF submittal.

Take samples at the belt leading to the weigh hopper or other locations close to the incorporation of the work as approved by the Engineer. The Engineer will determine the sampling location by using a random number chart and multiplying the random number by the sampling rate as defined in the Schedule of Materials Control. Test, and record the individual results.

The Engineer will randomly verify Contractor combined aggregate gradation results as defined in the Schedule of Materials Control.

If the quantities of concrete produced results in no gradation testing for any given day, include the untested quantity of concrete into the next day's production and include that quantity of concrete in the sampling rate. If the untested quantity is on the last day of production, add that quantity to the previous day's production.

D.3.a JMF Adjustments

If, during production, the moving average of QC aggregate gradation tests falls outside the allowable JMF working range, make adjustments within the limits specified in Table 2301-4 without submitting a new mix design as approved by the Engineer.

Table 2301-4
Allowable JMF Adjustments

Sieve Size	Allowable Adjustment, %
≥ No. 4 [4.75 mm]	±5
No. 8 [2.36 mm] – No.30 [600 μm]	±4
No. 50 [300 μm]	±3
No. 100 [150 μm]	±2

The Contractor may continue paving after submitting a new JMF with working range and aggregate volume adjustments to the Engineer. Submit all JMF adjustments on the MnDOT JMF Adjustments Worksheet available from the Department's website.

If the moving average of four tests falls outside of the adjusted allowable working range, stop production and provide a new mix design including JMF as directed by the Engineer, in conjunction with the Concrete Engineer.

D.4 Concrete Pavement Incentives and Disincentives

The Department will apply concrete mix incentives or disincentives for contracts using at least 3,500 cu. yd [2,900 cu. m] of concrete, calculated by multiplying the planned pavement area by the planned pavement thickness, of paving concrete.

The Department will only apply incentives or disincentives for materials provided or produced by the Contractor's primary concrete plant.

The Department will not provide water/cement ratio incentive payments for high-early mixes. The Department will only apply water/cement incentives or disincentives for concrete hauled in dump trucks, agitator trucks, or both.

If the Contractor adds water to the pavement surface without approval by the Engineer, the Department will not pay water/cement or ride incentives on sections where the water is added and the Engineer may reject the pavement in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

D.4.a Coarse Aggregate Quality Incentive/Disincentive

The Engineer will accept the coarse aggregate for paving concrete by statistical methods and in accordance with all other aggregate quality requirements of 2301, "Concrete Pavement," 2461, "Structural Concrete," and 3137, "Coarse Aggregate for Portland Cement Concrete."

The Coarse Aggregate Quality Incentive/Disincentive for CLASS B and CLASS C Aggregates will comply with the following:

The Engineer will take samples at the belt leading to the weigh hopper or other locations close to the incorporation of the work as determined by the Engineer. The Engineer will take samples in accordance with Table 2301-5:

Table 2301-5
Coarse Aggregate Quality Incentive/Disincentive Sampling Rates

Plan Concrete, cu. yd [cu. m]	Samples per Fraction (n)
3,500 – 7,500 [2,900 – 6,250]	3
7,501 – 10,000 [6,251 – 8,500]	5
10,001 – 25,000 [8,501 – 21,000]	10
25,001 – 50,000 [21,001 – 42,000]	15
> 50,000 [42,000]	20

The Engineer will consider the entire project as a single lot for each of the two fractions containing the highest percentage by weight. If the project is planned for construction over multiple years and before placing any concrete pavement, request that the Engineer calculate the incentive/disincentive payment on a yearly basis. The Engineer, in conjunction with the Concrete Engineer, will modify the sampling and testing rates as necessary.

The Engineer will establish a new statistical family for each change in aggregate source, fraction, or both.

The Engineer will randomly choose the acceptance samples.

The Engineer will divide a lot representing the plan cubic yards [cubic meters] of concrete by the number of samples to form sublots. The Engineer will multiply the number of cubic yards [cubic meters]

in a sublot by a random number to obtain the position in the sublot for the sample. The Engineer will split the samples and leave half of the sample for the Contractor. The Engineer's laboratory will test the samples and report the individual results. The Engineer will calculate a Quality Index (QI) for each fraction in accordance with the following:

$$QI = X + k(s)$$

Where:

$$X = \text{mean} = \sum \frac{X_i}{n}$$

X_i = individual test results

$$s = \text{standarddeviation} = \sqrt{\sum \frac{(x_i - x)^2}{(n-1)}}$$

k = Adjustment Factor based on the number of tests as shown in Table 2301-6:

Table 2301-6
Adjustment Factor "k"

k	No. of Tests
1.09	3
1.20	4
1.23	5
1.26	10
1.27	≥ 15

If Class A, Class B, and Class C aggregates meet the requirements as determined by the Engineer, the Department will provide payment based on a per fraction incentive in accordance with Table 2301-7.

Table 2301-7 Coarse Aggregate Quality Incentive/Disincentive		
Aggregate Class	**QI for Fraction, %**	**Structural Concrete per cu. yd [cu. m] Payment Change per Fraction**
Class A (including quartzite and gneiss)	—	$1.00 [$1.30]
Class B (based on % absorption)	≤1.00	$1.00 [$1.30]
	1.01 – 1.45	$0.50 [$0.65]
	1.46 – 1.76	$0.00
	1.77 – 1.85	–$1.00 [$1.30]
	≥ 1.86	As recommended by the Concrete Engineer, with coordination of the Engineer
Class C (based on % carbonate)	≤ 15.0	$1.00 [$1.30]
	15.1 – 24.0	$0.50 [$0.65]
	24.1 – 31.0	$0.00
	31.1 – 35.0	–$1.00 [$1.30]
	≥ 35.1	As recommended by the Concrete Engineer, with coordination of the Engineer

The Department will not pay incentives or disincentives for Class R aggregates.

If the concrete mixture contains at least three fractions of coarse aggregate, the Engineer will consider only the two containing the highest percentage by weight as eligible for incentive. The Contractor may combine at least two sub-fractions to form the ¾ in – [19 mm –] fraction for either the coarse or fine fraction of the coarse aggregate. Blend the sub-fractions by weight. The Engineer will base the maximum incentive for aggregate quality on the two largest fractions by weight.

The Department will pay for Coarse Aggregate Quality Incentive/ Disincentive for all paving concrete, including water/cement ratio concrete, and high-early concrete provided by the Contractor's primary paving plant.

D.4.b Water/Cement (w/c) Ratio

Provide and place concrete with a water/cement ratio not to exceed 0.40. Make any adjustments immediately when the water/cement ratio exceeds 0.40.

The Department will not make incentive payments for water/cement ratio on high-early mixes.

Do not add water to the surface of the concrete to aid in finishing without the approval of the Engineer. Supply sufficient trucks to ensure a steady forward progress of the paver.

The Department will determine the water/cement ratio for concrete hauled in dump or agitator trucks (concrete hauled in truck mixers are not eligible for w/c ratio incentives) in accordance with the following:

D.4.b(1) Water Content Determination

For a concrete paving batch plant, use an electronic meter approved by the Engineer to record the water, including temper water, added to the mix that is capable of printing the amount of total water on each batch ticket.

For a ready-mix plant, record the total water added to the mix, including temper water, on the computerized Certificate of Compliance.

The Engineer will determine the water content for calculating the water/cement ratio using the average water calculated from 10 batch tickets or Certificates of Compliances surrounding the randomly selected batch ticket sample (four previous tickets, ticket representing the random sample, and the five following tickets).

D.4.b(2) Water Content Verification

The Engineer will use plastic concrete taken at the plant site to verify the water content in the mix as determined in accordance with 2301.2.D.4.b(1), "Water Content Determination." Sample the plastic concrete as directed by the Engineer.

The Engineer will verify the water content in the plastic concrete mixture using the test procedure specified in AASHTO T 318-02, "Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying." The Engineer will begin the test within 45 min after the water has contacted the cement. Provide the microwave oven and the ancillary equipment as required by the Engineer to perform this test.

D.4.b(3) Cementitious Content Determination

The Engineer will determine the cementitious content for calculating the water/cement ratio using the average total cementitious calculated from 10 batch tickets or Certificates of Compliance surrounding the randomly selected batch ticket sample (four previous tickets, the ticket representing the random sample, and the five following tickets).

D.4.b(4) W/C Ratio Incentive/Disincentive

The Engineer will base the statistical analysis of acceptance for water/cement ratio in accordance with 2301.2.D.4.b(1), "Water Content Determination," and 2301.3.D.4.b(3), "Cementitious Content Determination," at a rate defined in the Schedule of Materials Control.

The Engineer will randomly choose acceptance samples. The Engineer will determine the sampling location by using a random number chart and multiplying the random number by the sampling rate as defined in the Schedule of Materials Control.

The Engineer will sample, test, and record the individual results.

If the quantities of concrete produced results in no Department moisture testing for any given day, include the untested quantity of concrete into the next day's production and include that quantity of concrete in the sampling rate. If the untested quantity is on the last day of production, add that quantity to the previous day's production.

Do not place concrete mix not meeting the 0.40 water/cement ratio requirement in the work. The Engineer may accept material not meeting the Contract requirements and the Department will pay for the work in accordance with Table 2301-8.

Table 2301-8 W/C Ratio Incentive/Disincentive	
W/C Ratio Test Result	**Payment incentive/disincentive per cu. yd [cu. m]**
≤ 0.37	+$3.00 [$3.90]
0.38	+$1.75 [$2.25]
0.39	+$0.50 [$0.65]
0.40	$0.00
0.41	–$0.50 [$0.65]
0.42	–$1.75 [$2.25]
0.43	–$3.00 [$3.90]
≥ 0.44	Determined by the Concrete Engineer

The Contractor may remove and replace concrete represented by water/cement ratios greater than 0.40. For concrete left in place with water/cement ratios greater than 0.40, if the level of payment is not defined in the table, the Engineer, in conjunction with the Concrete Engineer, will evaluate the material based on the adequacy of the material for the use intended. Remove and replace unsatisfactory concrete as determined by the Engineer at no additional cost to the Department.

D.4.c Well-Graded Aggregate Optional Incentive

The Engineer will use the Contractor's combined aggregate gradation test results, as verified by Department testing, to determine eligibility for the incentive.

The Contractor has two well-graded aggregate optional incentives available as follows:

(1) Percent Retained Gradation Band in accordance with Table 2301-9.

Table 2301-9 8-18 or 7-18 Percent Retained Gradation Band		
Sieve Size	**8-18 % Retained**	**7-18 % Retained**
2 in [50 mm]	0%	0%
1½ in [37.5 mm]	≤9%	≤9%
1 in [25 mm]	8–18%	7–18%
¾ in [19 mm]	8–18%	7–18%
½ in [12.5 mm]	8–18%	7–18%
⅜ in [9.5 mm]	8–18%	7–18%
No. 4 [4.75 mm]	8–18%	7–18%
No. 8 [2.36 mm]	8–18%	7–18%
No. 16 [1.18 mm]	8–18%	7–18%
No. 30 [600 µm]	8–18%	7–18%
No. 50 [300 µm]	≤13%	≤13%
No. 100 [150 µm]	≤8%	≤8%
No. 200 [75 µm]	≤8%	≤8%

(2) Gradation Zone II-A of the Coarseness Factor Chart in accordance with Table 2301-10.

Table 2301-10
Coarseness Factor Boundaries – Zone II-A

Coarseness Factor (CF) *	Workability Factor (WF) ‖
52	34–38
68	32–36

* Coarseness Factor (CF) is defined as follows:

$$CF = \frac{\text{Combined\% retained above 3/8 in [9.5 mm] sieve}}{\text{Combined\% retained above No.8 [2.36 mm] sieve}} \times 100$$

‖ Workability Factor (WF) is defined as follows:

WF = Combined % passing No. 8 [2.36 mm] sieve

The Engineer will use statistical analysis of the Contractor's combined aggregate gradation samples for well-graded aggregate on a lot basis representing one day's paving. The lot will represent the cumulative average of the sublot values on each sieve for the gradation band or the cumulative average of the sublot values of the coarseness factor and workability factor for the coarseness factor chart.

An optional incentive is available to the Contractor provided a concrete mixture is designed and produced with a well-graded aggregate gradation that meets one of the following in accordance with Table 2301-11. The Contractor may achieve only one of the optional incentives for any single lot.

Table 2301-11
Well-Graded Aggregate Optional Incentive

Gradation Options	Payment incentive/disincentive per cu. yard [cu. m]
8-18 Retained	$2.00 per cu. yd [$2.60 per cu. m]
7-18 Retained	$0.50 per cu. yd [$0.65 per cu. m]
Gradation Zone II-A	$2.00 per cu. yd [$2.60 per cu. m]

E Reinforcement Bars.....3301

F Dowel Bars.....3302

G Concrete Joint Sealers

G.1 Preformed Type.....3721

G.2 Hot-poured, Elastic Type.....3725

G.3 Silicone Type.....3722

H Preformed Joint Filler.....3702

I Curing Materials

I.1 Burlap Curing Blankets 3751

I.2 Poly-Alpha Methylstyrene (AMS) Membrane Curing Compound 3754

I.3 Linseed Oil Membrane Curing Compound 3755

I.4 Plastic Curing Blankets 3756

J Form Coating Material 3902

2301.3 CONSTRUCTION REQUIREMENTS

Use "slipform" as the standard construction method for concrete paving, unless otherwise specified in the Contract or allowed by the Engineer.

A.1 High-Early Strength Sections

For early use of the pavement as required by the Engineer, construct a section of pavement of high-early strength concrete in accordance with 2301.2.D, "Concrete Mix Design Requirements," at important road crossings, intersections, driveway entrances, or other locations as shown on the plans or directed by the Engineer. Take precautions to satisfactorily finish, cure, and protect high-early strength concrete pavements.

A.2 Operation and Supervision

Notify the Engineer at least 24 h before placing concrete to allow for inspection. Do not place concrete until the Engineer approves preparations for concrete placement. If the Contractor fails to notify the Engineer at least 24 h before concrete placement, the Engineer may not allow concrete placement in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

Provide paving operations supervision in accordance with 1506, "Supervision by Contractor." Provide an organizational chart listing names and phone numbers of individuals and alternates responsible for mix design, quality control administration, and inspection to the Engineer. Post the organizational chart in the Contractor's on-site facility.

Provide a manufacturer's manual explaining the operation and adjustments of the major pieces of power operated equipment used.

A.3 Plant Certification

Provide notice 16 hrs in advance of concrete paving production and in conjunction with the Engineer, perform a thorough on-site inspection of the concrete plant and complete MnDOT Form 2164, "Concrete Paving Plant Contact Report." Sign the report to certify compliance with the paving requirements and to certify review of the continual maintenance of the plant.

Calibrate and correlate the testing equipment in accordance with 2461.3.D, "Batching Requirements."

A.3.a Combination Plant Lab – Office Requirements

The Concrete Paving Contractor QC technicians and the Department QA technicians will equally share a combination plant lab – office during concrete paving.

For concrete paving projects in accordance with 2301.2.D.2, "Concrete Pavement ≥ 3,500 cu. yd [2,900 cu. m]," provide a separate combination plant lab – office in accordance with 1604, "Plant Inspection – Commercial Facility," except as modified by the following characteristics and requirements:

(1) Located at the plant site within 100 yd [91 m] from the batch plant or other location, as approved by the Engineer,
(2) Plant lab and plant office areas separated and isolated by a wall,
(3) Total plant lab-office floor area, based on exterior dimensions, of at least 224 sq. ft [21 sq. m],
(4) Plant lab floor area, based on exterior dimensions, of at least 144 sq. ft [13.5 sq. m],
(5) Plant office floor area, based on exterior dimensions, of at least 80 sq. ft [7.5 sq. m],
(6) Heating and cooling system capable of maintaining a uniform temperature between 72° and 85° F [22° and 29° C],
(7) Drinking water container or cooler with adequate supply of potable water,
(8) Detached portable toilet conveniently located,
(9) Electrical power supply that provides adequate amperage for all electrical needs,
(10) Water supply (storage tank with a capacity of 50 gal or more, or pressurized water supply) connected to the sink faucet,
(11) Provide a sample storage area to prevent contamination of the samples,
(12) Plant lab furnished in accordance with the following:
    (12.1) One sturdily-built workbench or countertop at least 30 in × 144 in [0.75 m × 3.65 m],
    (12.2) One service sink located near one end of the workbench with a water supply, faucet and an outside drain,
    (12.3) Shelf space above workbench or countertop or at other convenient locations, totaling at least 8 linear ft [2.5 m] × 8 in [0.2 m],
    (12.4) Electronic scales of sufficient size to weigh the samples for all required materials testing, and
    (12.5) A four (4) burner 30" standard electric stove top or stove and at least two (2) additional electric burners to perform required aggregate testing per the Schedule of Materials Control.
    (12.6) Microwave oven with turntable or wave deflection fan (900 Watt), heat resistant glass pan (approx. 9"x9"x2"), plain weave fiberglass cloth (10 oz/yd^2 and 14 mills thick), metal scrapper and grinding pestle,
    (12.7) Metal bowls of sufficient size to perform all required material testing,
(13) Plant office furnished in accordance with 2031.3.B.1, "Field Office Furnishings," except as modified by the following:
    (13.1) Two desks, one for the Department and one for the Contractor, with total exterior dimensions of at least 30 in × 60 in [¾ m × 1.50 m],
    (13.2) At least four (4) desk chairs,
    (13.3) A telephone capable of providing email, and

(13.4) A printer with scanning and copying capabilities.

For concrete paving projects supplied by a Certified Ready-Mix Plant, the separate Combination Plant - Lab Office requirements of 2301.2.A.3.a do not apply with the exception of the following:

(1) Electrical power supply that provides adequate amperage for all electrical needs,
(2) Water supply (storage tank with a capacity of 50 gal or more, or pressurized water supply) connected to the sink faucet,
(3) Electronic scales of sufficient size to weigh the samples for all required materials testing, and
(4) At least six (6) electric burners to perform required aggregate testing per the Schedule of Materials Control.
(5) Metal bowls of sufficient size to perform all required material testing,
(6) If w/c incentives apply, provide a microwave oven with turntable or wave deflection fan (900 Watt), heat resistant glass pan (approx. 9"x9"x2"), plain weave fiberglass cloth (10 oz/yd^2 and 14 mills thick), metal scrapper and grinding pestle,

Do not begin concrete paving operations until the Engineer approves the combination plant lab–office.

A.4 Sampling and Testing

Provide a MnDOT Certified Concrete Plant Level 2 Technician to oversee testing and plant operations and to remain on-site during concrete production or have cellular phone availability.

Provide technicians with certifications at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual. The Engineer will provide technicians with certifications at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual.

Perform testing in the accordance with the Concrete Manual and determine testing rates in accordance with the requirements of the Schedule of Materials Control. The Engineer performs testing in accordance with the Concrete Manual and determines testing rates meeting the requirements of the Schedule of Materials Control.

Take samples randomly using ASTM D 3665, Section 5.

A.5 Contractor Charting

Maintain and keep control charts current. Provide and display easily readable sized charts (letter-sized paper) on the testing facility wall or store in a 3-ring binder. Plot the following information on control charts using a method approved by the Engineer:

(1) Composite gradation,
(2) Air content (QC and QA),
(3) Moisture content of aggregates, and
(4) Water/cement ratio.

Also include the following information on the charts:

(1) Date,
(2) Time,
(3) Lot and sublot,
(4) Admixture dosage adjustments, and
(5) Other data necessary to facilitate control of the process.

Provide all reports, records, and diaries developed during the progress of construction activities to the Engineer. Provide all batch tickets and test results to the Engineer on a daily basis. The Engineer may suspend plant operations if the Contractor fails to provide daily test results.

A.6 MIT-SCAN T2 Non-Destructive Testing Device

The Contractor shall furnish a MIT-SCAN T2 non-destructive testing device having the ability to measure the location of concrete reinforcement, dowel bars and concrete pavement thickness in a single device. Agency and Contractor personnel shall mutually use this non-destructive testing device several times a day during concrete pavement construction.

The Contractor shall perform the following in the hardened concrete:

(1) For transverse joints the entire paved width
  (1.1) On first day, Scan one joint out of every five joints to verify dowel bar alignment and process.
  (1.2) If first day is acceptable, scan one joint out of every 500 feet as well as scan one joint out of every five joints on a 500 foot random segment each day for the remainder of the project.
  (1.3) If a joint is found to have dowel bars out of acceptable alignment tolerances, scan joints on both sides until alignments meets acceptable tolerances.
(2) For longitudinal L1T joints
  (2.1) On first day, scan 75 feet out of every 1000 feet, as well as scan one 500 foot random segment, to verify tie bar alignment and process.
  (2.2) If first day is acceptable, scan 75 feet out of every 5000 feet as well as scan one 500 foot random segment each day for the remainder of the project.
  (2.3) If a panel is found to have 2 or more tie bars missing or out of acceptable alignment tolerances, scan joints on both ends until 5 consecutive panels meets acceptable alignment tolerances.

Contact the Concrete Engineer for recommendations if alignment tolerances are not met.

Agency observations do not relieve the Contractor of the requirement to properly place the concrete reinforcement and dowel bars as shown in the plans. In addition, the Department reserves the right to reject the pavement in accordance with 1503, "Conformity with Plans and Specifications" and 1512, "Unacceptable and Unauthorized Work."

The Engineer will not provide additional payment for furnishing the above equipment for the Department's use.

B Subgrade and Aggregate Base Preparations

Prepare the subgrade and aggregate base in accordance with 2112, "Subgrade Preparation," and 2211, "Aggregate Base," and the following:

Fine grade the aggregate base to the shape and grade shown on the plans, allowing construction of the pavement to the thickness and cross section shown on the plans. Use an approved fine grading machine mounted on crawler tracks.

Shape and maintain the shoulders to allow surface water to drain away from the pavement and off the shoulders.

C Setting Forms

Provide forms meeting the following requirements and characteristics:

(1) Steel, straight edge sides,
(2) Depth equal to the pavement thickness shown on the plans,
(3) Smooth and free of localized indentations and deformities,
(4) Top face with deviations no greater than ⅛ in [3 mm] in any 10 ft [3 m] section,
(5) Faces of straight forms with deviations no greater than ¼ in [13 mm] in any 10 ft [3 m] section,
(6) Side forms containing no bends or damaged sides,
(7) Forms containing no damaged joint locks or pin pockets, and
(8) Form lengths at least 10 ft [3 m] long with horizontal joint and base width equal to the depth of the forms.

For pavements with radii no greater than 100 ft [30 m], use flexible or curved forms approved by the Engineer. Provide devices to securely set forms and withstand operation of the paving equipment without springing, settlement, or lateral displacement. Provide forms with joint locks to tightly join the ends of abutting form sections. Connect individual form sections using methods that create a continuous form.

Set the forms to the alignment and grade shown on the plans for a distance equal to at least 3 h ahead of concrete placement.

Compact the foundation before placing the forms in accordance with 2301.3.B, "Subgrade and Aggregate Base Preparations." Ensure the forms have a firm and uniform bearing over the entire base area, are tightly joined and securely staked, and are clean and free of accumulations of hardened concrete. Coat the contact faces of the forms with an approved form coating material in accordance with 3902, "Form Coating Material," before placing the concrete.

During a rain event, remove and reset the forms as necessary to allow drainage.

D Concrete Equipment and Paving Operations

Provide self-propelled spreading and finishing machines capable of consolidating and finishing the concrete, and producing a dense and homogeneous finished surface meeting the requirements specified in 2301, "Concrete Pavement."

D.1 Slipform Construction

Place concrete using a slipform paver or combination of pavers designed to spread, consolidate, screed, and float-finish the freshly placed concrete with minimum hand finishing. Provide a slipform paver with a non-oscillating extrusion plate with an adjustable angle of entry.

Place the concrete pavement before placing curb and gutter.

If the sequence of operations includes placing the curb and gutter before the concrete pavement, submit a jointing plan to the Engineer for approval before placing the curb and gutter.

Consolidate the full width and depth of concrete pavement placed by a single pass of a series of internal vibrators. Operate full-width vibrators from 3,600 VPM to 7,000 VPM [60 Hz to 117 Hz] in concrete, and from 4,150 VPM to 8,000 VPM [70 Hz to 133 Hz] when checked in air. Deliver the vibrator impulses directly to the concrete and operate at an intensity to consolidate the concrete uniformly throughout the entire depth and width of the concrete. The Contractor may increase the vibrator frequency as approved by the Engineer. Perform additional testing as directed by the Engineer at no additional cost to the Department. If the vibrator fails, suspend operations and remove unconsolidated concrete.

Regulate the rate of progress of the vibratory equipment and the duration of the application to fully, but not excessively, vibrate the concrete. If the forward progress of the paver stops, suspend the operation of vibrators.

Attach vibrators to spreading or finishing equipment. Do not allow vibrators to come in contact with preset dowel basket assemblies, the grade, pavement reinforcement, or side forms. Do not allow the operation of vibrators to cause separation or segregation of the mix ingredients, including the downward displacement of large aggregate or the accumulation of laitance on the concrete surface. The Contractor may reduce the vibration frequency within the specified range if reducing the forward progress of the paver to avoid segregation of the concrete mix. Connect the power to all vibrators so that they cease when the machine motion is stopped. Stop paving operations if a vibrator fails to operate within the range specified above.

Provide an electronic monitoring device meeting the following characteristics and requirements to display the operating frequency of each individual internal vibrator for concrete pavement placed by the slipform method:

(1) Contains a readout display near the operator's controls; visible to the paver operator and to the Engineer,
(2) Operates continuously as the paving machine operates,
(3) Displays all the vibrator frequencies with manual and automatic sequencing for each of the individual vibrators, and
(4) Records the following at least every 25 ft [7.62 m] of paving or at least every 5 min of time:
    (4.1) Clock time,
    (4.2) Station location,
    (4.3) Paver track speed, and
    (4.4) Operating frequency of individual vibrators.

Provide an electronic copy containing the record of data after the completion of the concrete paving operation. Provide vibration data daily as directed by the Engineer.

Operate the slipform paver with a continuous forward movement, and coordinate all operations of mixing, delivering, and spreading concrete to provide uniform progress with minimal stopping and starting of the paver.

Equip the paver with automatic grade control capable of maintaining both the elevation and longitudinal line shown on the plans at both sides of the paver by controlling the elevation of one side and controlling the crown, or by controlling the elevation of each side independently. Use an erected string line to achieve the grade reference.

Tightly stretch a wire or string line set parallel to the established grade for the pavement surface to achieve the grade reference. Set the control reference and support the line at intervals to maintain the established grade and alignment.

When constructing concrete overlays, set and use stringlines for grade control on both sides of the roadway during paving operations.

D.2 Fixed Form Construction

Place concrete using one or more machines to spread, screed, and consolidate between previously-set side forms. Accomplish vibration of these areas using hand-held or machine-mounted internal vibrators.

If not using an electronic monitoring device, use a tachometer or similar device to demonstrate to the Engineer that the paving equipment vibration meets the requirements in this section.

Use hand-held vibrators to consolidate concrete adjacent to side forms and fixed structures. Operate the hand-held vibrators at a speed of at least 3,600 VPM [60 Hz]. Do not allow the vibrator head to contact the joints, load transfer devices, reinforcement, grade, or side forms. If the vibrator fails, suspend operations and remove unconsolidated concrete.

Continue vibration to achieve adequate consolidation, without segregation, for the full depth and width of the area placed.

Provide an adequate number and capacity of machines to perform the work at a rate equal to the concrete delivery rate.

Strike-off concrete with a clary screed, unless otherwise approved by the Engineer. Finish small or irregular areas that are inaccessible to finishing equipment using other methods as approved by the Engineer.

Discontinue any operation that causes displacement of the side forms from the line or grade or causes undue delay, as determined by the Engineer, due to mechanical difficulties.

E Batching and Mixing

Batch and mix the concrete in accordance with 2461, "Structural Concrete," and the following:

E.1 Batching Requirements

Perform the initial spot check of the measuring equipment in accordance with the Concrete Manual for accuracy and sensitivity before starting production operations. Provide a copy of the inspection certificate to the Engineer.

Provide to the Engineer a computerized batch ticket that includes the following:

(1) Date,
(2) State project number (SP) or (SAP),
(3) Time concrete was batched,
(4) Quantity of concrete in this load,
(5) Running total of each type of concrete, each day for each project,
(6) Mix number,
(7) Labels identifying each material that correlates with the Contractor mix design, including cementitious and admixture abbreviations or MnDOT 5 digit pit numbers),
(8) Target weight of materials,
(9) Actual batched weights of materials,
(10) Temper water, and
(11) Total water weight.

If satisfactory finishing and curing of the pavement does not occur, as determined by the Engineer, suspend batching and mixing operations.

E.2 Concrete Ingredient Summaries

If delivering bulk cementitious materials directly to the concrete batching plant in railroad cars or sealed transport trucks, submit copies of the bill of ladings to the Engineer on the same day received from the transporting company.

Advise the Engineer of the method and schedule of cementitious material unloading. Do not unload cementitious materials until the Engineer approves the operation.

Each day of concrete pavement production, provide the Engineer with a production summary in an electronic format that includes the following:

(1) Daily total concrete produced in cubic yards for each concrete mixture type.
(2) Daily total ingredient quantities (aggregate, cementitious and water) including the percent overrun/underrun.

The Contractor shall provide final project total quantities for (1) and (2) to the Engineer at the end of the Project.

The Engineer will verify the following:

(1) Individual daily cement quantity do not show an underrun in cement usage greater than 1.0 percent of the quantity specified,
(2) The final cement quantity summary does not show an overall underrun greater than 1.0 percent, and
(3) If either one or both of these limitations are exceeded, the Engineer will not pay for the concrete represented at the Contract unit price.

The Engineer may reject defective concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," or the Department may pay for the defective concrete at an adjusted unit price at the same ratio to the Contract unit price as the quantity of cement used to the quantity of cement required less the allowable underrun. If the cement exceeds the limitations for individual cutoff and final cutoff, the Department may apply the price adjustment to the cutoff value that produces the greatest monetary deduction.

F Placing Concrete

Dump or discharge concrete without causing grade displacement or damage to the existing asphalt or bond breaker layer. Repair damage to the grade, existing asphalt or bond breaker layer as approved by the Engineer at no cost to the Department. Provide protection for turning concrete trucks.

Maintain the grade in a moist condition until placement of concrete.

Construct mainline pavement in a single layer of concrete. Place the concrete pavement in one complete pass of the paving machine to minimize the need for hand finishing.

Coordinate paving operations for mixing, delivering, spreading, and extruding the concrete to provide uniform progress of the paver. Use sufficient trucks to ensure a steady forward progress of the paver. If the forward movement of the paver stops for a period long enough to create a cold joint or honeycombing, construct a header joint in accordance with 2301.3.H.3, "Constructing Headers."

Do not add water to the surface of the concrete to aid in finishing without the approval of the Engineer.

When placing concrete on asphalt or asphalt bond beakers, comply with the following:

(1) Do not place concrete on an asphalt surface with an asphalt surface temperature greater than 120 °F [50 °C].
(2) Maintain the asphalt surface in a moist condition as necessary and at a surface temperature not greater than 120 °F [50 °C] before placing the concrete. The Engineer will allow the Contractor to apply water, whitewash of hydrated lime and water, or both to cool the asphalt surface, or other methods allowed by the Engineer.
(3) Before placing concrete on a milled asphalt surface, clean the milled surface by sweeping and patch as shown on the plans in accordance with 2231, "Bituminous Surface Reconditioning," or as directed by the Engineer.

When placing concrete adjacent to in-place concrete pavement, protect the following:

(1) All ends of transverse joints $^{3}/_{16}$ in [5 mm] or wider to the satisfaction of the Engineer. The Engineer will allow sawing through the existing joint when sawing the newly placed concrete, and

(2) The in-place pavement to prevent damage.

Do not allow the edges of the pavement, including longitudinal joints, to deviate from the line shown on the plans by greater than ½ in [13 mm] at any point.

Set manhole and catch basin frames or rings to the elevation shown on the plans during the paving operations.

F.1 Consistency

For slipform concrete pavement placement, place the concrete with a slump value that optimizes placement, except ensure the concrete does not slough or slump and is adequately consolidated and meets all other requirements of 2301, "Concrete Pavement." Maintain the concrete at a uniform consistency. The Engineer will not allow an edge slump greater than ⅛ in [3 mm] or irregular edge alignment.

For fixed form placement, place the concrete with a slump no greater than the maximum allowable slump in accordance with 2461.3.G.6, "Consistency."

F.2 Air Content

Maintain the air content of Type 3 paving concrete at the specified target of 7.0 percent ±1.5 percent of the measured volume of the plastic concrete before consolidation in accordance 1503, "Conformity with Contract Documents."

Make any adjustments immediately to maintain the desired air content.

Measure the air content after placement on the grade but before consolidation.

If using the slipform paving method, establish an air-loss correction factor (ACF) to determine the air content after consolidation once per half day of paving. Apply the ACF to tests taken before consolidation to estimate the air content after consolidation. Place concrete with an air content of at least 5.0 percent after consolidation.

Take the following actions for the following air content test results with the ACF applied or a test taken after consolidation:

(1) A single test (QC or QA) from 5.0 percent to 5.5 percent, adjust the mix design to obtain an air content greater than 5.5 percent without stopping production.
(2) Two consecutive tests (QC or QA) from 5.0 percent to 5.5 percent, make immediate adjustments to obtain an air content greater than 5.5 percent or stop production. Test every truck until the air content test results meet the requirements. Test at least three additional trucks after obtaining the correct air content.
(3) Any test (QC or QA) less than 5.0 percent, make immediate adjustments to obtain an air content greater than 5.5 percent or stop production. Test every truck until the air content meets the requirements. Test at least three additional trucks to ensure the concrete remains within compliance. Perform additional testing on the hardened concrete as required by the Engineer in conjunction with the Concrete Engineer.

F.2.a Non-Conforming Material

Only place Type 3 concrete meeting the air content requirements in the work. If the Contractor places Type 3 concrete not meeting the air content requirements into the work, the Engineer will not accept nonconforming concrete at the Contract unit price. For concrete not meeting the required air content, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the Contract pay item of the concrete in accordance with Table 2301-12. When there is not a separate structural concrete Contract unit price for a Contract item, the Department will reduce payment based on a concrete price of $60.00 per cu. yd [$78.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

Table 2301-12
Paving Concrete

Air Content Before Consolidation, %	Adjusted Contract Unit Price
>10.5	The Department will pay 75 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer.
>8.5 – ≤10.5	The Department will pay 95 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer
5.5 – 8.5	The Department will pay 100 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer
>4.5 – <5.5	The Department will pay 75 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer
>4.0 – ≤4.5	The Department will pay 25 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the surface is exposed to freeze-thaw cycling, coat the concrete with an epoxy penetrant sealer from the Approved/Qualified Products List.
≤ 4.0	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents" and 1512, "Unacceptable and Unauthorized Work" as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain place, the Engineer will not pay for the concrete and if the Engineer determines the surface is exposed to salt-brine freeze-thaw cycling, coat with an epoxy penetrant sealer from the Approved/Qualified Products List.

G Placing Reinforcement

Provide and place reinforcement meeting the following requirements and characteristics:

(1) Provide epoxy coated reinforcement in accordance with 2472, "Metal Reinforcement."
(2) Provide and place reinforcement bars including keyway bars, tie bars, taper steel, and stopper bars.
(3) Place keyways as shown on the plans.
(4) Provide and place supplemental pavement reinforcement as shown on the plans.

(5) Provide and place reinforcement bars on chairs, in stakes, utilizing tie bar basket assemblies or by appropriate equipment for depressing the bars to the specified location.

(6) For slipform paving, stake the tie bar steel to the roadbed, or use a mechanical device attached to the spreader or paver to place tie bar steel required for L1T joints as shown on the plans. Space and depress the tie bar steel to the depth and location shown on the plans. Do not place tie bars over a dowel bar assembly.

H Joint Construction

Unless otherwise shown on the plans, construct all joints perpendicular to the grade. Place dowel bars parallel to the grade and parallel to the centerline of the pavement.

H.1 Dowel Bar Placement

Provide dowel bar assemblies manufactured in single units for the lane widths shown on the plans, unless otherwise approved by the Engineer. Do not use more than two assembled sections in any one joint for ramps, loops, and tapered sections.

Secure the dowel bar assemblies to prevent movement during concrete placement in accordance with Standard Plate 1103 and the following:

(1) If placing dowel bar assemblies on asphalt or asphalt bond breaker layers, secure the assemblies with at least seven anchorage points. Place four of the anchorage points on the assembly side facing the front of the paver. Fasten the assemblies in accordance with the following:

(1.1) Place pins or fasteners of sufficient length and shank diameter of at least 0.177 in [0.45 cm] to penetrate through the asphalt bond breaker layer and into the concrete at least 1 in [25 mm] or at least 2 in [50 mm] into the in-place asphalt layer.

(1.2) Before paving, demonstrate the fastening method to the Engineer for approval.

Within 1 h before covering with concrete, coat the dowel bars with a thin uniform coating of a form coating material in accordance with 3902, "Form Coating Material."

Before placing the concrete, mark the location on both sides of each transverse joint as approved by the Engineer. Transfer the markings to the fresh concrete immediately after completing the final finishing operations.

The Contractor may use a mechanical dowel bar inserter to place dowel bars in the pavement as approved by the Engineer, in conjunction with the Concrete Engineer. Immediately before inserting the dowels, coat the dowels with a thin uniform coating of a form coating material in accordance with 3902, "Form Coating Material." If using a dowel bar inserter, initially and on each production day, demonstrate to the Engineer that the inserted dowel bars in the completed concrete pavement are parallel to the surface and centerline slab and are located at mid-depth of the slab thickness.

H.1.a Quality Control Plan for Dowel Basket Assemblies

Provide a Quality Control Plan in writing to the Engineer for acceptance that provides a method for keeping the dowel basket assemblies anchored to the existing asphalt or bond breaker layer and into the underlying concrete. The Quality Control Plan shall include the following at a minimum:

(1) Proposed type and number of fasteners
(2) Dowel basket assembly anchoring plan (ie. Anchored all basket assemblies prior to concrete placement, one lane at a time, anchor all basket assemblies during the concrete placement operation, etc.)
(3) Procedure if assemblies do not hold with the proposed method
(4) Sampling rate for locating basket assemblies with the MIT-SCAN T2

H.2 Joint Establishment

Space contraction joints at the intervals shown on the plans, except shorten the spacing at the following to provide panel lengths at least 5 ft [1.5 m]:

(1) Adjacent to header joints,
(2) Reinforced panels,
(3) Railroad grade crossings, and
(4) Free ends of pavement.

Provide either wet-cut saws referred to as "conventional concrete saws" or lighter weight dry-cut saws referred to as "early-entry concrete saws" capable of establishing joints sooner than the conventional saws.

Provide initial joint sawing as shown on the plans. Perform the initial sawing as soon as the concrete will support the joint sawing operation without raveling and before random cracking occurs.

Immediately after completing the joint sawing, use water under nozzle pressure to remove the sawing residue from each joint and the pavement surface.

If widening is necessary, do not widen the joints to full width until the concrete is at least 24 h old, or longer if the sawing causes raveling of the concrete.

Stake preformed joint filler material for expansion joints in place to maintain the position shown on the plans during concrete placement.

Extend transverse joints constructed in the pavement through the integrant curb.

H.3 Constructing Headers

Construct construction headers, temporary headers, and permanent headers as shown on the plans.

The Engineer will not allow incorporating any concrete accumulated in the grout box of the paver into the pavement. Construct all headers such that the concrete contained in the grout box is removed from the project. Use any approved construction header method as shown in the Standard Details.

Use internal vibration to consolidate the concrete along header joints before final finishing.

I Surface Finishing

Use a ⅜ in [10 mm] radius edging tool to finish edges of the pavement.

After consolidating, screeding, and floating the concrete, give the pavement surface a final finish texture in accordance with 2301.3.I.1, "Pavement Texture."

I.1 Pavement Texture

Pull a carpet drag or broom drag longitudinally along the pavement before the concrete attains its initial set to obtain the final finish. Mount the drag on a bridge. Provide a drag with the following dimensions:

(1) As wide as the concrete placed, and
(2) Longitudinal length with sufficient surface contact to produce a texture approved by the Engineer.

When using a carpet drag method, provide an artificial grass type carpeting for the carpet drag meeting the following characteristics and requirements:

(1) Molded polyethylene pile face,
(2) Blade length from ⅝ in to 1 in [15 mm to 25 mm], and
(3) Total weight of at least 70 oz per sq. yd [2.35 kg per sq. m].

The Contractor may use manual methods to achieve similar results on ramps and other locations as approved by the Engineer. The Contractor may use other texturing equipment to obtain an equivalent texture as approved by the Engineer.

Test the adequacy of the pavement skid resistance meeting the requirements of ASTM E 965-87, "Test Method for Measuring Surface Macrotexture Depth Using a Sand Volumetric Technique." Provide a texture depth of at least $^{1}/_{25}$ in [1.00 mm].

The Department defines a lot as pavement of a single lane. Establish a separate lot for each lane on the project.

The Department defines a sublot as the rate at which an individual measurement is taken over a given length. The Department considers a sublot as one lane wide, measured in accordance with the following:

(1) From the pavement edge to the adjacent longitudinal joint,
(2) From one longitudinal joint to the next, or
(3) In the absence of a longitudinal joint, between pavement edges.
(4) Each ramp and loop 18 ft [5.5 m] wide or less is considered a single lane.

The Engineer will break lots into sublots representing 1,000 linear ft [300 m] of pavement. Test the pavement surface at a point located transversely in the outside wheel path as determined by the Engineer. Test adjoining driving lanes at the same location. The Engineer will provide the Contractor with the locations using a random number multiplied by length of the sublot within 24 hours of pavement placement. If the project or individual lane results in less than three sublots, the Engineer will divide the project or individual lane lot into three sublots of equal length.

Complete surface texture testing no later than 48 h after pavement placement unless otherwise approved by the Engineer. Refer to Table 2301-13 for the acceptance criteria of texture depths below the

specification limits. If the Engineer determines by visual inspection, that areas not represented by random testing appear to not meet the minimum requirements of Table 2301-13, the Engineer reserves the right to require additional testing in those specific areas to determine compliance.

Table 2301-13
Pavement Texture Depth

Texture Depth Test Results for Individual Tests	Acceptance Criteria
$<{}^{1}/_{25}$ in to $\geq{}^{1}/_{32}$ in [<1.00 mm to ≥0.80 mm]	The Engineer will accept the work if the Contractor amends the operation to achieve the required depth of at least $^{1}/_{25}$ in [1.00 mm] as approved by the Engineer. If the Contractor fails to correct the operation, the Engineer will suspend the paving operation until corrections produce the required results.
$< {}^{1}/_{32}$ in [< 0.80 mm]	Perform concrete grinding of the pavement represented by this test to attain the necessary texture of $^{1}/_{25}$ in [1.00 mm] as required by the Engineer.

Run additional tests at 100 ft [30 m] intervals before and after the failing test location to determine the limits of any individual failing test.

J Concrete Curing and Protection

After completing final finishing operations, cure all exposed concrete surfaces. Use on of the following curing methods:

(1) Place the membrane curing compound conforming to 3754, "Poly-Alpha Methylstyrene (AMS) Membrane Curing Compound," or 3755, "Linseed Oil Membrane Curing Compound," within 30 minutes of concrete placement or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2301.3.J.1.a, "Membrane Curing Method." Place the membrane curing compound on the edges within 30 minutes after permanent removal of the forms or curing blankets, unless the Contract requires otherwise.

(2) Place plastic curing blankets or completely saturated burlap curing blankets in accordance with 2301.3.J.1.b, "Curing Blanket Method," as soon as practical without marring the surface.

Whenever weather conditions are such as to cause unusual or adverse placing and finishing conditions or equipment failures occur, expedite the application of a curing method or temporarily suspend the mixing and placing operations, as the conditions require.

If necessary to remove the coverings to saw joints or perform other required work, and if the Engineer approves, remove the covering for the minimum time required to complete that work.

Failure to comply with the above provisions will result in the Engineer, in conjunction with the Concrete Engineer, applying a monetary deduction in accordance with 1503, "Conformity with Contract Documents." When there is not a separate Contract unit price for Structural Concrete, the Department

will apply a monetary deduction of $30.00 per cu. yd [$39.00 per cu. m] or 50 percent of the Contractor-provided invoice amount for the concrete in question, whichever is less.

J.1 Curing Methods

J.1.a Membrane Curing Method

Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane curing compounds from freezing before application. Handle and apply the membrane curing compound in accordance with the manufacturer's recommendations.

Apply the curing compound in accordance with the following:

(1) At a rate of 1 gal per 150 sq. ft (1 L per 4 m^2) of surface curing area.
(2) Apply curing compound homogeneously to provide a uniform, solid, white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). If using a Department approved curing compound with a non white base color, apply the compound to provide a uniform, solid, opaque consistency meeting the intent of the requirement in this section.
(3) If the curing compound is damaged during the curing period, immediately repair the damaged area by re-spraying.
(4) If the Engineer determines that the initial or corrective spraying result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department.

Use the fully-automatic, self-propelled mechanical power sprayer approved by the Engineer to apply the curing compound in accordance with the following:

(1) Operate the equipment to direct the curing compound to the surface from two different lateral directions,
(2) Do not allow the sprayer to ride on the pavement surface,
(3) Ensure the sprayer covers the entire lane width and atomizes the curing compound, and
(4) If puddling, dripping, or non-uniform application occurs, suspend the operation to perform corrections as approved by the Engineer.

Use a fully automatic, self propelled mechanical power sprayer equipped with the following to apply curing compound as approved by the Engineer:

(1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,
(2) Separate filters for the hose and nozzle,
(3) Check valve nozzles,
(4) Multiple or adjustable nozzle system that provides for variable spray patterns,
(5) A shield to control loss of material by wind action, and
(6) A spray-bar drive system that operates independently of the wheels or track drive system.

For applying the curing compound on pavements that are 10 ft [3 m] wide or less and irregular shaped surfaces, the Engineer will allow an airless spraying machine that complies with the following:

(1) A re-circulating bypass system that provides for continuous agitation of the reservoir material,
(2) Separate filters for the hose and nozzle, and
(3) Multiple or adjustable nozzle system that provides for variable spray patterns.

J.1.b Curing Blanket Method

After completion of the finishing operations and without marring the concrete, cover the concrete with curing blankets. Install in a manner that envelops the exposed concrete and prevents loss of water vapor. After the concrete has cured, apply membrane curing compound to the concrete surfaces that will remain exposed in the completed work.

J.2 Protection Against Rain

Protect the concrete from damage due to rain. Have available, near the site of the work, materials for protection of the edges and surface of the concrete. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the rain-damaged concrete to 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

J.3 Protection Against Cold Weather

If the national weather service forecast for the construction area predicts air temperatures of 36 °F [1 °C] or less within the next 24 h and the Contractor wishes to place concrete, the Contractor shall submit a cold weather protection plan.

Protect the concrete from damage, including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken and may subject the damaged concrete to 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

J.3.a Cold Weather Protection Plan

Submit a proposed time schedule and plans for cold weather protection of concrete in writing to the Engineer for acceptance that provides provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the cold weather protection plans.

J.4 Vibratory and Backfilling Protection

Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 h. Resume vibratory and backfilling operations after the concrete has reached a minimum compressive strength of 2,000 psi [13.7 MPa] or a flexural strength of 250 psi [1.7 MPa]. Cast concrete control specimens in accordance with 2461.3.G.5, "Test Methods and Specimens." The Engineer will test the control specimens. If the Engineer discovers evidence of damaged concrete, the Engineer will suspend work until the Contractor corrects the work. The Engineer may reject damaged concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

The Contractor may use hand-operated concrete consolidation equipment, walk-behind vibratory-plate compactors, rollers in "static" mode, and fine grading machines 24 h after placing the concrete, and other equipment as approved by the Engineer, in conjunction with the Concrete Engineer.

K Removal of Forms

Do not remove side forms of pavement and back forms on integrant curb earlier than 12 h after placing the concrete, unless otherwise approved by the Engineer. Remove forms without exerting shock or strain, including temperature variations, on the pavement or curb. Cure concrete in accordance with 2301.3.J.1.a, "Membrane Curing Method."

L Joint Sealing

Provide a joint sealant in accordance with 3725, "Hot-Poured, Extra-Low Modulus, Elastic-Type Joint and Crack Sealer," unless the type of sealant for contraction joints is otherwise specified in the Contract.

If the concrete mixture contains Class B coarse aggregate as defined in 3137, "Coarse Aggregate for Portland Cement Concrete," do not seal joints with silicone.

Perform joint sealing as shown on the plans and in accordance with the following:

(1) Seal joints after the Engineer inspects and approves the joints;
(2) Perform joint sealing on surface dry concrete after cleaning the joints of debris, dirt, dust, and other foreign matter, including accumulations of concrete;
(3) Lightly sandblast the joint walls before final compressed air cleaning;
(4) Immediately before sealing the joints, clean the joints with a jet of compressed air under pressure of at least 85 psi [580 kPa];
(5) Seal transverse integrant curb joints with the same joint sealer used to seal the pavement joints;
(6) Seal joints in accordance with the tolerances shown on the plans;
(7) Provide backer rod material compatible with the sealer as shown on the plans; and
(8) Remove and replace sealer at joints filled above the permissible level shown on the plans at no additional cost to the Department.

Handle and place joint sealer material as recommended by the manufacturer and in accordance with the following requirements:

L.1 Hot-Poured Sealers

Heat hot-poured sealers in a double-boiler type kettle or melter. Fill the space between inner and outer shells with oil or other material as allowed by the manufacturer. Provide heating equipment with automatic temperature control, mechanical agitation, and recirculating pump. Use heating equipment as recommended by the manufacturer of the sealer material. Do not melt quantities of sealer material greater than the quantity used within the same day. After heating the sealer material to the application temperature, maintain the material temperature until placement. Place the sealer material within 4 h after the initial heating to the application temperature.

Apply sealant to the pavement at ambient pavement temperatures greater than 39 °F [4 °C].

L.2 Silicone Sealers

Install silicone sealers as recommended by the manufacturer.

L.3 Preformed Sealers

Provide preformed seals in one continuous length for each joint, except the Contractor may use butt splices in transverse joints at longitudinal joints.

Do not stretch the preformed sealer material in the installation process by greater than 5 percent of the joint length.

M Workmanship and Quality

M.1 Defective Pavement

The Department will pay for concrete pavement meeting the requirements and tolerances in accordance with this section at the Contract unit price. Pavement that fails to meet the minimum requirements when tested in the prescribed manner is considered defective. The Department may reject or adjust the payment for defective concrete pavement in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

The Engineer will determine the limits of each individual defective pavement area. If adjusting the price for defective payment, the Engineer will measure the area to the nearest whole square yard [square meter], except the Engineer will consider areas less than 1 sq. yd [1 sq. m] as 1 sq. yd [1 sq. m]. The Engineer will determine the condition of each individual defective area of pavement based on the calculation of greatest deficiency within the area.

M.2 Random or Uncontrolled Cracking

Repair or replace pavement with random or uncontrolled cracks as directed by the Engineer. If repairing the pavement as directed by the Engineer, use a dowel bar load transfer technique in accordance with the MnDOT Concrete Pavement Rehabilitation Details. Submit the intended repair technique to the Engineer for approval. Perform pavement repairs at no additional cost to the Department. If the repair fails, replace the pavement at no additional cost to the Department. The Engineer will accept repairs in accordance with 1516, "Acceptance."

M.3 Pavement Smoothness – IRI (International Roughness Index)

Provide concrete pavement smoothness in accordance with 2399, "Pavement Surface Smoothness."

N Thickness Requirements

Provide pavement with a finished pavement thickness as shown on the plans or as modified, in writing, by the Engineer.

N.1 Procedure

Construct pavement to the thickness shown on the plans. On each project and on each roadbed of a divided highway, evaluate pavement thickness in accordance with the following:

(1) Contractor Quality Control Probing (QCP),
(2) Probe Verification Core (PVC), and
(3) Quality Acceptance Core (QAC).

The Department defines plan thickness lot (PTL) as concrete pavement of the same thickness added together lineally. Establish a separate PTL for each concrete plan thickness on the project.

The Department defines a sublot as the rate at which an individual measurement is taken over a given length. The Department considers a sublot as one lane wide, measured in accordance with the following:

(1) From the pavement edge to the adjacent longitudinal joint;
(2) From one longitudinal joint to the next;
(3) In the absence of a longitudinal joint, between pavement edges; or
(4) The Department considers a single lane to be each ramp and loop 18 ft [5.5 m] wide or less.

The Engineer will divide the PTL into sublots of 4,000 lineal lane ft [3,300 lineal lane m] to determine the QCP, PVC, and QAC locations. The Engineer will add partial sublots less than 2,000 ft [1,650 m] to the previous lot. The Engineer will consider partial sublots equal to or greater than 2,000 lineal lane ft [1,650 lineal lane m] as individual sublots. If the PTL for the entire project is less than 4,000 lineal lane ft [3,300 lineal lane m] the Engineer will consider the PTL as an individual sublot.

The Engineer will identify the QCP, PVC, and QAC thickness measurement locations in accordance with the following:

(1) Determine the longitudinal locations using random numbers multiplied by length of the sublot;
(2) Determine the transverse offset locations using a random number multiplied by the width of the traffic lane, ramp, or loop at the determined longitudinal location; and
(3) Adjust the location to ensure the Contractor takes no measurements within 1 ft [0.3 m] of the pavement edge and takes no measurements within 2 ft [0.60 m] of any transverse or longitudinal joint or other obstructions.

N.2 Contractor Quality Control Probing (QCP)

Measure the pavement thickness of freshly finished concrete pavement at a rate of at least four QCP measurements per sublot. Notify the Engineer before performing probing thickness measurements in the plastic concrete so they may inspect or observe the Contractor's QCP tests during the paving operations.

Provide daily summary reports listing the results of the day's QCP thickness measurements and additional probing results to the Engineer.

N.3 Contractor QCP Probing Equipment and Probing Method

Provide the following equipment as approved by the Engineer to perform QCP probing:

(1) Probing rod meeting the following characteristics and requirements:
  (1.1) Non-flexing,
  (1.2) Length capable of completely penetrating the pavement for measuring,
  (1.3) Utilizes a circular or square top plate,
  (1.4) Contains a centrally located hole in the top plate with a diameter allowing for easy maneuvering along the length of the probing rod, and
  (1.5) Fitted with a locking device fixing the angle between the top plate and the probing rod at 90 degrees when locked.
(2) Base plate meeting the following characteristics and requirements:
  (2.1) 10.5 in [267 mm] square 26 gage galvanized steel plates or 11.8 in [295 mm] diameter 28 gage high-strength steel circular plates, and
  (2.2) Rigid when in place, allowing the probing rod to be pushed against it without flexing.
(3) Work bridge meeting the following characteristics and requirements:
  (3.1) Spans the full width of the freshly laid concrete,
  (3.2) Supports a person, and
  (3.3) Height above the concrete allows for the use of the probing device.
(4) Tape measure accurate to nearest ⅛ in [even mm] and with a length capable of measuring the depth of penetration of the probing device into the plastic concrete pavement.

Perform probing in accordance with the following:

(1) Place the base plates at the randomly selected locations and anchor the plates to prevent movement during concrete placement. Mark the locations of the base plates to ensure ease of locating the plates after the paver has passed.
(2) Position the bridge at the selected locations to reach and locate each point.
(3) Assemble the probing device. Keeping the probing rod perpendicular to the pavement surface, insert the rod into the plastic concrete until the rod strikes the base plate.
(4) Slide the top plate down the probing rod until it contacts the pavement surface then lock to the probing rod.
(5) Withdraw the probing device.
(6) Measure the length of the probing rod inserted into the plastic concrete from the underside of the top plate to the end of the probing rod. Record this measurement to the nearest ⅛ in [even mm].

N.4 Quality Acceptance Testing – Coring

The Engineer will measure the pavement thickness of concrete for each sublot in accordance with the following:

(1) Probe Verification Core (PVC), and
(2) Quality Acceptance Core (QAC).

The Engineer will mark one of every four QCP measurement locations per sublot for a PVC. The Engineer will mark one QAC per sublot.

The Contractor will core the designated PVC and QAC locations.

N.5 PVC and QAC Coring Method

(1) Begin coring on concrete older than 7 days, when the control beams attain a flexural strength in accordance with Table 2301-1, or when the control cylinders attain a compressive strength of 3,000 psi [20.6 MPa]. Use 3U18 concrete or another concrete mix approved by the Engineer to fill the core holes within 72 h of coring at no additional cost to the Department. Provide traffic control for coring;

(2) Cut 4 in [100 mm] nominal diameter cores at marked locations. Lay the cores next to the holes in a curing condition. Protect the cores. Do not submit cores out of round, not perpendicular, or containing ridges;

(3) The Engineer will field measure the core thickness to the nearest ⅛ in [even mm], verify (Field ID Number) the cores, and record the field measurement on MnDOT Form 24327, "Field Core Report," or a computerized spreadsheet available on the MnDOT Concrete Engineering website;

(4) Pick up the cores, accompanied by the Engineer. Store the cores in a water tank heated from 60 °F to 80 °F [15 °C to 25 °C] at the Department field office. The Engineer will not require the storage of cores in a curing condition for concrete older than 28 days;

(5) The Engineer will transport the cores in a curing condition, unless older than 28 days, to the MnDOT Office of Materials and Road Research; and

(6) The MnDOT Office of Materials and Road Research will determine the pavement thickness by measuring the length of the PVC and QAC cores in accordance with the procedure on file at the MnDOT Office of Materials and Road Research. Following this procedure, the MnDOT Office of Materials and Road Research will use nine probes interconnected in a hydraulic linkage to obtain the average length of the core in one operation. The MnDOT Office of Materials and Road Research will record the core length to the nearest 0.05 in [1 mm].

N.6 Non-conforming thickness

The Department will base acceptance of the pavement thickness and price adjustment for deficient thickness on the combination of both lab measured PVC and QAC coring.

The Department defines the tolerance limit for pavement thickness as the plan thickness lot (PTL) minus ½ in [13 mm]. If the QCP measurement shows a thickness deficiency greater than PTL minus ½ in [13 mm], take a core at the location of the deficient QCP. If any core thickness measurement (PVC or QAC) shows a thickness deficiency greater than PTL minus ½ in [13 mm], consider the pavement defective and take exploratory cores as directed by the Engineer.

The Department defines the defective pavement area as the entire area surrounding the deficient core within a traffic lane and between acceptable cores. The Department considers the pavement acceptable in the remaining areas as the increment where the cores show a thickness deficiency no greater than PTL minus ½ in [13 mm].

Take the first exploratory cores at any location within 10 ft [5 m] on each side of the deficient thickness location and at the same distance from the pavement centerline. Take an additional exploratory core in the adjacent traffic lane if the concrete was placed in the same operation. If the length of each of the first exploratory cores is at least equal to the PTL minus ½ in [13 mm], the Engineer will not require additional cores from this location. If any cores do not fall within the PTL minus ½ in [13 mm], take additional exploratory cores at 25 ft [10 m] intervals and at the same distance from the pavement

centerline in the same lane as the original thickness measurement, as directed by the Engineer. Perform coring in the direction of the deficiency until obtaining a core with a length at least equal to the PTL minus ½ in [13 mm]. The Engineer will use exploratory cores to determine the extent of deficient pavement thickness for adjusting the Contract unit price or requiring pavement removal and replacement.

For cores showing a pavement thickness greater than the PTL minus ½ in to 1 in [13 mm to 25 mm], the Contractor may choose one of the following:

(1) Remove and replace the defective pavement area at no additional cost to the Department, or
(2) Leave the pavement in place with a monetary deduction of $20 per sq. yd [$25 per sq. m] for the defective pavement area, as approved by the Engineer.

For cores showing a pavement thickness greater than PTL minus 1 in [25 mm], the Engineer, in conjunction with the Concrete Engineer, will determine whether the Contractor will remove and replace concrete pavement or leave the pavement in place at no cost to the Department and apply a monetary deduction of $20 per sq. yd [$25 per sq. m] for the defective pavement area in accordance with 1503, "Conformity with Contract Documents."

The Engineer will use the PVC and QAC cores to determine the final average plan thickness lot (PTL), except for the following:

(1) If exploratory cores are taken to identify the defective pavement area, substitute the two outside exploratory cores that are within PTL minus ½ in [13 mm] for the deficient PVC or QAC.
(2) If the length of a PVC or QAC exceeds the PTL plus 0.30 in [8 mm], the Engineer will limit the core length to the PTL plus 0.30 in [8 mm].

The Engineer will consider the pavement thickness as conforming provided the deficiency of the final average PTL does not exceed PTL minus 0.10 in [3 mm].

If the final average PTL is deficient by more than the PTL minus 0.10 in [3 mm], the Department will pay for the pavement in the PTL at the Contract unit price less the monetary deductions in Table 2301-14, excluding areas of defective pavement:

Table 2301-14
Deductions for Thickness Deficiencies

Thickness Deficiency Exceeding Permissible Deviations, *in [mm]*	Adjusted Contract unit price per sq. yd [sq. m] of Payment
0.00 – ≤ 0.10 [≤ 3]	None (tolerance)
0.10 – ≤ 0.20 [3 – ≤ 5]	$0.20 [$0.25]
0.20 – ≤ 0.30 [5 – ≤ 8]	$0.40 [$0.50]
0.30 – ≤ 0.40 [8 – ≤ 10]	$0.70 [$0.90]
0.40 – ≤ 0.50 [10 – ≤ 13]	$1.00 [$1.25]
0.50 – ≤ 1.00 [13 – ≤ 25]*	$20.00 [$25.00]

* Perform exploratory coring as required by the Engineer.

After Department thickness verification, the Department will test all of the cores for compressive strength at 60 days of age. The Department will test three of the cores from the entire project for rapid chloride permeability (RCP) in lieu of compressive strength testing for information only.

O Opening Pavement to Traffic

Do not open a new pavement slab to general public traffic or operate paving or other heavy equipment on it for 7 days, or until the concrete has reached a minimum flexural strength meeting the requirements of Table 2301-15, or minimum compressive strength of 3,000 psi [20.6 MPa]; whichever occurs first.

If the pavement joints are widened, seal the joints before operating paving or other heavy equipment and general public traffic on the pavement.

Cast the control specimens in accordance with 2461.3.G.5, "Test Methods and Specimens." Cure the control specimens in the same manner and under the same conditions as the pavement represented. The Engineer will test the control specimens in accordance with 2461.3.G.5, "Test Methods and Specimens."

Table 2301-15
Minimum Strength Requirements for Opening Pavements to Construction and to General Public Traffic

Slab Thickness, *in [mm]*	Flexural Strength, *psi [MPa]*
≤7.0 [175]	500 [3.4]
7.5 [190]	480 [3.3]
8.0 [200]	460 [3.2]
8.5 [215]	440 [3.0]
9.0 [225]	390 [2.7]
≥ 9.5 [240]	350 [2.4]

Perform operations on new pavement as approved by the Engineer and in accordance with the following:

(1) When moving on and off the pavement, construct a ramp to prevent damage to the pavement slab.
(2) Operate the paving equipment on protective mats to prevent damage to the pavement surface and joints. Before placing the protective mats, sweep the pavement surface free of debris.
(3) Operate equipment on a slab without causing damage. If damage results, suspend operations and take corrective action as approved by the Engineer. Do not operate the equipment wheels or tracks within 4 in [100 mm] of the slab edge.

2301.4 METHOD OF MEASUREMENT

A Concrete Pavement

If the Contract includes the Contract item *Concrete Pavement* or *Concrete Pavement High Early*, the Engineer will measure in accordance with the following:

(1) Measure the concrete pavement placed to a uniform cross-section thickness by the surface area of the pavement as constructed, including integrant curb;
(2) Verify the pavement thickness based on the final measurement of cores;

(3) Include measurements for concrete pavement without regard to grade, strength, or type of concrete, width, or thickness of the pavement in a single measurement, except if the plans include a Contract item for high-early strength concrete; and

(4) Apply incentive or disincentive for *Concrete Pavement* based on the theoretical volume of concrete used by multiplying the measured square yard [square meter] of concrete by the thickness shown on the plans.

B Place Concrete Pavement

If the Contract includes the Contract item *Place Concrete Pavement*, the Engineer will measure in accordance with the following:

(1) Measure concrete pavement placed to a variable cross-section thickness by area based on specified dimensions, including integrant curb. This measurement will represent the surface area of the pavement as constructed.

(2) Verify the pavement thickness based on the lab measured cores.

B.1 Structural Concrete

If the Contract includes the Contract item *Structural Concrete* or *Structural Concrete High Early*, the Engineer will measure in accordance with the following:

(1) Measure structural concrete placed to a variable cross-section thickness by volume.

(2) Verify the volume measurements from the computerized batch ticket printouts from the plant, as verified by cement cutoffs and the consideration of any waste.

(3) Include the volume of all specified concrete pavements into a single item without regard to grade, strength, width, or thickness of the concrete pavement, except if the plans include a Contract item for high-early strength concrete.

(4) Apply incentives or disincentives for *Structural Concrete* based on the cubic yard [cubic meter].

C Supplemental Pavement Reinforcement

The Engineer will measure supplemental pavement reinforcement over culverts, storm sewers, and water mains, by weight.

D Expansion Joints

The Engineer will separately measure dowelled expansion joints of each design designation as shown on the plans by length along the joint line.

E Reinforcement Bars

The Engineer will not separately measure keyway bars, tie bars, taper steel, stopper bars, and other reinforcement bars.

F Integrant Curb

The Engineer will separately measure integrant curb of each design by length.

G Dowel Bars

The Engineer will measure dowel bars by the actual number of individual dowels placed. The Engineer will not measure dowels included in the Contract linear foot [meter] price for *Dowelled Expansion Joints, Design ___*.

H Concrete Coring

The Engineer will not separately measure the number of cores taken, identified, and delivered as required by the Contract or directed by the Engineer.

2301.5 BASIS OF PAYMENT

A Concrete Pavement

Unless the plans include a separate Contract item for work incidental to *Concrete Pavement*, the Contract square yard [square meter] price for *Concrete Pavement* includes the cost of constructing the pavement, including the cost of batch materials and mixing operations; plant-lab office; producing the concrete; fine grading; forming, including all headers; providing and installing keyway and keyway bars, tie bars, taper steel, stopper bars, and other reinforcement bars; delivering; depositing; placing; spreading; screeding; vibration monitoring; finishing; curing; protecting; sawing; and sealing the concrete.

If the plans include a separate Contract item for *Concrete Pavement High-Early* or if the Contractor requests high-early and the Engineer approves, the Department will not provide extra compensation for the production of high-early strength concrete. The Contract square yard [square meter] price for *Concrete Pavement High-Early* includes the cost of constructing the pavement, including the cost of batch materials and mixing operations; plant-lab office; producing the concrete; fine grading; forming, including all headers; providing and installing keyway bars, tie bars, taper steel, stopper bars, and other reinforcement bars; delivering; depositing; placing; spreading; screeding; vibration monitoring; finishing; curing; and protecting the concrete.

If the plans do not include a separate Contract item for *Concrete Pavement High-Early* and the Engineer orders high-early concrete, the Department will pay for the additional cement at a rate of the invoice cost plus 15 percent.

B Place Concrete Pavement

Unless the plans include a separate Contract item for work incidental to *Place Concrete Pavement*, the Contract square yard [square meter] price for *Place Concrete Pavement* includes the cost of constructing the pavement, including fine grading; forming, including all headers; providing and installing keyway and keyway bars, tie bars, taper steel, stopper bars, and other reinforcement bars; placing; spreading; screeding; vibration monitoring; finishing; curing; protecting; sawing; and sealing the concrete.

B.1 Structural Concrete

The Engineer will field calculate the volume of *Structural Concrete* and *Structural Concrete High Early* placed. Due to variations in the asphalt or asphalt bond breaker layer, the Contractor may request additional volume up to 102 percent of the Engineer's field calculated final volume of *Structural Concrete*, *Structural Concrete High Early*, or both for the entire project. The Engineer will verify additional volume of concrete from the computerized batch ticket printouts from the plant, with consideration of any waste. If the Engineer finds the Contractor's request for the additional final volume valid, the Engineer will pay for the additional volume up to 102 percent of the calculated quantity for the entire project. The Contract cubic yard [cubic meter] price for *Structural Concrete* and *Structural Concrete High-Early* includes the cost of producing, delivering, and depositing the concrete, including the cost of the batch materials, mixing operations, and the plant-lab office. If the plans include a separate Contract item for *Structural Concrete High-Early* or if the Contractor requests high-early and the Engineer approves, the Department will not provide extra compensation for the production of high-early strength concrete.

If the plans do not include a separate Contract item for *Structural Concrete High-Early* and the Engineer orders high-early concrete, the Department will pay for additional cement at a rate of the invoice cost plus 15 percent.

C Other Concrete Items

The Contract pound [kilogram] price for *Supplemental Pavement Reinforcement* includes the cost of providing and placing the metal reinforcement, including tie wires, supporting devices, and splicing.

The Contract linear foot [meter] price for *Dowelled Expansion Joints, Design* ___ includes the cost of constructing the joints complete in place as shown on the plans, including the costs of providing and placing dowel bar assemblies, filler, and sealer materials.

The Contract linear foot [meter] price for *Integrant Curb, Design* ___ includes the cost of forming and finishing the curb and protecting and curing the concrete.

The relevant Contract unit price for *Concrete Pavement* or *Place Concrete Pavement* includes the cost of coring, including the cost of material, labor, equipment, delivery, core hole filling, and traffic control.

The Department will pay for concrete pavement on the basis of the following schedule:

Item No.:	Item:	Unit:
2301.604	Concrete Pavement ___ in [___ mm]	square yard [square meter]
2301.604	Concrete Pavement ___ in [___ mm] High-Early	square yard [square meter]
2301.604	Place Concrete Pavement ___ in [___ mm]	square yard [square meter]
2301.511	Structural Concrete	cubic yard [cubic meter]
2301.513	Structural Concrete High-Early	cubic yard [cubic meter]
2301.608	Supplemental Pavement Reinforcement	pound [kilogram]
2301.603	Dowelled Expansion Joints, Design ___	linear foot [meter]
2301.538	Dowel Bar	each
2301.541	Integrant Curb, Design ___	linear foot [meter]

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(2360) PLANT MIXED ASPHALT PAVEMENT (2013 VERSION)

January 23, 2013

2360.1 DESCRIPTION

This work consists of constructing plant mixed asphalt pavement on a prepared surface.

Plant mixed asphalt pavement designed according to a gyratory mix design method for use as a pavement surface.

A Mixture Designations

The Department will designate the mixture for asphalt mixtures in accordance with the following:

(1) The first two letters indicate the mixture design type:
  (1.1) SP = Gyratory Mixture Design.

(2) The third and fourth letters indicate the course:
  (2.1) WE = Wearing and shoulder wearing course, and
  (2.2) NW = Non-wearing Course.

(3) The fifth letter indicates the maximum aggregate size:
  (3.1) A = ½ in [12.5mm], SP 9.5,
  (3.2) B = ¾ in [19.0mm], SP 12.5,
  (3.3) C = 1 in [25.0mm], SP 19.0, and
  (3.4) D = ⅜ in [9.5mm], SP 4.75.

(4) The sixth digit indicates the Traffic Level (ESAL's × 10^6) in accordance with Table 2360-1, "Traffic Levels."

Table 2360-1
Traffic Levels

Traffic Level	20 Year Design ESALs
2 *	< 1
3 ‖	1 – < 3
4	3– < 10
5	10 – ≤ 30
6	>30 (See SMA Provision)

NOTE: The requirements for gyratory mixtures in this specification are based on the 20 year design traffic level of the project, expressed in Equivalent Single Axle Loads (ESAL's) 1 × 10^6 ESALs

* AADT < 2,300

‖ AADT > 2,300 to < 6,000

(5) The last two digits indicate the air void requirement:

(5.1) 40 = 4.0 percent for wear mixtures, and

(5.2) 30 = 3.0 percent for non-wear and shoulder.

(6) The letter at the end of the mixture designation identifies the asphalt binder grade in accordance with Table 2360-2, "Asphalt Grades."

Table 2360-2
Asphalt Grades

Letter	Grade
A	PG 52 – 34
B	PG 58 – 28
C	PG 58 – 34
E	PG 64 – 28
F	PG 64 – 34
H	PG 70 – 28
I	PG 70 – 34
L	PG 64 – 22
M	PG 49 – 34

Ex: Gyratory Mixture Designation -- SPWEB540E (Design Type, Lift, Aggr. Size, Traffic Level, Voids, Binder)

2360.2 MATERIALS

A Aggregate

Use aggregate materials in accordance with 3139.2.

B .....Asphalt Binder Material 3151

C Additives

The Department defines additives as material added to an asphalt mixture or material that does not have a specific pay item.

Do not incorporate additives into the mixture unless approved by the Engineer. Add anti-foaming agents to asphalt cement at the dosage rate recommended by the manufacturer. The Contractor may add mineral filler in quantities no greater than 5 percent of the total aggregate weight. The Contractor may add hydrated lime in quantities no greater than 2 percent of the total aggregate weight. Do not add a combination of mineral filler

and hydrated lime that exceeds 5 percent of the total aggregate weight. Use methods for adding additives as approved by the Engineer.

C.1 .....Mineral Filler
.....AASHTO M 17

C.1.a Mineral Filler – Hydrated Lime

Provide hydrated lime for asphalt mixtures with no greater than 8 percent unhydrated oxides (as received basis) and meeting the requirements of AASHTO M 216. Use a method to introduce and mix hydrated lime and aggregate as approved by the Engineer before beginning mixture production.

C.2 Liquid Anti-Stripping Additive (Contractor Added)

If adding a liquid anti-strip additive to the asphalt binder, complete blending before mixing the asphalt binder with the aggregate. Only use liquid anti-strip additives that ensure the asphalt binder meets the Performance Grade (PG) requirements in 3151. The Contractor may use asphalt binder with liquid anti-strip added at the refinery or the Contractor may add liquid anti-strip at the plant site. If using asphalt binder with liquid anti-strip added at the refinery, ensure the supplier tests the binder and additive blend to confirm compliance with the AASHTO M 320. If an anti-strip agent is added at the plant, the plant mixed asphalt producer is considered a supplier and the binder must conform to the requirements of 3151. Do not pave until the asphalt binder and additive blend testing results meet the criteria in 2360.2.B, "Asphalt Binder Material."

C.2.a Mixture Requirements at Design

Design the mixture with the same asphalt binder supplied to the plant site using mixture option 1, "Laboratory Mixture Design" or mixture option 2, "Modified Mixture Design."

Provide documentation with either design option and include the amount of anti-strip needed to meet the minimum tensile strength requirements. Verify that the binder with the anti-strip meets the PG binder requirements for the mixture.

C.2.b Contractor Production Testing Requirements

Sample and test the asphalt binder and anti-strip blend daily. The Contractor may test the blend by viscosity, penetration, or dynamic sheer rheometer (DSR) of the blend. If the contract requires the use of a polymer modified asphalt binder in the mixture, use the DSR as the daily QC test.

Send the Engineer and MnDOT Chemical Laboratory Director a weekly QC report summarizing the results of the daily testing.

Perform at least one test bi-weekly per project to ensure the binder and anti-strip blend meets the requirements of AASHTO M 320. Send the test results to the Engineer and MnDOT Chemical Laboratory Director.

Provide asphalt binder and anti-strip blend field verification samples in accordance with 2360.2.G.7, "Production Test."

C.2.c Liquid Anti-Strip Additive Metering System

Include a liquid anti-strip flow meter and an anti-strip pump with the metering system. Connect the flow meter to the liquid anti-strip supply to measure and display only the anti-strip being fed to the asphalt binder.

Position the meter readout so that the inspector can easily read it.

Provide means to compare the flow meter readout with the calculated output of the anti-strip pump.

Provide a system that displays the accumulated anti-strip quantity being delivered to the mixer unit in gallons [liters] to the nearest gallon [liter] or in units of tons [metric tons] to the nearest 0.001 ton [0.001 tonne].

Calibrate and adjust the system to maintain an accuracy of ± 1 percent.

Calibrate each plant set-up before producing the mixture.

"Stick" the anti-strip tank at the end of the day's production to verify anti-strip usage quantities. The Engineer may require "sticking" on a daily basis.

Ensure the system has a spigot for sampling the binder and anti-strip after blending.

Use alternative blending and metering systems only when pre-approved by the Engineer.

C.3 ..... Coating and Anti Stripping Additive 3161

C.4 Warm Mix Asphalt (WMA)

WMA is allowed on all projects. Any mix that is produced at temperatures 30°F or lower than typical HMA mixing temperature of the asphalt binder, as defined by the asphalt supplier, is considered as WMA. The WMA can be manufactured through use of foamed asphalt and/or chemical additive processes. Notify the Engineer in advance of using any WMA additive or process. When chemical additives are used, provide the plant mixing and the laboratory mixing and compaction temperatures as recommended by the manufacturer of the additive.

D ..... Bituminous Tack Coat 2357

E Mixture Design

E.1 Submittal Location

Submit documentation and sample aggregate materials for review to the District Materials Laboratory.

E.2 Aggregate Quality

Provide aggregate in accordance with 3139.2.

E.3 Restrictions

Do not add aggregates and materials not included in the original mixture submission unless otherwise approved by the Engineer.

E.4 Responsibility

Design a gyratory mixture that meets the requirements of this specification in accordance with the following:

(1) MnDOT Laboratory Manual Method 1820,
(2) The Asphalt Institute's Superpave Mix Design Manual SP-2 (Use a 2 h short term aging period for volumetric), and
(3) The Laboratory Manual.

E.5 Type of Mixture Design Submittal

E.5.a Option 1 — Laboratory Mixture Design

E.5.a(1) Aggregate

Submit the aggregate samples for option 1, at least 15 working days before beginning production samples for quality testing. At least 30 calendar days before beginning asphalt production, submit samples of aggregates that require the magnesium sulfate soundness test to the District Materials Laboratory. Test the samples for quality of each source, class, type, and size of virgin and non-asphaltic salvage aggregate source used in the mix design. Retain a companion sample of equal size until the Department issues a Mixture Design Report. Provide 24 h notice of intent to sample aggregates to the Engineer. Provide samples in accordance with the following:

Table 2360-4
Aggregate Sample Size

Classification	Sieve	Weight
Virgin	Retained on No. 4 [4.75 mm]	80 lb [35 kg]
Virgin	Passing No. 4 [4.75 mm]	35 lb [15 kg]
Recycled asphalt pavement (RAP)	—	80 lb [35 kg]
Recycled asphalt shingles (RAS)	—	10 lb [5 kg] sample of representative RAS material

E.5.a(2) Mixture Sample

At least 7 working days before the start of asphalt production, submit the proposed Job Mix Formula (JMF) in writing and signed by a Level II Quality Management mix designer for each combination of aggregates to be used in the mixture. Include test data to demonstrate conformance to mixture properties as specified in Table 2360-7, "Mixture Requirements," and 3139.2, "Bituminous Aggregates." Use forms approved by the Department for the submission.

Submit an uncompacted mixture sample plus briquettes, in conformance with the JMF, compacted at the optimum asphalt content and required compactive effort for laboratory examination and evaluation. Provide a mixture sample size and the number of compacted briquettes and in accordance with the following:

Table 2360-5
Mixture Sample Requirements

Item	Gyratory Design
Uncompacted mixture sample size	75 lb [30 kg]
Number of compacted briquettes	2

E.5.a(3) Tensile Strength Ratio Sample

At least 7 days before actual production, submit sample to the District Materials Laboratory for verification of moisture sensitivity retained tensile strength ratio (TSR). The Engineer may test material submitted for TSR verification for maximum specific gravity G_{mm} compliance in addition to TSR results. The Engineer will reject the submitted mix design if the tested material fails to meet the G_{mm} tolerance. If the Engineer rejects a mix design, submit a new mix design in accordance with 2360.2.E, "Mixture Design." The Contractor may use one of the following options to verify that the TSR meets the requirements in Table 2360-7, "Mixture Requirements."

E.5.a(4) Option A

Batch material at the design proportions including optimum asphalt. Split the sample before curing and allow samples to cool to room temperature, approximately 77 °F [25 °C]. Submit 80 lb [35 kg] of mixture to the District Materials Laboratory for curing and test verification. Use a cure time of 2 h ±15 minutes at 290 °F [144 °C] cure time for both groups and follow procedures Laboratory Manual Method 1813.

E.5.a(5) Option B

Batch and cure in accordance with Option A. Compact, and submit briquettes and uncompacted mixture in accordance with Table 2360-6, "Option B Mixture Requirements."

Table 2360-6
Option B Mixture Requirements

Item	Gyratory Design
Un-compacted mixture sample size	8,200 g
Number of compacted briquettes*	6
Compacted briquette air void content	6.5 % – 7.5 %

* 6 in [150 mm] specimens.

For both options, cure for 2 h ±15 min at 290° F [144° C] meeting the requirements in the MnDOT Laboratory Manual Method 1813.

E.5.a(6) Aggregate Specific Gravity

Determine the specific gravity of aggregate in accordance with Laboratory Manual Methods 1204 and 1205.

E.5.b Option 2 — Modified Mixture Design

The Contractor may use the modified mixture design if testing shows that the aggregates meet the requirements of 3139.2 in the current construction season and if the Level II mix designer submitting the mixture design has at least 2 years experience in mixture design. The Department will not require mixture submittal.

E.5.b(1) Mixture Aggregate Requirements

Size, grade, and combine the aggregate fractions in proportions that are in accordance with 3139.2.

E.5.b(2) JMF Submittal

At least 2 working days before beginning asphalt production, submit a proposed JMF in writing to the District Materials Laboratory signed by a Level II Quality Management mix designer for each combination of aggregates. For each JMF submitted, include documentation in accordance with 2360.2.E.5.a, "Option1 – Laboratory Mixture Design," to demonstrate conformance to mixture properties as specified in Table 2360-7, "Mixture Requirements," and Table 3139-3, "Mixture Aggregate Requirements." Submit the JMF on forms approved by the Department.

E.5.b(3) Initial Production Test Verification

The Department will take a mix verification sample within the first four samples at the start of production of each mix type. The Engineer will notify the Contractor electronically when a sample is to be taken and tested for tensile strength ratio (TSR). Initial production testing will be done within the first 5,000 tons [4500 tonnes] of the start of production.

E.6 Mixture Requirements

The Department will base mixture evaluation on the trial mix tests and in accordance with Table 2360-7, "Mixture Requirements."

Table 2360-7
Mixture Requirements

Traffic Level	2	3	4	5
20 year design ESALs	< 1 million	1 – 3 million	3 – 10 million	10 – 30 million
Gyratory mixture requirements:				
Gyrations for N_{design}	40	60	90	100
% Air voids at N_{design}, wear	4.0	4.0	4.0	4.0
% Air voids at N_{design}, Non-wear and all shoulder	3.0	3.0	3.0	3.0
Adjusted Asphalt Film Thickness, minimum μ	8.5	8.5	8.5	8.5
TSR*, *minimum %*	75‖	75‖	80†	80†
Fines/effective asphalt	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2

* Use 6 in [150 mm] specimens in accordance with 2360.2.I, "Field Tensile Strength Ratio (TSR)."
‖ MnDOT minimum = 65
† MnDOT minimum = 70

E.7 Minimum Ratio of Added Asphalt Binder to Total Asphalt Binder

Control recycled materials used in mixture by evaluating the ratio of new added asphalt binder to total asphalt binder as show in Table 2360-8.

Table 2360-8
Requirements for Ratio of Added New Asphalt Binder to Total Asphalt Binder[1] min%:

Specified Asphalt Grade[2]	Recycled Material		
	RAS Only	RAS + RAP	RAP Only
PG XX-28, PG 52-34, PG 49-34, PG 64-22			
Wear	70	70	70
Non-Wear	70	70	65
PG 58-34, PG 64-34, PG 70-34			
Wear & Non-Wear	80	80	80

1. [1] The ratio of added new asphalt binder to total asphalt binder is calculated as (added binder/total binder) x 100
2. [2] The Contractor can elect to use a blending chart to verify compliance with the specified binder grade. The Department may take production samples to ensure the asphalt binder material meets the requirements. The blending chart is on the Bituminous Office Website.

E.8 .....Adjusted Asphalt Film Thickness (Adj. AFT)
.....MnDOT Laboratory Manual Method 1854

Ensure the adjusted asphalt film thickness (Adj. AFT) of the mixture at design and during production meets the requirements of Table 2360-7,"Mixture Requirements." Base the Adj. AFT on the calculated aggregate surface area (SA) and the effective asphalt binder content.

E.9 Documentation

Include the following documentation and test results with each JMF submitted for review:

(1) Names of the individuals responsible for the QC of the mixture during production,
(2) Low project number of the contract on which the mixture will be used,
(3) Traffic level and number of gyrations,
(4) The following temperature ranges as supplied by the asphalt binder supplier:
  (4.1) Laboratory mixing and compaction,
  (4.2) Plant discharge, and
  (4.3) Field compaction.
(5) The percentage in units of 1 percent (except the No. 200 sieve [0.075 mm] in units of 0.1 percent) of aggregate passing each of the specified sieves (including the No. 16, No. 30, No. 50, and No. 100) for each aggregate to be incorporated into the mixture. Derive the gradation of the aggregate from the RAP after extracting the residual asphalt.
(6) Source descriptions of the following:
  (6.1) Location of material,
  (6.2) Description of materials,
  (6.3) Aggregate pit or quarry number, and

(6.4) Proportion amount of each material in the mixture in percent of total aggregate.

(7) Composite gradation based on (5) and (6) above. Include virgin composite gradation based on (6) and (7) above for mixtures containing RAP/RAS.

(8) Bulk and apparent specific gravities and water absorption (by % weight of dry aggregate). Both coarse and fine aggregate, for each product used in the mixture (including RAP/RAS). Use MnDOT Laboratory Manual Method 1204 and 1205. The tolerance allowed between the Contractor's and the Department's specific gravities are G_{sb} (individual) = 0.040 [+4 and -4] and G_{sb} (combined) = 0.020.

(9) FHWA 0.45 power chart represented by the composite gradation plotted on Federal Form PR-1115

(10) Test results from the composite aggregate blend at the proposed JMF proportions showing compliance with Table 3139-3:

(10.1) Coarse Aggregate Angularity,

(10.2) Fine Aggregate Angularity, and

(10.3) Flat and Elongated

(11) Extracted asphalt binder content for mixtures containing RAP/RAS with no retention factor included.

(12) Asphalt binder percentage in units of 0.1 percent based on the total mass of the mixture and the PG grade.

(13) Each trial mixture design includes the following:

(13.1) At least 3 different asphalt binder contents (with at least 0.4 percent between each point), with at least one point at, one point above and one point below the optimum asphalt binder percentage.

(13.2) Maximum specific gravity for each asphalt binder content calculated based on the average of the effective specific gravities measured by using at least two maximum specific gravity tests at the asphalt contents above and below the expected optimum asphalt binder content.

(13.3) Test results on at least two specimens at each asphalt binder content for the individual and average bulk specific gravities, density, and heights.

(13.4) Percent air voids of the mixture at each asphalt binder content.

(13.5) Adj. AFT for each asphalt binder content.

(13.6) Fines to Effective Asphalt (F/A) ratio calculated to the nearest 0.1 percent.

(13.7) TSR at the optimum asphalt binder content.

(13.8) Graphs showing air voids, adjusted AFT, G_{mb}, G_{mm} and unit weight vs. percent asphalt binder content for each of the three asphalt binder contents submitted with trial mix.

(13.9) Evidence that the completed mixture will conform to design air voids (V_a), Adj. AFT, TSR, F/A_e (Fines to effective asphalt ratio).

(13.10) Gyratory densification tables and curves generated from the gyratory compactor for all points used in the mixture submittal.

(13.11) % new asphalt binder to total asphalt binder.

(14) The Contractor has the option of augmenting the submitted JMF with additional sand or rock. When using this option, provide samples of the aggregate for quality analysis in accordance with 2360.2.E.5, "Type of Mixture Design Submittal." Also provide mix design data for two additional design points per add-material. Provide one point to show a proportional adjustment to the submitted JMF that includes 5 percent, by weight, add-

material at the JMF optimum asphalt percent. Provide a second point to show a proportional adjustment to the submitted JMF that includes 10 percent, by weight, add material at the JMF optimum asphalt percent. Report the following information for each of these two points:

(14.1) The maximum specific gravity determined by averaging two tests,

(14.2) Test results showing the individual and average bulk specific gravity, density, and height of at least two specimens at the optimum asphalt binder content,

(14.3) Percent air voids for the mixture for each point,

(14.4) Fines to Effective Asphalt ratio calculated to the nearest 0.1 of a percent,

(14.5) Crushing of the coarse and fine aggregate,

(14.6) Adj. AFT, and,

(14.7) Up to two add materials will be allowed.

F Mixture Design Report

The Department will provide a Mixture Design Report consisting of the JMF. Include the following in the JMF:

(1) Composite gradation,

(2) Aggregate component proportions,

(3) Asphalt binder content of the mixture,

(4) Design air voids,

(5) Adj. asphalt film thickness, and

(6) Aggregate bulk specific gravity values.

Show the JMF limits for gradation control sieves in accordance with aggregate gradation broadbands shown in Table 3139-2, percent asphalt binder content, air voids, and Adj. AFT. If the Department issues a Mixture Design Report, this report only confirms that the Department reviewed the mixture and that it meets volumetric properties shown in Table 2360-7 and Table 2360-8. The Department makes no guaranty or warranty, either express or implied, that compliance with volumetric properties ensures specification compliance regarding placement and compaction of the mixture.

Provide materials meeting the requirements of the aggregate and mixture design before issuing a Mixture Design Report. The Department will review two trial mix designs per mix type designated in the plan per contract at no cost to the Contractor. The Department will verify additional mix designs at a cost of $2,000 per design.

Provide a Department - reviewed Mixture Design Report for all paving except for small quantities of material as described in 2360.3.G, "Small Quantity Paving."

For city, county, and other agency projects, provide the District Materials Laboratory a complete project proposal, including addenda, supplemental agreements, change orders, and plans sheets, including typical sections, affecting the mix design before the Department begins the verification process.

G Mixture Quality Management

G.1 Quality Control (QC)

The Contractor will perform Quality Control (QC) as part of the production process. QC is the process control of the operations related to mixture production and determining the quality of the mixture being produced. The QC sample is the Contractor's sample taken and tested during production and used to control the production process. Provide and maintain a QC program for plant mix asphalt production, including mix design, process control inspection, sampling and testing, and adjustments in the process related to the production of an asphalt pavement.

G.1.a Certification

Provide the following to obtain certification:

(1) Completed and submitted request form application for plant inspection.

(2) Site map showing stockpile locations.

(3) Signed asphalt plant inspection report showing the plant and testing facility passed as documented by Asphalt Plant Inspection Report (TP 02142-02, TP 02143-02). The inspection report must also include documentation showing plant and laboratory equipment has been calibrated and is being maintained to the tolerance shown in the Bituminous Manual and sections 1200, 1800, and 2000 of the MnDOT Laboratory Manual.

(4) A Department-signed Mixture Design Report (MDR) before mixture production.

G.1.b Maintaining Certification

Maintain plant certification by documenting the production and testing of the certified plant asphalt mixtures. Sample and test asphalt mixtures in accordance with this section and meeting the requirements of the Schedule of Materials Control.

G.1.b(1) Annual Certification

Perform annual certification after winter suspension.

G.1.b(2) Sampling Rate

Sample at the rate in accordance with 2360.2.G.6 and the requirements of the Schedule of Materials Control.

G.1.b(3) Plant Moved

Recertify the plant if the plant moves to a new or previously occupied location.

G.1.c. Plant Certification Revocation

The Engineer may revoke certification for any of the following reasons:

(1) If the mix does not meet the requirements of 2360.2.E.6, 2360.2.E7,and 3139.2,
(2) If there is a failure to meet the testing rates, or
(3) If it is determined records were falsified.

If the Engineer revokes plant certification, the Department may revoke the Technical Certification of the individual or individuals involved. The Department will maintain a list of companies with revoked certifications.

G.2 Quality Assurance (QA)

The Engineer will perform Quality Assurance (QA) as part of the acceptance process. QA is the process of monitoring and evaluating various aspects of the Contractor's testing as described below. The QA sample is the Department's companion sample to the Contractor's QC sample. QA testing is performed to accept the work. The Engineer will perform the following:

(1) Conduct QA and verification sampling and testing,
(2) Observe the QC sampling and tests,
(3) Monitor the required QC summary sheets and control charts,
(4) Verify calibration of QC laboratory testing equipment,
(5) Communicate Department test results to the Contractor's personnel on a daily basis, and
(6) Ensure Independent Assurance (IA) sampling and testing requirements are met.

If the Engineer observes that the Contractor is not performing sampling and quality control tests in accordance with the applicable test procedures, the Engineer may stop production until the Contractor takes corrective action. The Engineer will notify the Contractor of observed deficiencies promptly, both verbally and in writing.

The Engineer may obtain additional samples, at any time and location during production, to determine quality levels in accordance with 2360.2.G.3, "Verification Sample."

The Department will post a chart with the names and telephone numbers for the personnel responsible for QA.

The Engineer will calibrate and correlate laboratory testing equipment in accordance with the Bituminous Manual and Laboratory Manual.

Table 2360-9
Allowable Differences between Contractor and Department Test Results*

Item	Allowable Difference
Mixture bulk specific gravity (Gmb)	0.030

Table 2360-9 Allowable Differences between Contractor and Department Test Results*	
Item	**Allowable Difference**
Mixture maximum specific gravity (Gmm)	0.019
Adjusted AFT (calculated)	1.2
Fine Aggregate Angularity, uncompacted voids (U) %	1
Coarse Aggregate Angularity, % fractured faces (%P)	15
Aggregate Individual Bulk Specific Gravity (+ No. 4 [+4.75 mm])	0.040
Aggregate Individual Bulk Specific Gravity (- No. 4 [-4.75mm])	0.040
Aggregate combined blend Specific Gravity (Gsb)	0.020
Tensile strength ratio (TSR), %	Table 2360-7
Asphalt binder content:	
Meter method, %	0.2
Spot check method, %	0.2
Chemical extraction methods, %	0.4
Incinerator oven, %	0.3
Chemical vs. meter, spot check, or incinerator methods	0.4
Incinerator oven vs. spot check	0.4
Gradation sieve, % passing:	
1 in [25.0 mm], ¾ in [19.0 mm], ½ in [12.5 mm], ⅜ in [9.5 mm]	6
No. 4 [4.75 mm]	5
No. 8 [2.36 mm], No. 16 [1.18 mm], No. 30 [0.60 mm]	4
No. 50 [0.30 mm]	3
No. 100 [0.15 mm]	2
No. 200 [0.075 mm]	1.2
* Test tolerances listed are for single test comparisons.	

G.3 Verification Sample

The Department will test a minimum of one of the companion samples to the Contractor's QC samples and identify this as a verification sample. The Department's verification sample is used to assure compliance of the Contractor's QC program. The verification samples can be any one or all of the splits to the Contractor's QC samples. Additionally, the Department can take a random sample at any time from behind the paver or from the truck box and will consider this a verification sample. The split of this sample, given to the Contractor, must be tested by the Contractor and will replace the next scheduled QC sample. The Department recommends sampling enough material to accommodate retesting in case the samples fail.

The Department will perform verification testing on at least one set of production tests in accordance with 2360.2.G.6.b, "Production," and 2360.2.G.7, "Production Test," on a daily basis per mix type. Use the verification companion sample to verify the requirements of Table 3139-2, Table 3139-3, and Table 2360-7. Compare the verification companion sample to the verification sample for compliance with

allowable tolerances in Table 2360-9, "Allowable Differences between Contractor and Department Test Results." These include the mixture properties of G_{mm} (mixture maximum gravity), G_{mb} (mixture bulk gravity), asphalt binder content, Adjusted AFT (calculated), Coarse and Fine Aggregate crushing, and gradation. Perform one test per week on a verification companion for coarse and fine aggregate crushing meeting the requirements of 2360.2.G.7.g "Coarse Aggregate Angularity" and 2360.2.G.7.h, "Fine Aggregate Angularity." These do not include the aggregate bulk specific gravity G_{sb}, fines to effective asphalt, or the tensile strength ratio (TSR). Determine the asphalt binder content and gradation in accordance with the extraction method specified in 2360.2.G.7.a, "Asphalt Binder Content," or 23602.G.7.b, "Gyratory Bulk Specific Gravity.

The Contractor may access the Department's verification test results for G_{mm} (mixture maximum gravity), Gmb (mixture bulk gravity), air voids (calculated), asphalt binder content, within 2 working days from the time the sample is delivered to the District Laboratory. The Department will provide the gradation, crushing, and Adj. AFT (calculated) results to the Contractor within three working days. The Department will include the verification test results on the test summary sheet. The Department will compare the results with the Contractor's verification companion for the allowable tolerances in Table 2360-9, "Allowable Differences between Contractor and Department Test Results." The Department will consider the verification process complete if the Contractor's verification companion meets the tolerances in Table 2360-9.

If the tolerances between the Contractor's verification companion and the Department's verification sample do not meet the requirements of Table 2360-9, the Department will retest the material. If the retests fail to meet tolerances, the Department will substitute the Department's verification test results for the Contractor's results in the QC program and use those results for acceptance. The Department will only substitute the out-of-tolerance parameters and will recalculate volumetric properties if applicable.

If the Adj. AFT calculation does not meet the tolerance, equalize the Department Adj. AFT result by increasing the original Department value by 0.5 microns. Use the increased Department Adj. AFT for the Individual Adjusted AFT result and to calculate the Moving Average Adj. AFT results. The increased Department Adj. AFT will form the basis for acceptance.

If the verification sample retests do not meet tolerances, the Department will immediately investigate the cause of the difference that will include a review of testing equipment, procedures, worksheets, gyratory specimen height sheets, and personnel to determine the source of the problem. The Engineer may require both the Department and Contractor to perform at least one hot-cold comparison of mixture properties.

To perform a hot-cold comparison, split the sample into three representative portions. The Engineer will observe the Contractor testing. Immediately compact one part while still hot. Apply additional heating to raise the temperature of the sample to compaction temperature if necessary. Allow the second and third part to cool to air temperature. Retain the second part and transport the third part to the District Materials Laboratory. On the same day and at the same time as the District Materials Laboratory, heat samples to compaction temperature and compact. Develop a calibration factor to compare the specific gravity of the hot compacted samples to reheated compacted samples. Use at least two gyratory specimens for each test. The Engineer or the Contractor may request that this test be repeated.

Reheat mix samples to 160° F [70° C] to allow splitting of the sample into representative fractions for the various tests. Do not overheat the mixture portions used for testing maximum specific gravity test.

The Department will test the previously collected QA samples until they meet the tolerances or until the Department has tested all of the remaining samples. After testing the samples, the Department will test QA samples subsequent to the verification sample until tolerances are met. The Department will base acceptance

on QC data. The Department will base acceptance on QC data with substitution of Department test results for those parameters out of tolerance. Cease mixture production and placement if reestablished test results do not meet tolerances within 48 h. Resume production and placement only after meeting the tolerances. The process for dispute resolution is available on the Bituminous Office website.

If the Engineer analyzes the data using methods for determination of bias on file in the Bituminous Office and finds a bias in the test results, the Engineer will specify which results to use. If through analysis of data, it is determined that there is a bias in the test results, the Engineer will determine which results are appropriate and will govern.

G.4 Contractor Quality Control

G.4.a Personnel

Submit an organizational chart listing the names and phone numbers of individuals and alternates responsible for the following:

(1) Mix design,
(2) Process control administration, and
(3) Inspection.

Provide QC technicians certified as a Level I Bituminous Quality Management (QM) Tester meeting the requirements of the MnDOT Technical Certification Program for QC testing and Level II Bituminous QM Mix Designer to make process adjustments. Provide at least one person per paving operation certified as a Level II Bituminous Street Inspector.

Provide a laboratory with equipment and supplies for Contractor quality control testing and maintain with the following:

(1) Up-to-date equipment calibrations and a copy of the calibration records with each piece of equipment,
(2) Telephone,
(3) Fax and copy machine; however, the Engineer may waive the requirement to have a fax machine if internet and email are available,
(4) Internet and Email,
(5) Computer,
(6) Printer, and
(7) Microsoft Excel, version 2010 or newer

Laboratory equipment need to meet the requirements listed in Section 400 of the Bituminous Manual, Laboratory Manual, and these specifications, including having extraction capabilities. Before beginning production, the laboratory equipment needs to be calibrated and operational.

Calibrate and correlate all testing equipment in accordance with the Bituminous Manual and Laboratory Manual. Keep records of calibration for each piece of testing equipment in the same facility as the equipment.

G.4.b Sampling and Testing

Take QC samples at random tonnage or locations, quartered from a larger sample of mixture. Sample randomly and in accordance with the Schedule of Materials Control. Determine random numbers and tonnage or locations using the Bituminous Manual; Section 5-693.7 Table A or ASTM D 3665, Section 5, or, an Engineer approved alternate method of random number generation. Sample either behind the paver or from the truck box at the plant site. Other sampling locations can be approved by the Engineer. The Contractor must decide and notify the Engineer where samples will be taken before production begins. The Contractor and Engineer must both agree to a change of sampling location once production has begun. The procedure for truck box sampling is on the Bituminous Office website. The Contractor will obtain at least a 130 pound [60 kg] sample. Split the sample in the presence of the Inspector. The Inspector will retain possession of the Agency portion of each split sample that is taken and randomly submit a minimum of one sample, on a daily basis, to the District Laboratory for Verification testing (see 2360.2.G.3). Store compacted mixture specimens and loose mixture companion samples for 10 calendar days. Label these split companion samples with companion numbers.

If coarse and fine aggregate angularity are not evaluated for every QC sample retain the extracted gradation samples for the respective QC samples for additional testing. Keep the aggregate samples in containers with field identification labels for a period of 10 calendar days. The Engineer will identify which extracted gradation sample is the Verification Companion and whether it is to be tested for coarse and fine aggregate angularity.

G.5 Production Test Requirements

Determine the planned tonnage [metric tons] for each mixture planned for production during the production day. Divide the planned production by 1,000 and round to the next highest whole number. The result is the number of production tests required for the mixture. Table 2360-11, "Production Testing Rates" shows the required production tests.

Split the planned production into even increments and select sample locations as described above. If actual tonnage is greater than the planned tonnage, repeat the calculation above and provide additional tests if the calculation results in a higher number of production tests. During production, the Department will not require mixture volumetric property tests if mix production is no greater than 300 ton [270 tonne]. Provide production tests if the accumulative weight on successive days is greater than 300 ton [270 tonne].

If there is a choice of more than one MnDOT approved test procedure, select one method at the beginning of the project with the approval of the Engineer and use that method for the entire project. The Contractor and Engineer may agree to change test procedures during the construction of the project.

G.5a ..... Establishing an Ignition Oven Correction Factor
..... MnDOT Lab. Manual 1853 Appendix

On the first day of production, for each mixture type, both the Contractor and the Agency will establish an ignition oven correction factor from the produced mixture. Re-establish correction factors when:

There are aggregate or RAP substitutions

There are 3 or more tolerance failures on the extracted asphalt content between the Agency and the Contractor as defined by Table 2360-9, "Allowable Differences between Contractor and Department Test Results".

G.6 Production Testing Rates

G.6.a Start –Up

At the start of production, for the first 2,000 ton [1,800 tonne] of each mix type, perform testing at the following frequencies:

Table 2360-10 Production Start-Up Testing Rates			
Production Test	**Testing Rates**	**Laboratory Manual Method**	**Section**
Bulk Specific Gravity	1 test per 500 ton [450 tonne]	1806	2360.2.G.7.b
Maximum Specific Gravity	1 test per 500 ton [450 tonne]	1807	2360.2.G.7.c
Air Voids (calculated)	1 test per 500 ton [450 tonne]	1808	2360.2.G.7.d
Asphalt Content	1 test per 500 ton [450 tonne]	1853	2360.2.G.7.a
Add AC/Total AC Ratio (calculated)	1 test per 1000 ton [900 tonne]	1853	2360.2.G.7.a
Adj. AFT (Calculated)	1 test per 500 ton [450 tonne]	1854	2360.2.E.6.b
Gradation	1 test per 500 ton [450 tonne]	1203	2360.2.G.7.f
Coarse Aggregate Angularity	1 test per 1,000 tons [900 tonne]	1214	2360.2.G.7.g
Fine Aggregate Angularity (FAA)	1 test per 1,000 ton [900 tonne]	1206	2360.2.G.7.h
Fines to Effective Asphalt Ratio (calculated)	1 test per 500 ton [450 tonne]	1203 & 1853	2360.2.G.7.f & 2360.2.G.7.a

G.6.b Production

After producing the first 2,000 ton [1,800 tonne] of each mix type test at the following frequencies:

Table 2360-11 Production Testing Rates			
Production Test	**Sampling and Testing Rates**	**Test Reference**	**Section**
Bulk Specific Gravity	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1806	2360.2.G.7.b
Maximum Specific Gravity	Divide the planned production by 1,000. Round the number to the next higher whole number.	Laboratory Manual 1807	2360.2.G.7.c
Air Voids (calculated)	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1808	2360.2.G.7.d
Asphalt Content	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1853	2360.2.G.7.a
Add AC/Total AC Ratio (calculated)	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1853	2360.2.G.7.a
Adj. AFT (Calculated)	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1854	2360.2.E.7.e
Gradation	1 gradation per 1,000 tons [900 tonne], or portion thereof (at least one per day)	Laboratory Manual 1203	2360.2.G.7.f
Coarse Aggregate Angularity	2 tests per day for at least 2 days, then 1 per day if CAA is met. If CAA >8% of requirement, 1 sample per day but test 1 per week.	Laboratory Manual 1214	2360.2.G.7.g
Fine Aggregate Angularity (FAA)	2 tests per day for at least 2 days, then 1 per day if FAA is met. If FAA >5% of requirement, 1 sample per day but test 1 per week.	Laboratory Manual 1206	2360.2.G.7.h
Fines to Effective Asphalt Ratio (calculated)	Divide the planned production by 1,000. Round the number to the next higher whole number	Laboratory Manual 1203 & 1853	2360.2.G.7.f & 2360.2.G.7.a
TSR	As directed by the Engineer	Laboratory Manual 1813	2360.G.7.i
Aggregate Specific Gravity	As directed by the Engineer	Laboratory Manual 1204, 1205, and 1815	2360.G.7.j
Mixture Moisture Content	Daily unless otherwise required by the Engineer	Laboratory Manual 1855	2360.G.7.k

Table 2360-11 Production Testing Rates			
Production Test	**Sampling and Testing Rates**	**Test Reference**	**Section**
Asphalt Binder	Sample first load (each grade), then 1 per 250,000 gal sample size 1 qt [1,000,000 L]	MnDOT Bituminous Manual 5-693.920	2360.G.7.l

G.7 Production Tests

G.7.a Asphalt Binder Content

Spotchecks are required only when the Engineer has waived the requirements of 2360.2G8 relating to furnishing a computerized printout of the plant blending control system. A minimum of 1 spotcheck per day per mixture blend is required to determine the new added asphalt binder.

Use an incinerator oven meeting the requirements of the Laboratory Manual Method 1853. Do not use the incinerator oven if the percentage of Class B material is greater than 50 percent within the composite blend, unless the Contractor determines a correction factor approved by the Engineer.

Perform chemical extraction meeting the requirements of Laboratory Manual Method 1851 or 1852.

G.7.b Gyratory Bulk Specific Gravity, Gmb

Use two specimens to determine gyratory bulk specific gravity meeting the requirements of Laboratory Manual Method 1806. Set Gyratory to an internal angle of 1.16° ± 0.02° according to AASHTO TP 71.

G.7.c Maximum Specific Gravity, Gmm

Determine maximum specific gravity meeting the requirements of Laboratory Manual Method 1807.

G.7.d Air Voids – Individual and Isolated (Calculation)

Calculate the individual and isolated air voids meeting the requirements of Laboratory Manual Method 1808. Use the maximum mixture specific gravity and corresponding bulk specific gravity from a single test to calculate the isolated air voids. Use the maximum specific gravity moving average and the bulk specific gravity from a single test to calculate the individual air voids.

Compact gyratory design to N_{design} in accordance with Table 2360-7, "Mixture Requirements" for the specified traffic level.

G.7.e Adjusted Asphalt Film Thickness (AFT) (Calculation)

Calculate the Adj. AFT meeting the requirements of the Laboratory Manual Method 1854.

G.7.f Gradation – Blended Aggregate

Determine the gradation of blended aggregate sample, from an extracted bituminous mixture, meeting the requirements of Laboratory Manual Method 1203.

G.7.g Coarse Aggregate Angularity

Test the Coarse Aggregate Angularity (CAA) meeting the requirements of Laboratory Manual Method 1214 to determine the CAA on composite blend from aggregates used in production of hot mix asphalt. Ensure CAA test results meet the requirements in accordance with Table 3139-3.

The Contractor may test mixtures containing virgin aggregates from composite belt samples. Test mixtures containing RAP from extracted aggregates taken from standard production samples. Test the percentage of fractured faces of the composite aggregate blend less than 100 percent twice a day for each mixture blend for at least two days, then one test per day if the test samples meet the CAA requirements. If the CAA crushing test results are greater than 8 percent of the requirements, take one sample per day and perform one test per week.

Report CAA results on the test summary sheet. The Department may reduce payment in accordance with Table 2360-15, "Reduced Payment Schedule for Individual Test Results," for mixture placed and represented by results below the minimum requirement in accordance with Table 3139-3. The Department will calculate tonnage subjected to reduced payment as the tons placed from the sample point of the failing test to the sampling point where the test result meets the specifications.

G.7.h Fine Aggregate Angularity

Use Laboratory Manual Method 1206 to test the composite blend from aggregates used in production of asphalt mixtures for Fine Aggregate Angularity (FAA) meeting the requirements of Table 3139-3. The Contractor may test mixtures that contain virgin aggregates from composite belt samples. Test mixtures that contain RAP from extracted aggregates taken from standard production samples. Perform two tests per day for each mixture blend for at least two days to test the percentage of uncompacted voids from the composite aggregate blend, then one test per day if the samples meet FAA requirements. If FAA test results are greater than 5 percent of the requirement, take one sample per day and one test per week.

Report FAA results on the test summary sheet. The Department may reduce payment in accordance with Table 2360-16, "Reduced Payment Schedule for Individual Test Results," for mixture placed and represented by results below the minimums in accordance with Table 3139-3. The Department will calculate tonnage subjected to reduced payment as the tons placed from the sample point of the failing test to the sampling point where the test result meets the specifications.

G.7.i ..... Field Tensile Strength Ratio (TSR)
..... Laboratory Manual Method 1813

If the Engineer requires sampling and testing of the mixture to verify tensile strength ratio (TSR), both the Contractor and the Department will be required to test these samples within 72 h after sampling. The Contractor shall obtain a sample weighing at least 110 lb [50 kg] and split the sample in half to provide a sample for the Department and the Contractor. Label the Department companion of this split with the following information:

(1) Date,
(2) Time,
(3) Project number, and
(4) Cumulative tonnage to date.

After the sample is split and labeled, give the Department's companion sample to the Department Street Inspector or Plant Monitor or to the Materials Engineer within 24 h of sampling as directed by the Engineer. When using Option 2, obtain the sample within the first 5,000 ton [4,500 tonne] of plant mixed asphalt produced or by the second day of production, whichever comes first, to verify tensile strength ratio (TSR).Take mixture samples from the windrow or truck box. Provide a 6 in [150 mm] specimen for gyratory design. The Contractor may test the sample at a permanent lab site or a field lab site.

Refer to Table 2360-12, "Mixture Type, Minimum TSR," for the minimum acceptable TSR values for production. Stop production immediately if the material does not meet minimum TSR requirements. Do not resume production until after adding anti-strip to the asphalt binder. Determine the responsible party for the cost of the anti-strip in accordance with the Department and Contractor TSR values in Table 2360-13. If the Department is responsible for the cost of the anti-strip, the Department will only pay for the cost of the anti-strip for mixtures placed on that project. The Department will not pay for delay costs associated with making changes related to this testing.

Table 2360-12
Mixture Type, Minimum TSR

Traffic Level 2 – 3, %		Traffic Level 4 – 5, %	
Contractor	**MnDOT**	**Contractor**	**MnDOT**
75	65	80	70

Table 2360-13 Anti-Strip Cost Responsibility			
Gyratory Level	**Contractor TSR**	**MnDOT TSR**	**Responsibility**
2 – 3	≥ 75	≥ 65	No anti-strip required
		< 65	Contractor
	< 75	≥ 65	Department
		< 65	Contractor
4 – 5	≥ 80	≥ 70	No anti-strip required
		< 70	Contractor
	< 80	≥ 70	Department
		< 70	Contractor

Take another sample and test within the first 500 ton [450 tonne] after production resumes. Stop production if the re-test fails to meet the minimum specified value. Discuss a proposal to resolve the problem with the Engineer before resuming production. Do not operate below the specified minimum TSR if at least 2 successive tests fail the TSR requirements.

A new sample and retest is automatically required if a proportion changes by greater than 10 percent from the currently produced mixture for a single stockpile aggregate or the Engineer directs the Contractor to sample and retest.

G.7.j.....Aggregate Specific Gravity(Gsb)
.....Laboratory Manual Methods 1204, 1205, 1815

Sample and test aggregate stockpiles to verify aggregate specific gravity if directed by the Engineer in conjunction with the District Materials Engineer. Provide 90 lb [40 kg] representative stockpile samples for each aggregate component. Split samples in half to provide material for both the Department and the Contractor. Label the Department companion with the following information:

(1) Date,
(2) Time,
(3) Project number, and
(4) Approximate cumulative tonnage to date.

Give the Department companion to the Department Street Inspector or Plant Monitor immediately after splitting or to the Materials Engineer within 24 h of sampling as directed by the Engineer. The Materials Engineer will compare the aggregate specific gravity results to the Contractor's values on the current Mix Design Report. If the results deviate beyond the tolerance in accordance with Table 2360-16, "Allowable Differences between Contractor and Department Test Results," the Materials Engineer will notify the Contractor and issue a new Mix Design Report with the current specific gravity results. Base new mixture placed after receiving notification of new specific gravity values on the Department results. The Engineer will notify the Contractor regarding new specific gravity values. The dispute resolution procedure for aggregate specific gravity is on the Bituminous Office website.

G.7.k..... Moisture Content
..... Laboratory Manual Method 1855

Provide a mixture with moisture content no greater than 0.3 percent. Measure moisture content in the mixture behind the paver or, if approved by the Engineer, in the truck box. Sample and test as directed by the Engineer. Store the sample in an airtight container. Do not perform microwave testing.

Do not provide plant mixed asphalt with a moisture content greater than 0.3 percent.

G.7.l Asphalt Binder Samples

Obtain asphalt binder samples from a sampling valve located between the pump and the drum. Sample each type of asphalt binder used in mixture production after 50 tons of mixture has been produced, then sample at a rate of one per 250,000 gal [1,000,000 L. A minimum of 1 gallon of binder must be drawn and wasted from the sampling valve before the actual sample is drawn. For batch plants, obtain the asphalt binder sample from the weigh pod. Provide a 1 qt [1.0 L] sized sample. The Inspector will monitor the sampling the Contractor performs. Record sample information on an Asphalt Sample Identification Card. Submit the sample to the Central Materials Laboratory. Contact the Department Chemical Laboratory Director for disposition of failing asphalt binder samples.

G.8 Documentation

Maintain documentation, including test summary sheets and control charts, on an ongoing basis. Maintain a file of gyratory specimen heights for gyratory compacted samples and test worksheets. File reports, records, and diaries developed during the work as directed by the Engineer. These documents become the property of the Department.

Number test results in accordance with the MDR and record on forms approved and provided by the Department.

Send production test results on test summary sheets to the District Materials Laboratory and to other sites as directed by the Engineer by 11 AM of the day following production by facsimile, or e-mail when approved by the Engineer.

Include the following production test results and mixture information on the Department approved test summary sheet:

(1) Percent passing on all sieves in accordance with Table 3139-2 (including No. 16, No. 30, No. 50, No. 100),
(2) Coarse and fine aggregate crushing,
(3) Maximum specific gravity (G_{mm}.),
(4) Bulk specific gravity (G_{mb}),
(5) Percent total asphalt binder content (P_b),
(6) New added asphalt binder content,

(7) Ratio of % new added asphalt binder to total asphalt binder,
(8) Calculated production air voids (V_a),
(9) Calculated adjusted AFT (Adj. AFT),
(10) Composite aggregate specific gravity (G_{sb}) reflecting current proportions,
(11) Aggregate proportions in use at the time of sampling,
(12) Tons where sampled,
(13) Tons represented by a test and cumulative tons produced,
(14) Fines to effective asphalt ratio (F/A_e),
(15) Signature Line for MnDOT and Contractor Representative,
(16) Mixture Moisture Content, and
(17) MnDOT verification sample test result.
(18) Identify, when used, the WMA additive or process and dosing rates.

Submit copies of failing test results to the Engineer on a daily basis.

Provide the Engineer with asphalt manifests or bill of lading's (BOL) on a daily basis.

Provide a daily plant diary, including a description of QC actions taken. Include changes or adjustments on the test summary sheets.

Provide weekly truck scale spot checks.

Provide a Department approved accounting system for mixes and provide a daily and final project summary of material quantities and types.

Provide a final hard and electronic copy of QC test summary sheets and control charts, and density worksheets at completion of bituminous operations on the project to the Engineer.

Provide an automated weigh scale and computer generated weigh ticket. Ensure the ticket indicates the following information:

(1) Project number,
(2) Mix designation, including binder grade,
(3) Mixture Design Report number,
(4) Truck identification and tare,
(5) Net mass, and
(6) Date and time of loading.

Do not include deviations from the minimum information on the computer generated weigh ticket unless otherwise approved by the Engineer in writing.

Continue test summary sheets, charts, and records for a mixture produced at one plant site from contract to contract. Begin new summary sheets and charts annually for winter carry-over projects. Begin new summary sheets and charts when an asphalt plant is re-setup in the same location after it has moved out.

Furnish an electronic printout (long form recordation) from an automated plant blending control system at 20 minute intervals when the plant is producing mixture. The Engineer may waive this requirement if the plant does not have the capability to produce the automated blending control information; however, the Contractor must then perform daily spotchecks to determine percent new asphalt added.

Include the following information on the plant control printout for Drum Plants:

(1) Both the virgin and recycle belt feed rates (tons/hr),
(2) Feeder bin proportions (%),
(3) Total % asphalt cement in the mixture,
(4) Virgin asphalt cement added (%)
(5) Mixture Temperature °F [°C],
(6) Mixture code,
(7) Date and time stamp, and
(8) Current tons of mixture produced and daily cumulative tons of mixture produced at time of printout.

Provide a daily electronic printout of the plant calibration (SPAN) numbers for each bin and meter.

Include the following information on the plant control printout for Batch Plants:

(1) Both the virgin and recycle belt feed rates (tons/hr),
(2) Feeder bin proportions (%),
(3) Mixture Temperature °F [°C],
(4) Mixture code,
(5) Date and time stamp, and
(6) Current tons of mixture produced and daily cumulative tons of mixture produced at time of printout.

Provide a daily electronic printout of the plant calibration (SPAN) numbers for each bin and meter.

G.9 Control Charts

Provide control charts and summary sheets computer generated from software approved by the Engineer. The Contractor may use software available at the Bituminous Office. Record the following data on standardized control charts:

(1) Blended aggregate gradation, include sieves in accordance with Table 3139-2 for specified mixture;

(2) Percent asphalt binder content (P_b);

(3) Maximum specific gravity (G_{mm});

(4) Production air voids (V_a); and

(5) Adj. AFT.

Unless otherwise directed by the Engineer, plot individual test results for each test point and connect individual points with a solid line. Plot the moving average for each test variable starting with the fourth test and connect with a dashed line. Plot the Department's QA and verification test results with triangles. Plot the specification JMF limits on the control charts using a dotted line.

G.10 JMF Limits

Base the production air voids and Adj. AFT on the minimum specified requirements in accordance with Table 2360-7, "Mixture Requirements." Base gradations and asphalt binder content limits on the current Department reviewed Mixture Design Report. Provide gradation control sieves in accordance with Table 3139-2. Refer to the Mixture Design Report for the mixture production targets. JMF limits are the target plus or minus the limits in accordance with Table 2360-14, "JMF Limits (N=4)." Use JMF limits as the criteria for acceptance of materials based on the moving average.

Table 2360-14
JMF Limits (N=4)

Item	JMF Limits
Adj. AFT	- 0.5
Production air voids, *%*	± 1.0
Asphalt binder content, *%*	- 0.4
Sieve, *% passing:*	
1 in [25.0 mm], ¾ in [19.0 mm], ½ in [12.5 mm], ⅜ in [9.5 mm], No. 4 [4.75 mm]	Broad band limits
No. 8 [2.36 mm]	Broad band limits
No. 200 [0.075 mm]	Broad band limits

G.11 Moving Average Calculation

Calculate a moving average as the average of the last four test results. Continue the calculation without interruption, except begin new summary sheets and charts annually for winter carry-over projects and if an asphalt plant is re-setup in the same site after it has been moved out.

G.12 JMF Bands

JMF Bands are the area between the target, as identified on the Mixture Design Report, and the JMF limits.

G.13 JMF Adjustment

Begin mixture production with aggregate proportions within 5 percent of the design proportions and mixture parameters in Table 2360-14 within the JMF limits shown. Use all the aggregate proportions included on the Mixture Design Report unless the aggregate proportion is shown as 0 percent. If the Contractor provides the District Materials Laboratory with prior documented production data showing how production affects the mixture properties or if the Contractor provides the District Materials Laboratory with a written justification or explanation of material changes since the original mixture submittal waive the preceding requirements.

G.13.a JMF Request for Adjustment

The Contractor may make a request to the Bituminous Engineer or District Materials Engineer for a JMF adjustment to the mix design if the QC test results indicate a necessary change to achieve the specified properties. Do not use aggregates or materials not part of the original mix design to make adjustments unless otherwise approved by the Engineer, in conjunction with the District Materials Engineer or the Department Bituminous Engineer.

A Certified Level II Bituminous QM Mix Designer will review the requested change for the Department. If the request meets the design requirements in Table 3139-2,"Aggregate Gradation Broad Bands", Table 3139-3,"Mixture Aggregate Requirements", and Table 2360-7, "Mixture Requirements," the Department will issue a revised Mixture Design Report. Each trial mixture design submittal in accordance with 2360.2.E, "Mixture Design" may have three JMF adjustments per mixture per project without charge. The Department will charge the Contractor $500 for each additional JMF adjustment requests.

Perform an interactive process with the Engineer before making JMF adjustments. Make JMF adjustments only within the mixture specification gradation design broadbands in accordance with Table 3139-2. Submit a new JMF if redesigning the mixture. Only reduce the JMF asphalt content if the moving average Adj. AFT is 8.5μ or more and Individual Adjusted AFT is at least 7.5 μ.

The department will not allow consecutive requests for a JMF adjustment without production data. Continue calculation of the moving average after the approval of the JMF.

G.13.b JMF Request for Adjustment for Proportion Change > 10%

If requesting a JMF adjustment for a proportion change greater than 10 percent from the currently produced mixture for a single stockpile aggregate, provide supporting production test data from at least four tests run at an accelerated testing rate of one test per 500 ton [450 tonne] with the adjustment request. The Department will base acceptable verification and approval of the requested JMF on individual and moving average test results in addition to the requirements listed above. Individual test results must be within twice the requested JMF limits for percent asphalt binder, production air voids, and Adj. AFT. Individual gradations must be within the Broad Bands. The moving average values must be within the control limits in accordance with Table 2360-14. Continue to calculate the moving average after the change in proportions.

If the mixture meets the design requirements as discussed in G.13.a, the District Materials Laboratory will sign the request for JMF adjustment effective from the point of the proportion change. If the mixture fails to meet the design requirements, the Department will either reduce the payment or direct the Contractor to remove and replace. Do not make consecutive requests for JMF adjustments without production data.

G.13.c JMF Request for Adjustment When Cumulative Proportion Changes > 10%

Submit a request for JMF adjustment when the cumulative change on any one product exceeds 10% from the original MDR. The Department will issue a revised MDR provided the mixture meets the requirements in Table 3139-2,"Aggregate Gradation Broad Bands", Table 3139-3,"Mixture Aggregate Requirements", and Table 2360-7, "Mixture Requirements".

G.14 Failing Materials

The Department will base material acceptance on individual and moving average test results. The Department will use isolated test results for acceptance of air voids at the start of mixture production. The Department will consider individual test results greater than two times the JMF bands as failing. The Department will fail moving average test results exceeding the JMF limits. Begin new summary sheets annually for winter carry-over projects.

Stop production and make adjustments if the moving average values exceed the JMF limits. Restart production after performing the adjustments and notifying the Engineer. Resume testing at the accelerated rates and for the tests listed in Table 2360-10, "Production Start-Up Testing Rates," for the next 2,000 ton [1,800 tonne] of mixture produced. Continue calculating the moving average after the stop in production.

The Department will consider mixture produced where the moving average of four exceeds the JMF limits as unsatisfactory in accordance with 2360.2.G.14.d, "Moving Average Failure at Mixture Start-Up – Production Air Voids," 2360.2.G.14.e, "Moving Average Failure at Mixture Start-Up — Adjusted AFT," 2360.2.G.14.f, "Moving Average Failure - Production Air Voids," and 2360.2.G.14.g, "Moving Average Failure — Percent Asphalt Binder Content, Gradation, and Adj. AFT."

If the total production of a mixture type for the entire project requires no greater than four tests the Department will accept the material in accordance with 2360.2.G.14.b, "Isolated Failures at Mixture Start-Up — Production Air Voids," and 2360.2.G.14.c, "Individual Failure — Gradation, Percent Asphalt Binder, Production Air Voids, and Adj. AFT."

If the Contractor's testing data fails to meet the tolerances in accordance with Table 2360-9, "Allowable Differences between Contractor and Department Test Results," the Department will substitute QA and verification data to determine the payment factor.

G.14.a Ratio of New Added Asphalt Binder to Total Asphalt Binder – Acceptance Criteria

Minimum design ratio of new added asphalt binder to total asphalt binder is shown in Table 2360-15 below. During production the ratio must meet individual and moving average requirements as listed in

Table 2360-15,"Ratio of New Added Asphalt Binder to Total Asphalt Binder Acceptance Criteria". If the individual or moving average ratio drops below the minimum requirement, the Contractor must stop production and make adjustments to correct the process. Restart production only after notifying the Engineer of the adjustments made. The calculation of the moving average will continue after the stop in production.

Table 2360-15
Ratio of New Added Asphalt Binder to Total Asphalt Binder Acceptance Criteria

Specified Asphalt Grade	Recycled Material		
	RAS Only	RAS + RAP	RAP Only
PG XX-28, PG 52-34, PG 49-34, PG 64-22			
Wear (ind./moving average)	66/70	66/70	66/70
Non-Wear (ind./moving average)	66/70	66/70	61/65
PG 58-34, PG 64-34, PG 70-34			
Wear & Non-Wear (ind./moving average	76/80	76/80	76/80

G.14.b Isolated Failures at Mixture Start-Up – Production Air Voids

At the start-up of mixture production, use the first three isolated test results for production air voids before establishing a moving average of four. Calculate isolated production air voids using the maximum mixture specific gravity and the corresponding bulk specific gravity from that single test. After testing four samples and establishing a moving average of four, the Department will base acceptance on individual and moving average production air voids.

The Department will not accept the material if any of the first three isolated test results for production air voids exceeds twice the JMF bands from the target listed on the Mixture Design Report at the start of production. The Department will reduce payment for unacceptable material in accordance with Table 2360-16, "Reduced Payment Schedule for Individual Test Results." The Department will calculate the quantity of unacceptable material on the tonnage placed from the sample point of the failing test to the sample point when the isolated test result is back within twice the JMF bands. If the failure occurs at the first test after the start of production, the Department will calculate the tonnage subject to reduced payment as described above, including the tonnage from the start of production.

If isolated air voids are less than 1.0 percent or greater than 7.0 percent, the Engineer will either reduce the payment or order the material removed and replaced at no additional cost to the Department. The Engineer may require the Contractor to test in-place mixture to better define the removal and replacement limits. The Engineer may require the Contractor to test in-place mixture placed before the failing test result. If the Engineer reduces the payment, the Department will pay for the material at 50 percent of the contract unit price.

G.14.c Individual Failure – Percent Asphalt Binder, Production Air Voids, and Adj. AFT

Table 2360-16
Reduced Payment Schedule for Individual Test Results

Item	Pay Factor, % *

Table 2360-16 Reduced Payment Schedule for Individual Test Results	
Item	**Pay Factor, % ***
Coarse and fine aggregate crushing	90
Asphalt binder content	90
Production air voids, individual‖ and isolated†	80

* Apply the lowest pay factor when using multiple reductions on a single test.

‖ Calculate individual air voids using the moving average maximum specific gravity and the bulk specific gravity from that single test.

† Calculate the isolated air voids from the maximum specific gravity and the bulk specific gravity from that single test. The Engineer will only use isolated void test results for acceptance for the first three tests after mixture production start-up.

If the individual test result for adjusted AFT is less than 7.5μ, the Department may either reduce payment in accordance with Table 2360-17, "Reduced Payment Schedule for Individual Test Results, Adjusted AFT," or order the material removed and replaced represented by the individual test. This tonnage includes all material placed from the sample point of the failing test to the sample point when the test result meets specification requirements. If the failure occurs at the first test after the start of daily production, the Department will include the tonnage from the start of production that day with the tonnage subject to reduced payment or removal and replacement.

Table 2360-17 Reduced Payment Schedule for Individual Test Results, Adjusted AFT	
Individual Adjusted AFT, μ	**Pay Factor, %**
≥ 7.5	100
7.4 – 7.0	90
6.9 – 6.1	75
≤ 6.0	R&R(*)

* Remove and replace at no expense to the Department.

The Department will not accept material if the individual tests for percent asphalt binder content or production air voids exceeds twice the JMF bands from the target listed on the Mix Design Report. The Department will reduce payment in accordance with Table 2360-16, "Reduced Payment Schedule for Individual Test Results." The Department will calculate the material subject to reduced payment as the material placed from the sample point of the failing test until the sample point when the test result is back within twice the JMF limits. If the failure occurs at the first test after the start of daily production, the Department will include tonnage from the start of production that day with the tonnage subjected to reduced payment.

The Department will not accept material if individual air voids are less than 1.0 percent or greater than 7.0 percent, Remove and replace unacceptable material at no additional cost to the Department as directed by the Engineer. Test in-place mixture to better define the area to be removed and replaced as directed by the Engineer. Test mixture placed before the failing test result as directed by the Engineer. The Department may reduce payment for unacceptable material at 50 percent of the relevant contract unit price.

G.14.d Moving Average Failure at Mixture Start-Up — Production Air Voids

If a moving average failure occurs within any of the first three moving average results after mixture start-up (tests 4, 5, 6), the Department will accept the mixture if the individual air void, corresponding to the moving average failure meets the JMF limits. The Department will not accept material if the individual air void fails to meet the JMF limit. The Department will reduce payment for unacceptable material unless the Engineer determines that the isolated air void corresponding to the individual air void meets the JMF limit. The Department will pay for unacceptable material at 70 percent of the relevant contract unit price. The Department will calculate the quantity of material subject to reduce payment as the tons placed from the sample point of the failing moving average result and corresponding individual air void beyond the JMF limit to the sampling point when the individual test result is back within the JMF limit. If the failure occurs at the first test after the start of daily production, the Department will include tonnage from the start of production that day with the tonnage subjected to reduced payment.

G.14.e Moving Average Failure at Mixture Start-Up — Adj. AFT

The Engineer will calculate the Moving Average (n=4) Adj. AFT during the sixth test after the beginning of mixture production of that specific mixture. The Engineer will include the individual results of calculations for tests No. 3, No. 4, No. 5, and No. 6 with this calculation.

G.14.f Moving Average Failure — Production Air Voids

A moving average production air void failure occurs when the individual production air void moving average of four exceeds the JMF limit. The Department will consider the mixture unacceptable and subject to reduced payment. The Department will pay for unacceptable mixture at 70 percent of the contract unit price. The Department will calculate the quantity of mixture subject to reduced payment as the tons placed from the sample point of all individual test results beyond the JMF limits, which contributed to the moving average value that exceeded the JMF limit, to the sampling point where the individual test result meets the JMF limits. If the failure occurs at the first test after the start of daily production, the Department will include the tonnage from the start of production that day with the tonnage subject to reduced payment.

Table 2360-18
Reduced Payment Schedule for Moving Average Test Results

Item	Pay Factor, % *
Gradation	90
Coarse and fine aggregate crushing	NA (individual failures only)
Adjusted AFT	80
Asphalt binder content	80
Production air voids	70

* Lowest Pay Factor applies when there are multiple reductions on a single test.

G.14.g Moving Average Failure - Percent Asphalt Binder Content, Gradation, and Adj. AFT

The Engineer will consider the mixture unacceptable and subject to reduced payment for mixture properties, including asphalt binder content and gradation, where the moving average of four exceeds the JMF limits. The Department may reduce payment for unacceptable mixture properties in accordance with Table 2360-18, "Reduced Payment Schedule for Moving Average Test Results." The Department will calculate the quantity of material subject to replacement or reduced payment as the tons placed from the sample point of all individual test results beyond the JMF limits, which contributed to the moving average value that exceeded the JMF limit, to the sampling point when the individual test result is back within the JMF limits. If the failure occurs at the first test after the start of daily production, the Department will include the tonnage from the start of production that day with the tonnage subjected to reduced payment.

The Engineer will calculate the Moving Average (n=4) Adjusted AFT during the sixth test after the beginning of mixture production of that specific mixture. The Engineer will include the individual results of calculations for tests No. 3, No. 4, No. 5, and No. 6 with this calculation. The Department will consider material with the Moving Average (n=4) of the Adjusted AFT is less than 8.0 μ as unsatisfactory and will pay for the material at 80 percent of the relevant contract unit price. The Department will calculate the quantity of material subject to replacement or reduced payment as the tons placed from the sample point of all Individual Adjusted AFT results less than 8.0μ, which contributed to the Moving Average value that was less than 8.0μ, to the sample point where the Individual Adjusted AFT is at least 8.0μ. If the failure occurs at the first test after the start of daily production, the Department will include the tonnage from the start of production that day with the tonnage subject to reduced payment.

G.14.h Coarse and Fine Aggregate Crushing Failure

If any CAA or FAA test results do not meet the requirements specified in Table 3139-3, the Department may reduce payment for the placed material in accordance with Table 2360-16, "Reduced Payment Schedule for Individual Test Results." The Department will calculate the quantity of material subject to reduced payment as the tons placed from the sample point of the failing test until the sampling point where the test result meets the specifications. If the failure occurs at the first test after the start of daily production, the Department will include the tonnage from the start of production that day with the tonnage subjected to reduced payment.

2360.3 CONSTRUCTION REQUIREMENTS

A Restrictions

A.1 Asphalt Release Agents

Do not use petroleum distillates to prevent adhesion of asphalt mixtures to equipment. An asphalt release agent must meet the criteria for "Effect on Asphalt" as described in the most recent Asphalt Release Agent on file in MnDOT's Office of Environmental Services.

A.2 Edge Drop Off

When construction is under traffic, the requirements of 2221.3.D will apply.

A.3 Surge and Storage Bins

Store the asphalt mixture for no more than 18 h at storage facilities that prevent segregation of the mix and drainage of asphalt from the mix. Maintain the mixture at within 9 °F [5 °C] of the temperature when discharged from the silo or mixer and prevent excessive cooling or overheating.

A.4 Weather Limitations and Paving Date

Do not perform work within the roadway in the spring until removal of seasonal load restrictions on roads in the vicinity unless otherwise approved by the Engineer.

Do not place asphalt mixtures when weather or roadbed conditions or moisture conditions of the roadway surface are judged unfavorable by the Engineer.

Do not place asphalt pavement final wearing course lift after October 15 north of an east-west line between Browns Valley and Holyoke, or after November 1 south of an east-west line between Browns Valley and Holyoke. The Engineer may waive these restrictions when:

(1) The Contractor is not placing asphalt mixture on the traveled portion of the roadway,
(2) The roadway involved is closed to traffic during the following winter, or
(3) The Engineer provides written direction to place the mixture.

A.5 Mixing and Discharge of Materials

Notify the Engineer of the recommended plant mixing temperatures as provided from the asphalt supplier. Unless authorized by the Engineer, do not produce the mixture more than 30°F above the recommended maximum mixing temperature. Use the automated plant control printout to monitor discharge temperature. The Department will not pay for or allow placement of any mixture produced at more than 30°F above the recommended maximum mixing temperature unless the higher mixing temperatures have been approved by the Engineer.

B Equipment

B.1 Plant

B.1.a Segregation

Provide plant mixed asphalt from a plant capable of producing a uniform mix free of segregation.

B.1.b Scales

Test and calibrate scales in accordance with 1901.

B.1.c Mineral Filler

Add mineral filler to the mixture using a storage silo equipped with a device to ensure a constant and uniform feed.

B.1.d Storage Tanks

Provide storage tanks equipped to heat and maintain the material at the temperatures recommended by the certified asphalt supplier. Place the discharge end of the circulating line below the surface of the asphalt material. Provide agitation for modified asphalt as recommended by the supplier.

Provide an outage table or chart and measuring stick for each storage or working tank. Equip tanks with provisions to take asphalt binder material samples. After delivery of asphalt binder material to the project, do not heat the material at temperatures greater than 350° F [175° C]. Do not store modified asphalt at temperatures greater than the manufacturer's recommendation.

B.1.e Asphalt Binder Control

If proportioning asphalt binder material by volume, equip the plant with either a working tank or a metering system to determine asphalt binder content of the mixture.

Provide a working tank with a capacity from 1,000 gal to 2,000 gal [3,800 L to 7,600 L]. Calibrate and supply the working tank with a calibrated measuring stick. The Contractor may connect the tank to a mixing unit and use it only during spot check operations as long as it is available at all times. Return feedback to the working tank during spot check operations.

Provide a metering system with at least one approved asphalt binder flow meter and a asphalt binder pump. Connect the flow meter to the asphalt binder supply to measure and display only the asphalt binder being fed to the mixer unit. Position the meter readout for convenient observation. Provide a means to compare the flow meter readout with the calculated output of the asphalt binder pump. Provide a system to display that shows the accumulated asphalt binder quantity being delivered to the mixer in gallons [liters] or to the nearest 0.001 ton [0.001 tonne]. Calibrate and adjust the system to maintain an accuracy of ±1 percent error for each plant set-up before producing the mixture.

Provide an outage table or chart and measuring stick for each storage or working tank. Equip tanks with provisions to take asphalt binder material samples. After delivery of asphalt binder material to the project, do not heat the material at temperatures greater than 350° F [175° C]. Do not store modified asphalt at temperatures greater than the manufacturer's recommendation.

B.1.e (1) Asphalt Binder Sampling Valve

Provide an asphalt binder sampling valve located between the pump and the drum. Sample asphalt binder from the weigh pod for batch plants.

B.1.f Dryer

The Department will not allow unburned fuel in the mix.

B.1.g Temperature Control

Equip the plant with enough temperature sensors to ensure temperature control of the aggregate and asphalt binder.

B.1.h ..... Pollution 1717

B.2 Street Equipment

B.2.a Paver

Provide a paver capable of spreading and finishing to widths as shown on the plans and with an operational vibratory screed and automatic screed control to place mix without segregation.

Use an asphalt paver to place the mixture. When necessary, the Contractor may use a motor grader, when approved by the Engineer, to spread mixtures in areas that are inaccessible to a paver or when the quantity of mixture makes it impractical to place with a paver.

Use a shouldering machine to spread the mixture on shoulder surfacing and uniform width widening, when the placement width is too narrow for a paver.

Using a screed or strike-off assembly, produce a finished surface of the required evenness and texture without tearing, shoving, or gouging. For mainline paving, if the paving width is greater than the basic screed, auger and mainframe extensions, which meet manufacturer's recommendations for the paving width, are required unless otherwise directed by the Engineer. The Department will not allow strike-off only extension assemblies for mainline wearing course paving, unless the Engineer directs otherwise.

Equip all pavers with an approved automatic screed control. Sensor-operated devices need to include automatic controls that follow reference lines, or surfaces on one or both sides of the paver as required. Adjust the speed of the paver to produce the best results. A string line is only required if stated in the contract.

Spread all mixtures without segregation to the cross sections shown on the plans (excluding tight blade and scratch course applications) . The objective on the leveling layer is to secure a smooth base of uniform grade and cross section so that subsequent courses will be uniform in thickness. The Contractor may spread the leveling layer with a properly equipped paver or, when approved by the Engineer, a motor grader equipped with a leveling device or with other means for controlling the surface elevation of the leveling layer.

Place each course over the full width of the section under construction on each day's run, unless the Engineer directs otherwise.

B.2.b Trucks

Provide trucks with tight, clean, and smooth truck haul beds. Do not allow mixture to adhere to the truck beds. When directed by the Engineer, provide a cover that extends at least 1 ft [300 mm] over the truck bed sides and attach to tie-downs, if the truck is not equipped with a mechanical or automated covering system.

B.2.c Motor Graders

Use a motor grader with the following characteristics:

(1) Self-propelled,
(2) Equipped with pneumatic tires with a tread depth of ½ in [13 mm] or less,
(3) Equipped with a moldboard blade that is at least 10 feet [3 m], and
(4) With a wheelbase of at least 15 feet [4.5 m].

B.2.d Distributor

Provide a distributor capable of uniformly applying material up to 15 ft [4.6 m] wide and equipped with the following:

(1) An accurate volume measuring device with tachometer,
(2) Pressure gauges,
(3) Thermometer for measuring temperatures of tank contents,
(4) Power-operated pump, and
(5) Full circulation spray bars with lateral and vertical adjustments.

B.2.e Rollers

Compact each lift of asphalt to the density require in 2360.3.D, "Compaction."

B.2.e(1) Steel-Wheeled Rollers

Self-propelled steel wheeled compacting equipment must weigh at least 8 ton [7.3 tonne]. If using vibratory rollers, provide rollers that produce 3,085 lbf per ft [45 kN per m] of width and a vibratory frequency of at least 2,400 vpm using the low amplitude setting. Provide a roller capable of reversing without backlash and equipped with spray attachments for moistening rollers on both sets of wheels.

B.2.e(2) Pneumatic Tired Rollers

Self-propelled pneumatic tired compacting equipment must have a compactiion width of at least 5 ft [1.5 m] and a gross wheel load force of at least 3,000 lb [13 kN] per wheel for traffic level 2 and level 3 mixtures, 5,000 lb [22 kN] per wheel for traffic level 4 and level 5 mixtures, and, if using vibratory, at least 8 ton [7.3 tonne] total mass. Provide a roller with a tire arrangement that obtains full compaction over the full width with each pass of the roller.

B.2.e(3) Trench Rollers

Self-propelled trench rollers must weigh at least 2,960 lb per foot [4,400 kg per meter] of width.

B.3 Tack Coat

Apply a uniform asphalt tack coat to the clean and dry existing asphalt or concrete surface and to the surface of each course or lift constructed, except for the final course or lift, in accordance with 2357. Coat the contact surfaces of all fixed structures and the edge of the inplace mixture in all courses at transverse joints and in the wearing course at longitudinal joints. Do not coat the longitudinal joint if a rubberized asphalt joint adhesive will be applied to the vertical face of the joint. A uniform application will not have streaks (corn rows), bare spots, puddles, or other irregular patterns. Allow emulsified asphalt tack coats to break, as indicated by a color change from brown to black, before placing subsequent lifts. Take tack samples from the asphalt distributor according to rates provided in the Material Control Schedule. The Inspector will monitor the sampling the Contractor performs.

C Joints

C.1 Construction Joints

Compact joints to produce a neat, tightly bonded joint that meets surface tolerances as described in 2360.3.E. Transverse and longitudinal joints are subject to the density requirement in accordance with 2360.3.D, "Compaction."

C.2 Transverse Joints

Construct a transverse joint, the full width of the paver, at right angles to the centerline when mixture placement operations are suspended. When work resumes, cut the end vertically for the full depth of the layer unless constructing a formed edge as approved by the Engineer.

C.3 Longitudinal Joint

Construct the longitudinal joint between strips and parallel to the pavement centerline. In multiple lift construction, construct the longitudinal joints between strips in each lift at least 6 in [150 mm] measured transversely from the longitudinal joints in the previously placed lift. If constructing a wearing course in an even number of strips, place one longitudinal joint on the centerline of the road. When constructing a wearing course in an odd number of strips, locate the centerline of one strip on the centerline of the road, provided that no joint is located in the wheel path area of a traffic lane. The Contractor will align longitudinal joints in multiple lift construction over portland cement concrete pavements directly over the concrete pavement longitudinal joints as approved by the Engineer.

At longitudinal joints formed by placing multiple strips, ensure the adjoining surface is higher but does not exceed ⅛ in [3 mm], after final compaction of the previously placed strip. When constructing a strip

adjoining a previously placed strip or a concrete pavement, remove to the longitudinal joint line, any fresh mixture that overlaps a previously placed strip or pavement before rolling.

D Compaction

After spreading each course, compact in accordance with the maximum density method as described in 2360.3.D.1, unless the ordinary compaction method is called for in the special provisions or as described in 2360.3.D.2, "Ordinary Compaction." Do not allow rollers to stand on the uncompacted mixture or newly rolled pavement with a surface temperature greater than 140 °F [60 °C]. Do not roll with steel-wheeled rollers if rolling produces aggregate that is crushed, cracked, or pulverized or causes displacement of the mixture.

To maintain a true surface, correct the following by removing and replacing the material in the defective areas as directed by the Engineer at no additional cost to the Department:

(1) Variations such as depressions or high areas, which may develop during rolling operations; and

(2) Lean, fat, or segregated areas.

When spreading mixtures with a motor grader, compact the mixture with pneumatic tired rollers simultaneously with the spreading operation.

D.1 Maximum Density

Compact the pavement to at least the minimum required maximum density values in accordance with Table 2360-19, "Required Minimum Lot Density (Mat)," and Table 2360-20, "Longitudinal Joint Density Requirement." Density evaluation will include compacted mat density and compacted longitudinal joint density. Density evaluation will not include longitudinal joint density on lifts with a 1 percent reduced density requirement.

Table 2360-19
Required Minimum Lot Density (Mat)

	SP Wear Mixtures* ‖	SP Non-Wear Mixtures* ‖	SP Shoulders* ‖	
			Designed at 3% Voids	Designed at 4% voids
% Gmm	92	93	93	92

* Reduce the minimum by 1 percent on the first lift constructed over PCC pavements.

‖ Reduce the minimum by 1 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 roadway with a spring load restriction no greater than 7 ton [6.35 tonne], including shoulders.

Table 2360-20
Longitudinal Joint Density Requirement

Location	Confined Edge of Mat*	Unconfined Edge of Mat‖
Long joint wear and shoulder (4% air voids)	89.5	88.1
Long joint non-wear and shoulder (3% air voids)	90.5	89.1

* The Department defines "confined" as the edges of the placed mat abutting another mat, pavement surface, or curb and gutter.

‖ The Department defines "unconfined" or "unsupported" as no abutment on the side of the mat being placed with another mat or pavement surface.

D.1.a Shoulders Greater Than 6 ft [1.8 m]

Unless otherwise shown on the plans or required by the special provisions, compact shoulders wider than 6 ft [1.8 m] paved using the maximum density method. When shoulders are compacted by the maximum density method and are paved separately from the driving lane, or have a different required minimum density than the driving lane, delineate the lot tonnage placed on the shoulder in separate lots from the driving lanes for the day paving was conducted.

D.1.b Shoulders Equal to or Less Than 6 ft [1.8 m]

Unless otherwise shown on the plans or required by the special provisions, use the ordinary compaction method in accordance with 2360.3.D.2 to compact a narrow shoulder no wider than 6 ft [1.8 m] paved in the same pass as a driving lane or paved separately. The Department will exclude mixture compacted under ordinary compaction from lot density requirements and from incentive or disincentive payment.

When compacting a narrow shoulder using the maximum density method, compact to densities in accordance with Table 2360-19. If the minimum required density of the shoulder is different than the driving lane, delineate the tonnage placed on the shoulder in separate lots from the driving lane.

D.1.c Echelon Paving

The Department considers echelon paving, two pavers running next to each other in adjacent lanes, as separate operations.

D.1.d Density Determination (Core Bulk Density)

Calculate each individual lot's maximum density by averaging the results of the cores within the lot expressed as the percentage of the maximum specific gravity. Use Laboratory Test Method 1810 to determine core density unless the mixture is considered coarse graded. If 45 percent or less of the aggregate material passes the No. 4 [4.75 mm] sieve the Engineer may require bulk specific gravity be determined in accordance with Laboratory Manual Method 1816, Corelok.

Obtain the maximum specific gravity value for calculating the percentage density for the lot from the maximum gravity values taken from production tests during that day's paving. If the production tests during that day's paving result in only one or two maximum specific gravity values, use the moving average value at that

test point. If production tests during that day's paving result in three or more maximum specific gravity values, use the average of those tests alone as indicated above.

D.1.e Timeline

Complete compaction within 8 h of mixture placement and before obtaining core samples. Only use pneumatic tired or static steel rollers for compaction performed between 6 h and 8 h after mixture placement. Do not reroll compacted mixtures with deficient densities.

D.1.f Stop Production

If all the lots in a day's production or greater than 50 percent of the lots on multiple days fail to meet the minimum density requirement stop production and determine the source of the problem. Discuss with the Engineer what corrective action will be taken to bring the work into compliance with specified minimum required density.

D.1.g Lot Determination

Table 2360-21
Lot Determination

Daily Production, *ton [tonne]*	Lots
300* – 600 [270* – 545]	1
601 – 1,000 [546 – 910]	2
1,001 – 1,600 [911 – 1,455]	3
1,601 – 2,600 [1,456 – 2,360]	4
2,601 – 4,600 [2,361 – 4,175]	5
> 4,600 [4,175]	‖

* If producing no greater than 300 ton [270 tonne] of mix, establish the first lot when the total weight is greater than 300 ton [270 tonne].

‖ Add one lot for each additional 900 tons [820 tonne] or part thereof.

D.1.h Mat Density Cores

Obtain four cores in each lot. Take two cores from random locations as directed by the Engineer. Take the third and fourth cores, the companion cores, within 1 ft [0.3 m] longitudinally from the first two cores. Submit the companion cores to the Engineer immediately after coring and sawing. If the random core location falls on a longitudinal joint, cut the core with the outer edge of the core barrel 1 ft [0.3 m] away laterally from the edge of the top of the mat. Do not take cores for compacted mat density within 1 ft [300 mm] of any longitudinal joint. The Contractor is responsible for maintaining traffic, coring, patching the core holes, and sawing the cores to the paved lift thickness before density testing.

The Engineer may require additional density lots to isolate areas affected by equipment malfunction, heavy rain, or other factors affecting normal compaction operations.

D.1.i Contractor Core Testing

Take and test cores at least 4 in [100 mm] in diameter at locations determined and marked by the Engineer.

Mark samples with the lot number and core number or letter. Transport the cores to the laboratory daily taking care to prevent damage to them. Schedule the approximate time of testing during normal project work hours to allow the Engineer to observe the test and to record the saturated surface dry and immersed weight of the cores.

Determine the density by the end of the next working day after compaction. Measure each core three times for thickness before saw cutting. Report the average lift thickness on the core sheet. If placing multiple layers in a single day, saw and separate cores for each layer, test, and report by the end of the next working day. Place and compact mix into the coring hole to restore the surface within 24 h after coring or the Department will fine the Contractor $100 per working day per lot until restored.

D.1.j Companion Core Testing

The Department will select at least one of the two companion cores per lot to test for verification. For lots designated as longitudinal joint density lots, the Department will test at least one of the mat density companion cores and at least one of the longitudinal joint density companion cores.

D.1.k Tolerance Comparison

D.1.k(1) Tolerance Comparison – Individual

Compare the individual core bulk specific gravities obtained by the Contractor and by the Department. If the bulk specific gravity between the Contractor and the Department cores differ by more than 0.030, use the Department's bulk specific gravity.

D.1.k(2) Tolerance Comparison – Day's Shrinking Tolerance

For a second comparison of the cores that pass the individual tolerance criteria, compare the average of the Contractor's bulk specific gravities with the average of the Department's bulk specific gravities. Determine the tolerance by dividing 0.030 by the square root of the number of samples compared. Use all the Department's results for the day's paving if the cores do not fall within the determined tolerance.

D.1.l Recoring

The Engineer may allow the Contractor to re-core a sample if the sample was damaged in the coring process or damaged in transit to the laboratory through no fault of the Contractor.

D.1.m One Percent Reduced Density

The Department will exclude incentive payments for reduced minimum density in accordance with Table 2360-19, "Required Minimum Lot Density (Mat)." The Contractor may elect to waive the reduced density requirement and reevaluate the density in accordance with Table 2360-19, "Required Minimum Lot Density (Mat)," including incentives, for all cases except the first lift constructed over concrete pavement. The Contractor must notify the Engineer, in writing, after the first day's paving and by the end of the third day of paving of their intent to waive reduced density. Once reduced density has been waived the normal maximum density will remain in effect for the duration of mixture placement on that lift. For multi-year projects, the waiving of reduced density will be for that year only and will be re-evaluated for subsequent years on an annual basis. The Contractor is required to comply with any construction requirements on subsequent lifts.

D.1.n Longitudinal Joint Density

Evaluate longitudinal joint density in one lot per day unless the total daily weight is greater than 5,000 ton [5,000 tonne]. If the total daily weight is greater than 5,000 ton [5,000 tonne], evaluate two lots per day. Randomly select the location to take cores for longitudinal joint density from the mat density core locations. Take six cores at this location. Take cores for longitudinal joint density with the outer edge of the core barrel within 6 in [150 mm] from the edge of the top of the mat for both sides of the mat. Take a companion core 1 ft [0.3 m] longitudinally from each core. Take two cores for mat density at either 2 ft [0.61 m] right or 2 ft [0.61 m] left of the center of the mat the Contractor is paving, regardless of random number generation.

D.1.o Imaginary Joint

An actual longitudinal joint will not exist if pulling the shoulder and driving lane in the same paving pass. Do not cut a core on the imaginary line where a joint would have existed had the shoulder and the drive lane been paved separately.

D.1.p Shoulders

D.1.p(1) Shoulder – Ordinary Compaction

If compacting the shoulder under the ordinary density specification, do not take longitudinal joint cores in shoulders. Core at the centerline longitudinal edge cores (6 in [150 mm] from the joint) and at the mat density cores (2 ft [0.61 m] right or left of the center of the paving pass).

D.1.p(2) Shoulder-Maximum Density Specification

Core at the following locations:

(1) Centerline longitudinal edge cores (6 in [150 mm] from the joint),
(2) Mat density cores (2 ft [0.61 m] right or left of the center of the paving pass), and
(3) Edge of the shoulder (6 in [150 mm] from the outside edge).

Do not cut cores on the imaginary line at the edge of the shoulder adjacent to the driving lane. Move coring locations on imaginary lines to 6 in [150 mm] inside the edge of the shoulder.

D.1.q Payment Schedule

Table 2360-22 Payment Schedule for Maximum Mat Density			
		s 64.3 Mat Density Pay Factor A	
SP Wear and SP Shoulders (4% Void) Density, %*	**SP Non-Wear and SP Shoulders (3% Void), Density, %***	s **64.4** Traffi c Level 2 & 3	s **64.5** Traffi c Level **s 64.6** 4 & 5
≥ 93.6	≥ 94.6	1.03‖	1.05‖
93.1 – 93.5	94.1 – 94.5	1.02‖	1.04‖
92.0 – 93.0	93.0 – 94.0	1.00	1.00
91.0 – 91.9	92.0 – 92.9	0.98	0.98
90.5 – 90.9	91.5 – 91.9	0.95	0.95
90.0 – 90.4	91.0 – 91.4	0.91	0.91
89.5 – 89.9	90.5 – 90.9	0.85	0.85
89.0 – 89.4	90.0 – 90.4	0.70	0.70
< 89.0	< 90.0	†	†

* Calculate the percent of maximum specific gravity to the nearest tenth.

‖ Payment will only apply if the day's weighted average individual production air voids fall within - ½ percent of the target air void value. Base the weighted average air voids on all the mixture production tests in accordance with 2360.2.G.7, "Production Tests" for the corresponding day and weight by the tons the corresponding test represents.

† The Department will pay for the HMA material represented by the lot at 70 percent of the relevant contract unit price; unless a single core density in the lot is less than 87.0 percent of the maximum specific gravity (G_{mm}). If a single core density is less than 87.0 percent of Gmm, the Engineer will decide if the mixture is subject to removal and replacement or if will be accepted at a reduced payment of 50 percent of the relevant contract unit price. If the Engineer decides the material is to be removed and replaced, the Contractor will do so at no additional cost to the Department. Take additional core samples to determine the limits of the removal and replacement area or 50% payment using the same offset from centerline as the original core. If the original low density core was taken within 1½ ft [0.45 m] of an edge of the paver pass, take the additional cores at 1½ ft [0.45 m] from the edge of the paver pass. Determine the densities at 50 ft [15 m] intervals both ahead and behind the point of unacceptable core density until finding a point of acceptable core density (>89.0% for 4% void and 1% reduced voids and >90.0% for 3% voids). If the 50 ft (15 m) incremental testing extends into a previously accepted lot, removal and replacement may be required, but, these results will not be used to recalculate the previously accepted lot density. Perform the additional coring and testing at no cost to the Department. The Department will calculate the area of unacceptable pavement as the product of the longitudinal limits as determined by the 50 ft [15 m] cores and the full width of the paver pass, laying in the traffic lane or lanes. The Department will exempt shoulders from this calculation unless density failure occurred in the shoulder area.

Establish an additional density lot for the pavement that has been removed and replaced. Cut 2 cores randomly with companions for the Department (total 4 cores) and determine average density. Make payment in accordance with Table 2360-22 or Table 2360-23 excluding any incentive payment.

Determine the density for the remainder of the lot by averaging the original acceptable core density value with the first two acceptable core densities taken ahead and behind the unacceptable core density. Make payment in accordance with Table 2360-22 or Table 2360-23 excluding any incentive payment.

Table 2360-23*
1 Percent Reduced Table

SP Wear and SP Shld (4% Void) Maximum Specific Gravity, %‖	SP Non-Wear, and SP Shld (3% Void), Maximum Specific Gravity, %‖	Payment, %
≥ 91.0	≥ 92.0	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
< 89.0†	< 89.0	†

* Reduce the minimum by 1 percent for the first lift constructed on aggregate base (mainline and shoulder), reclaimed or cold inplace recycled base courses and first lift of an overlay on a roadway with a spring load restriction (including shoulders) no greater than 7 ton [6.35 tonne]. Reduce the minimum by 1 percent on the first lift constructed on PCC pavements (reduced density cannot be waived on PCC).

‖ Calculate the percent of maximum specific gravity to the nearest tenth.

† The Department will pay for the HMA material represented by the lot at 70 percent of the relevant contract unit price; unless a single core density in the lot is less than 87.0 percent of the maximum specific gravity (G_{mm}). If a single core density is less than 87.0 percent of Gmm, the Engineer will decide if the mixture is subject to removal and replacement or if will be accepted at a reduced payment of 50 percent of the relevant contract unit price. If the Engineer decides the material is to be removed and replaced, the Contractor will do so at no additional cost to the Department. Take additional core samples to determine the limits of the removal and replacement area or 50% payment using the same offset from centerline as the original core. If the original low density core was taken within 1½ ft [0.45 m] of an edge of the paver pass, take the additional cores at 1½ ft [0.45 m] from the edge of the paver pass. Determine the densities at 50 ft [15 m] intervals both ahead and behind the point of unacceptable core density until finding a point of acceptable core density (>89.0% for 4% void and 1% reduced voids and >90.0% for 3% voids). If the 50 ft (15 m) incremental testing extends into a previously accepted lot, removal and replacement may be required, but, these results will not be used to recalculate the previously accepted lot density. Perform the additional coring and testing at no cost to the Department. The Department will calculate the area of unacceptable pavement as the product of the longitudinal limits as determined by the 50 ft [15 m] cores and the full width of the paver pass, laying in the traffic lane or lanes. The Department will exempt shoulders from this calculation unless density failure occurred in the shoulder area.

Establish an additional density lot for the pavement that has been removed and replaced. Cut 2 cores randomly with companions for the Department (total 4 cores) and determine average density. Make payment in accordance with Table 2360-22 or Table 2360-23 excluding any incentive payment.

Determine the density for the remainder of the lot by averaging the original acceptable core density value with the first two acceptable core densities taken ahead and behind the unacceptable core density. Make payment in accordance with Table 2360-22 or Table 2360-23 excluding any incentive payment.

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Table 2360-24*

Payment Schedule for Longitudinal Joint Density
(SP Non-wear and SP Shoulders, 4% Void)

ongitudinal Joint (Confined Edge) Density, %‖	s 64.7 Pay Factor B Longitudinal (Confined Edge)		Longitudinal Joint (Unsupported Edge) Density, %‖	s 64.8 Pay Factor C s 64.9 (Unsupported Edge)	
	s 64.10 Traffic Level 2 & 3	s 64.11 Traffic Level 4 & 5		s 64.12 Traffic Level s 64.13 2 & 3	s 64.14 Traffic Level s 64.15 4 & 5
≥ 92.1	1.02†	1.03†	≥ 91.0	1.02†	1.03†
91.6 – 92.0	1.01†	1.02†	90.1 – 90.9	1.01†	1.02†
89.5 – 91.5	1.00	1.00	88.1 – 90.0	1.00	1.00
88.5 – 89.4	0.98	0.98	87.0 – 88.0	0.98	0.98
87.7 – 88.4	0.95	0.95	86.0 – 86.9	0.95	0.95
87.0 – 87.6	0.91	0.91	85.0 – 85.9	0.91	0.91
< 87.0	0.85	0.85	< 85.0	0.85	0.85

The Department will limit incentive payment for longitudinal joint density to lots with evaluated longitudinal joint densities.

Calculate the percent of maximum specific gravity to the nearest tenth.

Payment will only apply if the day's weighted average individual production air voids fall within - ½ percent of the target air void value. Base the weighted average air voids on all the mixture production tests in accordance with 2360.2.G.7, "Production Tests" for the corresponding day and weight by the tons the corresponding test represents.

Table 2360-25*

Payment Schedule for Longitudinal Joint Density
(SP Non-wear and SP Shoulders, 3% Void)

Longitudinal Joint (Confined Edge) Density, % ‖	s 64.16 Pay Factor B Longitudinal (Confined Edge)		Longitudinal Joint (Unsupported Edge) Density, % ‖	s 64.17 Pay Factor C s 64.18 (Unsupported Edge)	
	s 64.19 Traffic Level 2 & 3	s 64.20 Traffic Level 4 & 5		s 64.21 Traffic Level s 64.22 2 & 3	s 64.23 Traffic Leve s 64.24 4 & 5
≥ 93.1	1.02†	1.03†	≥ 92.0	1.02†	1.03†
92.6 – 93.0	1.01†	1.02†	91.1 – 91.9	1.01†	1.02†
90.5 – 92.5	1.00	1.00	89.1 – 91.0	1.00	1.00
89.5 – 90.4	0.98	0.98	88.0 – 89.0	0.98	0.98
88.7 – 89.4	0.95	0.95	87.0 – 87.9	0.95	0.95
88.0 – 88.6	0.91	0.91	86.0 – 86.9	0.91	0.91
< 88.5	0.85	0.85	< 86.0	0.70	0.85

* The Department will limit incentive payment for longitudinal joint density to lots with evaluated longitudinal joint densities.

‖ Calculate the percent of maximum specific gravity to the nearest tenth.

† Payment will only apply if the day's weighted average individual production air voids fall within ½ percent of the target air void value. Base the weighted average air voids on all the mixture production tests in accordance with 2360.2.G.7, "Production Test" for the corresponding day and weight by the tons the corresponding test represents.

D.1.r Pay Factor Determination

Determine the pay factor in accordance with the following:

(1) Case 1: Total Pay Factor = (Pay Factor A) × (Pay Factor B) × (Pay Factor C)
(2) Case 2: Total Pay Factor = (Pay Factor A) × (Pay Factor B) × (Pay Factor B)
(3) Case 3: Total Pay Factor = (Pay Factor A) × (Pay Factor C) × (Pay Factor C)

Where:

Pay Factor A = Mat density,
Pay Factor B = Confined edge density,
Pay Factor C = Unsupported edge density.

Use a pay factor of 1.00 for Pay Factor B, Pay Factor C, or both in lots where no cores are taken at the longitudinal joint.

D.2 Ordinary Compaction

Perform ordinary compaction for the following:

(1) Layers identified in the typical sections with a minimum planned thickness less than 1½ in [40 mm],
(2) Thin lift leveling,

(3) Wedging layers,

(4) Patching layers,

(5) Driveways, and

(6) Areas the Contractor cannot compact with standard highway construction equipment and practices.

(7) Bike paths, walking paths, and other similar non-traffic paving areas

If using the ordinary compaction method to evaluate density, use a control strip to establish a rolling pattern. Use the rolling pattern to compact the asphalt mixture for the layer on which the control strip is constructed or until constructing a new control strip. The Engineer may waive the control strip requirement in small localized areas or other areas not conducive to its establishment.

D.2.a Control Strip

Construct a control strip at least 395 sq. yd [330 sq. m] and of the same thickness as the lift the control strip represents at the beginning of the work on each lift of each course. Begin compacting immediately after spreading the mixture. Continue compacting until additional roller coverage does not produce appreciable increase in density. Determine densities by means of a portable nuclear testing device or approved alternate and create a growth curve to determine the optimum rolling pattern. Provide documentation of the growth curve to the Engineer. Roll the remainder of that course in accordance with the pattern developed in the test strip for that roller. Provide a new control strip in accordance with the following:

(1) If using a new JMF with a proportion change greater than 10 percent when compared to the currently produced mixture for a single stockpile aggregate,

(2) If changing the source of either aggregate or binder, or

(3) After 10 days of production.

D.2.b Equipment

Use rollers that meet the requirements in 2360.3.B.2.e. Use the same equipment type and weight on the remainder of the pavement course that was used to construct the control strip. Provide at least two rollers. Provide a tandem steel wheeled roller for final rolling. The Contractor may use trench rollers or mechanical tampers to compact areas inaccessible to the conventional type rolling equipment.

D.2.c Mixture Temperature

Refer to Table 2360-26, "Minimum Temperature Control" for the minimum laydown temperatures in all courses of the asphalt mixture as measured behind the paver or spreading machine. Do not pave when the air temperature is less than 32° F [0° C] unless otherwise directed by the Engineer in writing.

Table 2360-26* Minimum Temperature Control				
Air Temperature, °F [°C]	Compacted Mat Thickness, †			
	1 in [25 mm]	1½ in [40 mm]	2 in [50 mm]	≥3 in [75 mm]
32 – 40 [0-5]	—	265[129] ‖	255 [124]	250 [121]
41 – 50 [6-10]	270 [130] ‖	260 [127]	250 [121]	245 [118]
51 – 60 [11-15]	260 [127] ‖	255 [124]	245 [118]	240 [115]
61 – 70 [16-21]	250 [121] ‖	245 [118]	240 [115]	235 [113]
71 – 80 [22-27]	245 [118]	240 [115]	235 [113]	235 [113]
81 – 90 [28-32]	235 [113]	230 [110]	230 [110]	230 [110]
≥ 91 [33]	230 [110]	230 [110]	230 [110]	225 [107]

* Not applicable if using a Warm Mix Asphalt (WMA) additive or process

‖ Use at least one pneumatic-tire roller for intermediate rolling unless otherwise directed by the Engineer. The Engineer may specify or modify the minimum laydown temperature in writing.

† Based on the lift thicknesses shown on the plans.

D.3 Mat Density Cores (Optional Department Only Core Testing)

The Contractor can request all density cores be tested by the Department. The written request should be made at the pre-construction meeting and a written response, from the Department, either approving or denying the request will be made within 5 calendar days from the date of the request. Once approval is granted, Department Only Core Testing will remain in effect for the duration of the project. For multi-year projects, Department core testing will be for that year only. Cores will be tested in either the Department's Field Lab or in the Contractor's Field Lab. The Contractor is permitted to observe and record all weighing of the cores.

D.3.a Contractor Coring Responsibilities

Obtain two cores in each lot. Take cores of at least 4 in [100 mm] in diameter at locations determined and marked by the Engineer. If the random core location falls on a longitudinal joint, cut the core with the outer edge of the core barrel 1 ft [0.3 m] away laterally from the edge of the top of the mat. Do not take cores for compacted mat density within 1 ft [300 mm] of any longitudinal joint. Label samples with the lot number and core number or letter. The Contractor is responsible for maintaining traffic, coring, patching the core holes.

Measure each core three times for thickness before saw cutting. Report the average lift thickness to the Engineer. If placing multiple layers in a single day, measure and record lift thickness and then saw and separate cores for each layer. Place and compact mix into the coring hole to restore the surface within 24 h after coring or the Department will fine the Contractor $100 per working day per lot until restored.

The Engineer may require additional density lots to isolate areas affected by equipment malfunction, heavy rain, or other factors affecting normal compaction operations.

D.3.b Department Testing Responsibilities

The Department will take possession of the cores after they have been measured and cut. The Department will test all cores. Density results will be determined by the end day in which the cores were cut provided they are in the Department's possession by 10:00am, otherwise, results will be available the next working day. Test results will be reported on the Core Density Sheet.

D.3.c Longitudinal Joint Density

Evaluate longitudinal joint density in one lot per day unless the total daily weight is greater than 5,000 ton [5,000 tonne]. If the total daily weight is greater than 5,000 ton [5,000 tonne], evaluate two lots per day. Randomly select the location to take cores for longitudinal joint density from the mat density core locations. Take three cores at this location. Take cores for longitudinal joint density with the outer edge of the core barrel within 6 in [150 mm] from the edge of the top of the mat for both sides of the mat. Take one core for mat density at either 2 ft [0.61 m] right or 2 ft [0.61 m] left of the center of the mat the Contractor is paving, regardless of random number generation.

E Surface Requirements

After compaction, the finished surface of each lift shall be reasonably free of segregated, open and torn sections, and shall be smooth and true to the grade and cross section shown on the plans with the following tolerances:

Table 2360-26
Surface Requirements

Course/Location	Description	Tolerance
Leveling/1st lift using automatics	Tolerance also applies to 1st lift placed other than leveling when automatics are used.	½ in [15 mm]
Wear	Tolerance of final 2 lifts from the edge of a 10 foot [3 m] straightedge laid parallel to or at right angles to the centerline.	¼ in [6 mm]
Shoulder Wear, Temporary Wear & bypasses	Tolerance from the edge of a 10 foot [3 m] straightedge laid parallel to or at right angles to the centerline.	¼ in [6 mm]
Transverse joints/construction joints	Tolerance from the edge of a 10 foot [3 m] straightedge centered longitudinally across the transverse joint. Correction by diamond grinding required when directed by the Engineer.	¼ in [6 mm]
Transverse Slope	Tolerance for surface of each lift exclusive of final shoulder wear.	Not to vary by more than 0.4 % from plans.

Distance from edge of each lift and established centerline.	No less than the plan distance or more than 3 inches [75 mm] greater than the plan distance. The edge alignment of the wearing lift on tangent sections and on curve sections of 3 degrees or less can't deviate from the established alignment by more than 1 inch [25 mm] in any 25 foot [7.5 m] section.	See Description
Final wear adjacent to concrete pavements.	After compaction the final lift wear adjacent to concrete pavements must be slightly higher but not to exceed 1/4" [6mm] than the concrete surface.	See Description
Final wear adjacent to fixed structures.	After compaction the final lift wear adjacent to gutters, manholes, pavement headers, or other fixed structures must be slightly higher but not to exceed 1/4" [6mm] than the surface of the structure.	See Description
Finished surface of each lift.*	Must be free of segregated and open and torn sections and deleterious material. *Excluding tight blade and scratch courses.	See Description

Cut or saw and then remove and replace material placed outside the described limitations at no additional cost to the Department. If the Engineer determines the material can remain in place outside the limits, the Department will pay for the material at a reduced cost of $10 per sq. yd [$12 per sq. m]. The Department will consider any single occurrence of material outside the limitations to have a minimum dimension of at least 1 sq. yd [1 sq. m] in any dimension.

In addition to the list the above the pavement surface must meet requirements of 2399 (Pavement Surface Smoothness) requirements.

E.1 Lift Thickness

After compaction, the thickness of each lift shall be within a tolerance of ¼ in [6 mm] of the thickness shown on the plans, except that, if automatic grade controls are used, this thickness requirement will not apply to the first lift placed. This thickness requirement will not apply to a leveling lift whether or not automatic grade controls are required. The Engineer may require removal and replacement of any part of any lift that is constructed to less than the minimum required thickness, at no additional cost to the Department.

Measure cores taken for density determination for thickness also. Measure each core three times for thickness before sawing. Report the average of these three measurements. Document each lot's average core thickness and submit to the Engineer. If the average of the two Contractor cores exceed the specified tolerance, an additional two cores may be taken in the lot in question. The Engineer will use the average of all core thickness measurements per day per lift to determine daily compliance with thickness specifications.

On that portion of any lift constructed to more than the maximum permissible thickness, the materials used in the excess mixture above that required to construct that portion of the lift to the plan thickness plus ¼ in [6 mm] may be excluded from the pay quantities or at the discretion of the Engineer and at the Contractor's expense may be required to be removed and replaced.

F Asphalt Mixture Production (FOB Department Trucks)

Produce asphalt mixture for the Department. Load the mixture being produced onto Department furnished trucks at the mixing plant at a time agreed on by the Engineer and Contractor. The Engineer will notify the Contractor of the total quantity of mixture required not less than 2 weeks prior to completion of the final wearing course. The Engineer will not accept the asphalt mixture if it is unsuitable for the intended use.

G Small Quantity Paving

A MDR is not required for planned project quantities less than 9,000 sq. yd inches (4,500 sq. yd per 2-inch thickness, etc) [191,200 m^2 mm] or 500 ton [450 tonne]. Verify in writing that the asphalt mixture delivered to the project meets the requirements of Table 3139-3 and Table 2360-7, "Mixture Requirements." The Department will obtain samples, as determined by the Engineer, to verify mixture requirements and to perform material acceptance in accordance with 2360.2.G.14.b, "Isolated Failures at Mixture Start-Up — Production Air Voids," 2360.2 G.14.c, "Individual Failure — Gradation, Percent Asphalt Binder, Production Air Voids, and Adj. AFT," and 2360.2.G.14.h, "Coarse and Fine Aggregate Crushing Failure."

2360.4 METHOD OF MEASUREMENT

When paying for material by weight, the Engineer will measure separately asphalt mixture of each type by weight based on the total quantity of material hauled from the mixing plant. The Engineer will not make deductions for the asphalt materials.

When paying for material by area, the Engineer will separately measure asphalt mixture of each type and for each specific lift by area and by thickness on the basis of actual final dimensions placed.

2360.5 BASIS OF PAYMENT

The contract unit price for asphalt mixture used in each course includes the cost of constructing the asphalt surfacing and providing and incorporating asphalt binder, mineral filler, hydrated lime. Anti-stripping additives may be permitted or required as indicated in 2360.2.C.

The Department will pay for additives required by the contract at the relevant contract unit price for the mixture. The Department will pay for additives incorporated as directed by the Engineer as extra work in accordance with 1403, "Extra Work."

The Department will apply reduced payment if the mixture includes steel slag as one of the aggregate proportions and the production lab density at the design gyrations at the recommended or established asphalt content is greater than 160 lb per cu. ft [2,565 kg per cu. m]. The Department will pay for the mixture at the contract unit price, calculated as follows:

$$\%Payment = \frac{100 - (100 \times (production_density_at_design_gyrations - 160)}{160}$$

$$\left[\%Payment = \frac{100 - (100 \times (production_density_at_design_gyrations - 2{,}565)}{2{,}565}\right]$$

If the plans do not show a contract pay item for shoulder surfacing and other special construction, the Department will include payment for the quantities of material used for these purposes in the payment for the wearing course materials.

Complete yield checks and monitor thickness determinations to construct the work as shown on the plans. Use the tolerances for lift thickness in accordance with 2360.3.E, "Surface Requirements" and surface smoothness requirements in accordance with 2399 for occasional variations and not for continuous over-running or under-running, unless otherwise required by the Engineer.

The contract unit price for asphalt mixture production includes the cost of the material and loading onto Department-provided trucks at the mixing plant.

The Department will pay for plant mixed asphalt pavement on the basis of the following schedule:

Item No.:	**Item:**	**Unit:**
2360.501	Type SP* Wearing Course Mixture †‡	ton [metric ton]
2360.502	Type SP* Non-Wearing Course Mixture †‡	ton [metric ton]
2360.503	Type SP*‖ Course Mixture †‡# in [mm] thick,	square yard [square meter]
2360.504	Type SP*‖ Course Mixture †‡	square yard [square meter]
2360.505	Type SP * Bituminous Mixture for Specified Purpose	ton [metric ton]
2360.506	Type SP * Bituminous Mixture Production	ton [metric ton]

* Aggregate size Designation, 9.5, 12.5 or 19 as appropriate, see 2360.1.A.3.
‖ "Wearing" or "Non Wearing" as appropriate.
† Traffic level in accordance with Table 2360-1, "Traffic Levels."
‡ AC binder grade designation (Table 2360-2).
\# Lift thickness shown on the plans.

(2461) STRUCTURAL CONCRETE (2013 VERSION)

MnDOT 2461 shall be deleted and replaced with the following:

2461.1 DESCRIPTION

This work consists of producing, providing, placing, curing, and protecting portland cement concrete for placement in structures, pavements and incidental construction.

2461.2 MATERIALS

A Cementitious Materials

Provide cementitious materials from certified sources listed on the Approved/Qualified Products list.

Use Type I or Type I/II portland cement to produce Type 1 non-air-entrained concrete.

Use Type I or Type I/II portland cement and an air-entraining admixture listed on the Approved/Qualified Products List to produce Type 3 air-entrained concrete.

Use Type III portland cement as allowed by the Contract or the Engineer.

A.1 Portland Cement 3101

A.2 Ground Granulated Blast Furnace Slag. 3102

A.3 Blended Hydraulic Cement 3103

A.4 Fly Ash 3115

A.5 Cementitious Content

Provide concrete with the minimum cementitious content for the grades and slumps of concrete in accordance with Table 2461-1:

Table 2461-1
Minimum Cementitious Content,
lb per cu. yd [kg per cu. m]

Specified Slump Limit, *in [mm]*	Grades							
	U	V	W	X	Y	A	B	C
1 [25]	800 [475]	730 [435]	—	—	—	—	—	—
2 [50]	830 [490]	765 [455]	660 [390]	630 [375]	570 [340]	530 [315]	490 [290]	420 [250]
3 [75]	850 [505]	730 [475]	695 [410]	665 [395]	605 [360]	560 [335]	515 [305]	445 [265]
> 3 [75]	—	—	730 [475]	700 [415]	640 [380]	590 [350]	540 [320]	470 [280]

Except for grout mixtures, limit the maximum cementitious content for a cubic yard [cubic meter] of concrete to 850 lb [505 kg].

A.6 Cementitious Substitutions

The Contractor may replace Type I or Type I/II portland cement with other cementitious materials in accordance with the following restrictions:

(1) Maximum of 15 percent substitution of Class C or Class F Fly Ash, on a one for one basis, by weight of the designed portland cement;

(2) For Department designed mixes, the Department will adjust the batch weight of coarse aggregates to compensate for volume changes due to cementitious substitutions;

(3) Maximum of 33 percent substitution of Class C or Class F Fly Ash for concrete pavement, on a one for one basis, by weight of the designed portland cement;

(4) Maximum of 35 percent substitution of slag, on a one for one basis, by weight of the designed portland cement; and

(5) Ternary mixes (portland cement and two other supplementary cementitious materials) are allowed when approved by the Engineer, in conjunction with the Concrete Engineer, or required by or allowed in the Contract.

B Fine Aggregate 3126

C Coarse Aggregate 3137

Unless otherwise required by the Contract, the Contractor may select the class of coarse aggregate as defined in 3137.2.B, "Classification."

D Water 3906

E Concrete Admixtures 3113

The Contractor may use the following admixtures listed on the Approved/Qualified Products List:

(1) Type A, "Water Reducing and Mid Range Water Reducing Admixtures,"
(2) Type B, "Admixtures Identified as Hydration Stabilizers,"
(3) Type D, "Water Reducing and Retarding Admixtures"
(4) Type S, "Viscosity Modifying Admixtures."

Use of any other admixtures in the concrete requires approval of the Concrete Engineer unless otherwise required by or allowed in the Contract.

When incorporating admixtures into the concrete:

(1) Use admixture dosage rates recommended by the manufacturer.
(2) Add all admixtures at the plant.
(3) Provide admixture additions at the job site that are the same products as originally incorporated into the mix.
(4) Use calcium chloride in concrete as approved by the Engineer, in conjunction with the Concrete Engineer. Do not use calcium chloride in units containing prestressing steel or in bridge superstructure concrete.

E.1 Use of Additional Admixtures

On a case by case basis, the Engineer, in conjunction with the Concrete Engineer, will consider the use of the following admixtures, added either at the plant or at the job site, as listed on the Approved Products list:

(1) Type C, "Accelerating Admixtures"
(2) Type E, "Water Reducing and Accelerating Admixtures"
(3) Type F, "Water Reducing, High Range Admixtures"
(4) Type G, "Water Reducing, High Range and Retarding Admixtures"

E.1.a Delivery Time Beyond 90 Minutes

If the haul time does not facilitate mixing and placing the concrete within 90 minutes, perform the following procedures for pre-qualifying a concrete mix to extend the delivery time to 120 minutes. Extending the delivery time beyond 120 minutes will require additional testing at 30 minute intervals up to the maximum desired delivery time as directed by the Concrete Engineer.

(1) Provide a Contractor mix design in accordance with 2461.3G2 for each combination of materials.
(2) Specification 2461.3D is modified to allow up to 25% fly ash replacement for cement. All other requirements of 2461 apply.
(3) Laboratory trial batching on the proposed mix includes the following testing requirements:
    (a) Perform all laboratory trial batching at an AMRL accredited laboratory.
    (b) Perform all plastic concrete testing after adding all admixtures to the concrete mixture.
    (c) Perform slump, air content, unit weight and temperature testing immediately after batching and at 90 and 120 minutes.
    (d) Fabricate concrete cylinders for compressive strength at 90 and 120 minutes (sets of 3) and cylinders for hardened air content testing at 90 and 120 minutes (sets of 5).

(e) Test the cylinders for compressive strength at 28 days.

(f) Determine the hardened air content (ASTM C457) at a minimum of 7 days. The Contractor is required to test at 2 samples representing 90 minutes and 2 samples representing 120 minutes and provide MnDOT with the other 6 samples for testing at their discretion. Retain any hardened concrete test specimens for a minimum of 90 days for MnDOT to examine at their discretion.

(g) Ensure the admixture manufacturer's technical representative is present during the trial batching.

(h) Contact the MnDOT Concrete Engineering Unit a minimum of 2 days prior to mixing. This same 2 day notification is required prior to any physical testing on hardened concrete samples.

(i) Once accepted by the Concrete Engineer, the laboratory trial batching is considered acceptable for use for 5 years, unless it is determined the material sources have changed significantly since the initial laboratory testing and acceptance. In all cases, the Engineer will require field trial batching on a project specific basis.

(4) Field trial batching on the proposed mix for each specific project shall include batching in the presence of the Engineer and the following:

(a) Provide a QC Plan for extending the delivery time beyond 90 minutes.

(b) Mix and transport the concrete using the same materials as were utilized in the laboratory trial batching.

(c) Batch a minimum 5 cu. yd (4 cu. m) of concrete utilizing the same methods intended for use when supplying concrete placed into the permanent work.

(d) Maintain the ready mix truck in transit; by either driving around the yard or on the roadway; and maintain the drum speed at 5 to 7 revolutions per minute for the entire 120 minutes.

(e) Perform all plastic concrete testing after adding admixtures to the concrete mixture.

(f) Perform slump, air content, unit weight and temperature testing at 90 and 120 minutes.

(g) Fabricate concrete cylinders for compressive strength at 90 and 120 minutes (sets of 3) and cylinders for hardened air content testing at 90 and 120 minutes (sets of 2).

(h) Test the cylinders for compressive strength at a minimum of 7 days.

(i) Determine the hardened air content (ASTM C457) at a minimum of 7 days. The Contractor is required to test 1 sample representing 90 minutes and 1 sample representing 120 minutes and provide MnDOT with the other 2 samples for testing at their discretion. Retain any hardened concrete test specimens for a minimum of 90 days for MnDOT to examine at their discretion.

(j) Incorporate the trial batch concrete into other work with the approval of the Engineer.

(k) The Contractor must demonstrate to the Engineer the ability to properly mix, control and place the concrete.

(5) The Concrete Engineer, in coordination with the Engineer, will review the trial batch results and all related concrete testing for compliance with the QC Plan and the Contract. Final approval of the mixture is based on satisfactory field placement and performance.

F Concrete Mix Designs

F.1 Department Designed

The Department will provide the estimated composition of concrete mixes unless otherwise required by the Contract.

The Department may adjust the mix composition of the concrete without adjusting the Contract unit price for any Contract items.

F.1.a Concrete Yield

The Department defines concrete yield as the ratio of the volume of mixed concrete, less accountable waste, to the planned volume of the work constructed. The Department will not assume responsibility for the yield from a given volume of mixed concrete.

F.1.b High-Early Strength Concrete

When the Engineer requires high-early strength concrete, the concrete is designed in accordance with the following:

(1) Increasing the cement content of the concrete up to 30 percent; using an approved accelerator as allowed by the Engineer, in conjunction with the Concrete Engineer; or both.

(2) Using 100 percent portland cement, unless allowed by the Contract or the Engineer.

(3) A maximum cement content for a cubic yard [cubic meter] of concrete not to exceed 900 lb [535 kg].

(4) A water/cement ratio not to exceed 0.38 for Type 3 Concrete unless otherwise required by the Contract.

F.2 Contractor Designed

Design the concrete mix based on an absolute volume of 27.00 cu. ft ± 0.10 cu. ft [1.000 cu. m ± 0.003 cu. m] for the following:

(1) Concrete paving mixes in accordance with 2301, "Concrete Pavement;"

(2) Concrete mixes with an anticipated or required 28-day compressive strength of at least 5,000 psi [34 MPa];

(3) Precast concrete in accordance with 2405, "Prestressed Concrete Beams," 2412, "Precast Concrete Box Culverts," 3236, "Reinforced Concrete Pipe," 3238, "Precast Concrete Box Culverts," 3621, "Concrete Masonry Units," 3622, "Sectional Concrete Manhole and Catch Basin Units," and 3630, "Precast Concrete Median Barriers;"

(4) Colored concrete;

(5) Stamped concrete;

(6) Cellular Concrete Grout – Controlled Low Strength Material (CLSM);

(7) Extended Delivery Times Beyond 90 minutes; and

(8) Concrete as otherwise required by the Contract.

Submit the concrete mixes using the MnDOT Contractor Mix Design Submittal Package available on the Department's website at least 21 calendar days before initial placement of the concrete mix. The Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data for mix design calculations.

The Concrete Engineer, in coordination with the Engineer, will review the mix design submittal and will approve the materials and mix design for compliance with the Contract.

The Contractor assumes full responsibility for the mix design and performance of the concrete.

The Engineer determines final acceptance of the concrete for payment based on satisfactory field placement and performance.

F.3 Classification of Concrete

The Department will classify concrete by type, grade, consistency, and aggregate size. Refer to the mix number and Table 2461-2 to determine the mix requirements for each item of work.

Table 2461-2
Mix Number Identification

First Digit	Second Digit	Third Digit	Fourth Digit	Additional Digits
Type	Grade	Slump range	Coarse aggregate gradation range	Class A coarse aggregate when required, modified mix designation, or both

Refer to individual Contract items in the Standard Specification for Mix Numbers. Deviations from the specified Mix Numbers require coordination with the Concrete Engineer.

If the Contract does not show a concrete mix number, provide Type 3, Grade Y concrete with a slump and aggregate gradation determined by the Engineer.

The Department will designate grout by type and grade followed by the word "GROUT." Do not provide grout containing coarse aggregate. If the plans do not show a type or grade for grout, provide 3A GROUT.

F.3.a Type Designation

Provide Type 1 or Type 3 concrete in accordance with Table 2461-3:

Table 2461-3
Concrete Type Designation

Concrete Type	Target Air Content*, %	Maximum Water/Cement Ratio‖
1	2.0	≤ 0.53 for 1A43 ≤ 0.68 for 1C62 ≤ 0.64 for 1C Grout
3	6.5 †	≤ 0.45†#

* For concrete mix design purposes only.

‖ The water/cement ratio is defined as the ratio of the total water weight to the total cementitious weight.

† Unless otherwise required by 2301 or elsewhere in the Contract.

#The maximum water/cement ratio for machine placed concrete is 0.42.

F.3.b Grade Designation

The Department will designate concrete grade using a letter to represent the anticipated compressive strength and the minimum cementitious content in accordance with 2461.2.A.5, "Cementitious Content," and Table 2461-4:

Table 2461-4
Concrete Grade Designation

Concrete Grade	Type 1 Anticipated Compressive Strength, *psi [MPa]* *	Type 3 Anticipated Compressive Strength, *psi [MPa]* *
U	6,300 [43]	5,600 [39]
V	6,000 [41]	5,300 [37]
W	5,700 [39]	5,000 [34]
X	5,400 [37]	4,700 [32]
Y	5,000 [34]	4,300 [30]
A	4,500 [31]	3,900 [27]
B	4,100 [28]	3,400 [23]
C	3,200 [22]	2,700 [19]

* Anticipated minimum strength produced in accordance with the Department specifications and cured for 28 days under laboratory conditions.

The Concrete Engineer, in coordination with the Engineer, may increase the cement content for concrete with test cylinder results less than the anticipated compressive strength in accordance with Table 2461-4, "Concrete Grade Designation." The Contractor may request an increase in the cement content as approved by the Engineer, in conjunction with the Concrete Engineer.

F.3.c Slump Designation

Refer to the slump designation for the upper limit of the slump range without a water reducer in accordance with Table 2461-5:

Table 2461-5
Slump Designation

Slump Designation	Slump Range without Water Reducer, *in [mm]*
1	½ – 1 [12 – 25]
2	1 – 2 [25 – 50]
3	1 – 3 [25 – 75]
4	2 – 4 [50 – 100]
5	2 – 5 [50 – 125]
6	3 – 6 [75 – 150]

F.3.d Coarse Aggregate (CA) Designation

Refer to the coarse aggregate designation for the range of optional coarse aggregates gradations allowed in the mix in accordance with Table 3137-4, "Coarse Aggregate Designation for Concrete," and Table 2461-6:

Table 2461-6
Coarse Aggregate Designation for Concrete

Range	Optional Coarse Aggregate Designation
0	CA-00 only
1	CA-15 to CA-50, inclusive
2	CA-15 to CA-60, inclusive
3	CA-35 to CA-60, inclusive
4	CA-35 to CA-60, inclusive
5	CA-45 to CA-60, inclusive
6	CA-50 to CA-70, inclusive
7	CA-70 only
8	CA-80 only

F.3.e Additional Designations

For mix designs that require a specified class of coarse aggregate as defined in 3137.2.B, "Classification," an additional letter will follow the fourth digit of the Mix Number such as "A" (Class A Aggregate Requirement).

The Engineer may identify special concrete mix designations with additional letters following the last digit such as "HE" (High Early), "WC" (Water/Cement Ratio), "HPC" (High Performance Concrete), "MS" (Microsilica), or others.

2461.3 CONSTRUCTION REQUIREMENTS

A Batching Equipment

A.1 Mixer Requirements

Provide stationary mixers or truck mixers.

A.2 General Condition

Maintain mixers as necessary to detect changes in condition due to accumulations of hardened concrete or mortar and examine to detect wear of blades.

Replace or recondition pickup and throwover blades in mixers with a rated capacity less than 14 cu. ft [0.40 cu. m] showing a blade wear loss of greater than ½ in [13 mm], and pickup and throwover blades in mixers of greater capacity, showing a blade wear loss of no greater than ¾ in [19 mm] from the original factory dimensions.

A.3 Manufacturer's Rating Plate

Provide mixers that include the manufacturer's rating plate, showing the following information:

(1) Serial number of the unit,
(2) Mixing speed of the drum or paddles, and
(3) Maximum capacity in terms of volume of mixed concrete.

A.4 Drum Speed for Stationary Mixers

Operate the drum speed in the mixer as specified by the manufacturer or as directed by the Engineer.

A.5 Auxiliary Equipment Requirements

Provide mixers equipped with the following:

(1) Timing device,
(2) Discharge locking device,
(3) Water measuring device that operates mechanically and automatically during each batching cycle, and
(4) A graduated adjustable indicator device to represent the volume of discharge in increments no greater than ¼ gal [1 L] in full view.

A.6 Mixer Capacity

Do not exceed the manufacturer's rated capacity of the mixer when mixing a single batch of concrete.

Batch concrete in volumes the mixer can accommodate without spilling, leaking, or segregating during the charging, mixing, or discharging operations. Provide mixers with a capacity of at least 1 sack [0.25 cu. m].

A.7 Mixing Time

The Department defines the mixing time as the time period beginning when the cement and aggregates enter the mixer drum and ending when the discharge begins.

Refer to the manufacturer's recommended minimum mixing time for single drum and dual drum mixers. In the absence of manufacturer's recommendation, the Engineer will designate the minimum mixing time. The minimum mixing time for any concrete batch is 60 s. The Contractor may reduce the manufacturer's recommended minimum mixing time or the Engineer designated mixing time if the Contractor obtains uniform mixing in accordance with 2461.3.E, "Mixing Requirements," and as approved by the Engineer, in conjunction with the Concrete Engineer.

If there is evidence of inadequately mixed concrete (unmixed or partially mixed materials) during concrete placement, the Engineer may direct an increase in the mixing time.

A.8 Turbine Type Mixers

Provide turbine type mixers meeting the applicable requirements for conventional type mixers (2461.3.A.1 through 2461.3.A.7) and in accordance with this subsection (2461.3.A.8). Maintain the mixer drum in a cylindrical shape within ¾ in [19 mm] from the original factory dimensions at any point. Maintain the mixer discharge gate in

a mortar tight condition in the closed position. Replace or recondition mixer paddles showing a wear loss greater than ½ in [13 mm] from the original factory dimensions.

Add the mixing water to the batch materials in a manner that distributes the water to the inner or central areas of the drum. Start the flow of water before introducing the solid batch materials into the mixer drum.

During mixing, operate the paddles at a speed between 20 revolutions and 30 revolutions per minute. After adding the batch materials to the drum, mix the concrete for an additional 60 s.

A.9 Horizontal Axial-Revolving Blade Type Mixers

Provide horizontal axial-revolving blade type mixers in accordance with the applicable requirements for conventional type mixers (2461.3.A.1 through 2461.3.A.7) and in accordance with this subsection (2461.3.A.9).

Charge the water, aggregates, and cement in the sequence approved by the Engineer. Test the concrete uniformity as directed by the Engineer. The Engineer will use concrete uniformity tests to determine the minimum mixing time.

B Transportation Units

B.1 General Requirements

Equip transportation units intended for both mixing and agitating with watertight revolving drums mounted and powered and fitted with properly designed mixing blades in accordance with 2461.3.A.1 through 2461.3.A.7. Provide units capable of combining all the ingredients into a homogeneous mixture and designed to provide two drum speeds, one for mixing and the other for agitating. Provide units capable of delivering the concrete without segregation or loss of any of the batch materials.

Equip the mixer drum with a working counting device to record the number of revolutions.

Equip dump trucks and agitator trucks with vibrators to aid in discharge.

B.2 Capacity of Transportation Units

Refer to the truck mixer manufacturer's certification plate attached to the unit for the maximum capacity of the unit. If the unit will not satisfactorily mix the maximum volume shown, reduce the batch volume to allow proper mixing or discontinue use of the mixing unit as directed by the Engineer until the problem is corrected.

C Handling and Storing Materials

C.1 Batch Material Requirements

Do not change the source, kind or gradation of batch materials after the start of concrete production for the work unless otherwise approved by the Engineer. If the Engineer approves use of different material, completely exhaust the supply on hand before changing to the different material.

If delivering freshly washed aggregates to the batching plant, drain the aggregates for at least 12 h before using in the batching operation. If draining freshly washed aggregates at the site of the batching plant, completely

separate the drained material from the undrained materials, and provide for the disposal of water that accumulates from the drainage of materials.

Provide smooth, firm, and well-drained stockpile sites cleared of vegetable and extraneous matter. Where the natural foundation is unsatisfactory, as determined by the Engineer, construct the stockpiles on suitable platforms. Construct suitable bulkheads or partitions to separate different kinds of aggregate, gradation, or water content.

Construct stockpiles by methods that hold segregation and degradation to a minimum. If the Engineer sees segregation or degradation, the Engineer may designate that pile as unacceptable for use.

Do not use aggregates used to construct runways for loading or hauling equipment in concrete batches.

Use of aggregates from the bottom 1 ft [0.3 m] of a stockpile placed on an unprepared surface in concrete batches is allowed only under the Engineer's direct supervision and if the material meets all requirements of 3126, "Fine Aggregate for Portland Cement Concrete," and 3137, "Coarse Aggregate for Portland Cement Concrete."

Provide aggregates in accordance with the specified gradation requirements.

The Engineer will consider aggregates unacceptable if the variation in moisture content carried by any of the aggregates causes a marked variation in the consistency of successive batches of the mixed concrete, and will suspend operations until corrected.

C.2 Concrete Temperature Control

Produce concrete at temperatures from 50 °F to 90 °F [10 °C to 30 °C] and maintain temperatures until deposited in the work.

If necessary to maintain placement temperature, uniformly heat or cool the water, aggregates, or both, before introduction into the mixer. Control the temperature of the mixing water during heating or cooling.

Use aggregate at temperatures from 32 °F to 130 °F [0 °C to 55 °C]. Do not allow cementitious material to contact other batch material when the aggregate temperature exceeds 130 °F [55 °C].

Do not heat the cement, add salt, or add chemical admixtures to the concrete mix to prevent freezing.

Use a heating system to heat batch materials as approved by the Engineer. Do not use steam jets to spot heat the material as the work progresses.

Do not place mixer heaters intended for heating the batch materials in the mixer drum.

D Batching Requirements

Calibrate weighing equipment in accordance with 1901, "Measurement of Quantities." Inspect and calibrate the scales in accordance with the Concrete Manual.

D.1 Batching by Weight

D.1.a Proportioning Methods

Proportion concrete batch materials by weight in a central plant or by volume as directed by the Engineer, in conjunction with the Concrete Engineer.

D.1.b Weighing Equipment and Tolerances

Weigh or measure concrete mixture ingredients using load cells or meters for ready-mix and paving concrete to within the targeted batch weight in accordance with the following:

(1) Water – 1 percent,
(2) Cement – 1 percent,
(3) Other cementitious materials – 3 percent,
(4) Aggregates – 2 percent, and
(5) Admixtures – 3 percent.

D.1.c Batching of Mixing Water

Measure the mixing water on scales or water metering devices containing the following:

(1) A discharge indicator capable of being set to within 1 gal [5 L] of a predetermined quantity,
(2) A positive automatic shutoff valve, and
(3) An approved inspection seal on the scale or water metering device dating the time of the previous calibration and adjustment

An authorized service agency will calibrate the water meter every 6 months and make adjustments as necessary before use meeting the requirements of the weighing procedure in the Concrete Manual.

Check the water meter for accuracy at least once each month as the work progresses.

D.1.d Batching of Cementitious Materials

Weigh the cementitious material independently of the aggregates in separate compartments or on separate scales.

If the Contractor weighs the cement first and then separately records the weights of each individual cementitious material, the Contractor may weigh the cementitious materials cumulatively as approved by the Engineer, in conjunction with the Concrete Engineer.

D.1.e Batching of Aggregates

If the Contractor records each individual fraction weight of aggregates separately, the Contractor may weigh aggregates cumulatively as approved by the Engineer, in conjunction with the Concrete Engineer.

D.1.f Admixture Proportioning

If using two or more admixtures in a single concrete batch, add each admixture separately to prevent interaction of the different admixtures before mixing with other batch materials. Agitate admixtures to ensure homogeneous concentrations in accordance with the manufacturers recommendations.

Incorporate admixtures to the batch mix in liquid form. Maintain admixture solutions at a uniform concentration at all times. Use the solution concentration and proportions designated by the manufacturer.

If using a mechanical dispenser for proportioning Class I or Class II admixtures, provide a site gauge or meter. Have the admixture manufacturer check admixture dispensers yearly to determine accuracy and ensure unobstructed flow.

D.2 Batching by Volume

Proportion concrete for bridge deck overlays by volume or as required by the Contract.

If the Contractor calibrates the mixer for the specific batch materials in use, the Contractor may proportion concrete on other items of work by volume as approved by the Engineer in writing.

The Engineer will approve all methods and equipment used in volumetric proportioning.

Determine all material proportions and calibration settings on the basis of 100 lb [100 kg] of cementitious material.

Provide and use only sacked cement in the original mill containers unless the Contractor calibrates the mixer for the specific materials in use. Do not use fractional sacks.

Increase the cementitious content by 10 percent in the computation of volume proportions unless the Contractor calibrates the mixer for the specific materials in use.

E Mixing Requirements

The Engineer may check the water measuring equipment for accuracy before mixing operations begin and at any other time the Engineer considers necessary.

Mix concrete by one of the following methods:

(1) A central plant (stationary plant),
(2) Entirely or in part in truck mixers, or
(3) At the construction site.

Do not allow the mixing batch to merge or intermix with the subsequent dry batch during mixing.

Discharge water remaining in the drums before batching.

Mix concrete to provide a mixture that is homogeneous and uniform in color. The Engineer will reject concrete batches that show a marked variation in consistency or evidence of improper mixing as unacceptable work

in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

After completely mixing the concrete, either in a central plant mixer or truck mixer, continuously agitate while in transit to the point of placement until the concrete is discharged from the unit, unless otherwise allowed by the Engineer, in conjunction with the Concrete Engineer.

If the mixing does not appear uniform, perform slump tests at the 15 percentage point and the 85 percentage points during unloading. If the results show a slump variation greater than 1½ in [38 mm], stop work and correct the mixing unit.

Produce concrete in such quantity and at such a rate as proper placement and finishing will permit. Do not re-temper partially set concrete.

Do not hand mix concrete.

E.1 Mixing In Truck Mixer

Charge the materials into the truck mixer drum by introducing sufficient water before adding solid materials. Perform charging operations without losing materials.

Leave the truck mixer at the plant site for a minimum of 5 min or 50 revolutions during the mixing period. Transport the concrete at agitating speed to the point of placement.

F Certified Ready-Mix Concrete

F.1 Definitions

The Department defines ready-mix concrete as one of the following:

(1) Central-mixed concrete proportioned and mixed in a stationary plant and hauled to the point of placement in revolving drum agitator trucks or a truck mixer, or

(2) Truck-mixed concrete proportioned in a stationary plant and fully mixed in truck mixers.

Table 2461-7 defines commonly used certified ready-mix terms.

Table 2461-7
Certified Ready-Mix Terminology

Term	Definition
Mix design water	The maximum allowable water content for 1 cu. yd [1 cu. m] of concrete in accordance with MnDOT Form TP 02406, *Estimated Composition of Concrete Mixes.*
Total moisture factor	Factor used to determine total amount of water carried by a given wet aggregate.
Absorption factor	Factor used to determine the water contained within the pores of the aggregate and is held within the particles by capillary force.

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 added to free moisture. Total water may also include the water used in diluting admixture solutions.
Temper water	Water added in mixer to adjust slump.
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 Contractor.

F.2 General Requirements

Supply ready-mix concrete in accordance with 2461.3.F.3, "Certified Ready-Mix Plant Program."

The Engineer will reject ready-mix concrete delivered to the work site that does not meet the specified requirements for delivery time, consistency, quality, air content, or other properties as unacceptable work in accordance with 1512, "Unacceptable and Unauthorized Work."

Provide batches for a delivered load of concrete in sizes of at least 1 cu. yd [1 cu. m].

F.3 Certified Ready-Mix Plant Program

Provide ready-mix concrete produced by a certified ready-mix plant. Perform quality control of concrete production under a certification program for ready-mix concrete plants.

Complete all concrete plant documentation utilizing the Concrete Ready-mix Plant QC Workbook available from the MnDOT Concrete Engineering website. Electronically submit the QC Workbook to the Engineer by the Tuesday immediately following the previous week's production.

F.3.a Plant Certification

Before concrete production each season, ensure the producer performs the following:

(1) Performs an on-site inspection at the concrete plant with the Engineer and completes a MnDOT Form 2163, *Concrete Plant Contact Report.*

(2) Signs the report certifying compliance with the Certified Ready Mix requirements and continual maintenance of the plant. The Engineer will also sign MnDOT Form 2163, *Concrete Plant Contact Report.*

(3) Provides a copy of the current Concrete Manual and retains it on-site.

(4) Equips the Certified Ready-Mix Plant with a working facsimile machine or an email address.

(5) Keeps plant reports, charts ,and supporting documentation on file at the plant site for 5 calendar years.

(6) Provides electronic scales for weighing all materials.

F.3.b Sampling and Testing

Provide a MnDOT Certified Concrete Plant Level 2 Technician to oversee testing and plant operations and to remain on-site during concrete production or have cellular phone availability.

Provide facilities in accordance with 1604, "Plant Inspection – Commercial Facility," for the use of the plant technician in performing tests.

Ensure the producer provides technicians with certification at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual. The Engineer will provide technicians with certification at least meeting MnDOT Concrete Plant Level 1 to perform all of the duties in accordance with the Concrete Manual.

Ensure the producer performs testing in accordance with the Concrete Manual and determines testing rates meeting the requirements of the Schedule of Materials Control. The Engineer performs testing in accordance with the Concrete Manual and determines testing rates meeting the requirements of the Schedule of Materials Control.

Take samples randomly using ASTM D 3665, Section 5.

Perform testing at the certified ready-mix plant site. Perform additional testing as directed by the Engineer. The Engineer may oversee the quality control sampling process.

Provide equipment and perform calibrations meeting the requirements of the following:

(1) AASHTO T 27, "Sieve Analysis of Fine and Coarse Aggregates,"
(2) AASHTO T 255, "Total Moisture Content of Aggregate by Drying,"
(3) AASHTO M 92, "Wire-cloth Sieves for Testing Purpose," and
(4) AASHTO M 231, "Weighing Devices Used in the Testing of Materials."

F.3.c Gradations

Determine the gradation of the fine aggregates and the coarse aggregates as required by the Contract. Use mechanical shakers for sieve analysis of fine and coarse aggregates.

Identify quality control companion samples with the following information:

(1) Date,
(2) Test number,
(3) Time,
(4) Type of material,
(5) Plant, and
(6) Sampling location.

Document gradation results on MnDOT Form 2449, *Weekly Concrete Aggregate Report.*

Chart all producer gradation results and Department verification gradation results of the coarse aggregate and the No. 8 [2.36 mm], No. 30 [600 μm], and No. 50 [300 μm] sieves of the fine aggregate.

The producer may request a reduction in testing rates as approved by the Engineer, in conjunction with the Concrete Engineer.

If the gradation tests on split samples from quality control or verification samples result in a variation between the producer and the Department greater than that set forth in Table 2461-8, the parties shall follow the procedures for test result dispute resolution available from the MnDOT Concrete Engineering website.

Table 2461-8
Allowable Variations on Percent Passing Sieves

Sieve Size	Allowed Percentage
2 in – ⅜ in [50 mm – 9.5 mm]	± 6
No. 4 – No. 30 [4.75 mm – 600 μm]	± 4
No. 50 [300 μm]	± 3
No. 100 [150 μm]	± 2
No. 200 [75 μm]	± 0.6

F.3.c.(1) Non-conforming Material

Only place concrete meeting the gradation requirements in the work. If the Contractor places concrete not meeting the gradation requirements into the work, the Engineer will not accept nonconforming concrete at the Contract unit price.

For concrete not meeting the required gradation, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the concrete Contract item in accordance with Table 2461-9 and Table 2461-10. When there is not a separate *Structural Concrete* Contract unit price for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of $100.00 per cu. yd [$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

Table 2461-9 General Concrete for Individual Aggregate Fractions Fine and Coarse Aggregate Specification Sieves other than Fine Aggregate No. 200 [75 µm]	
Outside of Specification, %	**Adjusted Contract Unit Price**
≤ 3	The Department will pay 98 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
4 – 6	The Department will pay 95 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
7 – 10	The Department will pay 90 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
> 10	The Department will pay 75 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.

Table 2461-10 General Concrete for No. 200 [75 µm] Sieve of Fine Aggregate	
Outside of Specification, %	**Adjusted Contract Unit Price**
< 0.3	The Department will pay 98 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
0.4 – 0.6	The Department will pay 95 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
0.7 – 1.0	The Department will pay 90 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.
> 1.0	The Department will pay for 75 percent of the relevant Contract unit price for concrete placed as approved by the Engineer.

If failure occurs on the fine aggregate No. 200 [75 µm] sieve and on other sieves concurrently, the Department will only reduce the price based on the larger percentage deduction.

The Engineer, in conjunction with the Concrete Engineer, will determine adjusted Contract unit prices for coarse aggregate quality failures in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

F.3.d Moisture Content

Ensure the producer performs the following:

(1) Determines the moisture content using the oven-dry method in all fractions of the aggregate.
(2) Documents moisture tests on MnDOT Form 2152, *Concrete Batching Report*.
(3) Charts the moisture content of each aggregate.

In addition to the oven-dry moisture test, the producer may obtain the moisture content in the fine aggregate using a moisture probe.

To obtain approval for the use of a moisture probe, ensure the producer calibrates the moisture probe before each construction season meeting the requirements of the Concrete Manual. Ensure the producer verifies and charts both the probe moisture content and the oven-dry verification moisture test.

F.3.e Plant Diaries

Provide daily plant diaries in accordance with the Concrete Manual using an approved form from the MnDOT's Concrete Engineering website.

F.3.f Batch Weight Verification

The Engineer will observe the batching process to verify weights shown on the Certificate of Compliance.

The Engineer will observe the actual water batched during each collection of verification gradations in accordance with the following:

(1) Watching the ready-mix truck reverse the drum after washing,
(2) Verifying use of the current moisture test,
(3) Verifying that any additional water added to adjust the slump is recorded, and
(4) Validating water weights on the load batched and comparing the total water with the design water.

The Engineer will document the actual water batched on MnDOT Form 24143, *Weekly Certified Ready-Mix Plant Report* and submit a copy to the Engineer to provide to the Concrete Engineer.

The Engineer will provide plant diaries in accordance with the Concrete Manual.

F.3.g Certificate of Compliance

Provide a computerized Certificate of Compliance with each truckload of ready-mixed concrete at the time of delivery. The Department defines computerized to mean a document that records mix design quantities from load cells and meters.

If the computer that generates the Certificate of Compliance malfunctions, the Engineer may allow the Contractor to finish any pours in progress if the producer issues a handwritten MnDOT Form 0042, *Certificate of Compliance* with each load. Do not allow the producer to begin new pours without a working computerized Certificate of Compliance.

Provide a computerized Certificate of Compliance from the producer for each item of information, including the following:

(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 (if 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 (MnDOT Mix Designation Number).

(11) Cementitious materials using MnDOT Standard Abbreviations.

(12) Admixtures using MnDOT Standard Abbreviations.

(13) Aggregate sources using 5 digit State Pit Numbers.

(14) Admixture quantity in fluid ounces per 100 lb [milliliters per kilogram] or ounces per cubic yard [milliliters per cubic meter].

(15) Batch information for materials using MnDOT standardized labels to represent each column in Table 2461-11. Present the information in the order listed across the page (a through k) or print the information using two lines provided that the materials are identified in each line of information.

Table 2461-11
Standardized Certificate of Compliance Labels

	Formula Letter	Formula	Standard Label
a	Ingredients (aggregate, cementitious, water, admixtures)	—	Ingredient
b	Product Source (MnDOT Standard Abbreviation)b	—	Source
c	Total Moisture Factor (in decimals to 3 places)	—	MCFac
d	Absorption Factor (in decimals to 3 places)	—	AbsFac
e	MnDOT mix design oven dry (OD) weights, *lb/cu. yd [kg/cu. m]*	—	OD
f	Absorbed moisture in the aggregates, *lb/cu. yd [kg/cu. m]*	(e × d)	Abs
g	Saturated surface dry (SSD) weights for aggregates, *lb/cu. yd [kg/cu. m]*)	(e + f)	SSD
h	Free moisture, *lb/cu. yd [kg/cu. m]*	(c - d) × e	Free Mst
i	Target weights for one cubic yard [cubic meter] of concrete, *lb/cu. yd [kg/cu. m]*	(g + h)	CY Targ [CM Targ]
j	Target batch weights, *lb [kg]*	(cu. yd × i) [cu. m × i]	Target
k	Actual batch weights, *lb [kg]*	—	Actual

NOTE: Actual cubic yards [cubic meters] 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) in pounds [kilograms].

(17) Water available to add [(Mix Design Water) × (Target CY (CM)) – Total water] in gallons [liters].

(18) Space to note the water adjustment information, including:

(18.1) Water in gallons [liters] added to truck at plant (filled in by producer, enter zero if no water is added).

(18.2) Water in gallons [liters] added to truck at the jobsite (filled in by producer or Engineer, enter zero if no water is added), and

(18.3) Total actual water in pounds [kilogram] (Total Water from Certificate of Compliance plus any additions).

(19) The following information printed with enough room beside each item to allow the Engineer to record the test results:

(19.1) Air content,

(19.2) Air temperature,

(19.3) Concrete temperature,

(19.4) Slump,

(19.5) Cylinder number,

(19.6) Location or part of structure,

(19.7) Time discharge, and

(19.8) Signature of Inspector.

(20) Location for the signature of the MnDOT Certified Plant 1 Technician representing the producer. The technician will review the first Certificate of Compliance for each mix type, each day, for accuracy and hand sign the Certificate of Compliance at a location designated for signature signifying agreement to the terms of this policy and to certify that the materials itemized in the shipment comply requirements of the Contract.

F.3.h Decertification

If the Contractor provides concrete from a plant that cannot produce concrete, fails to perform testing, fails to report accurate results, or fails to complete the required documentation, the Engineer may reject the concrete as unacceptable in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

The Concrete Engineer, with coordination from the Engineer, may decertify the plant and halt production of concrete if the producer performs the following:

(1) Procedural changes made after the completion of the Concrete Plant Contact Report and after starting the work that cause non-compliance with the program,

(2) Continually produces concrete in non-compliance with this section,

(3) Completely disregards the requirements of this section, and

(4) Submits fraudulent test reports.

If decertifying the plant, the Concrete Engineer may perform the following:

(1) Revoke plant certification.

(2) Revoke technician certification for individuals involved,

(3) Revoke bidding privileges as determined by the Construction Engineer, and

(4) Criminal prosecution for fraud as determined by the Attorney General.

G Concrete Placement

Do not produce concrete earlier than 60 min before the National Weather Service official sunrise, unless the Engineer approves otherwise.

Place concrete after the Engineer inspects and approves the foundation preparations, forms and falsework erection, placement of reinforcement steel, materials, equipment condition, and cold weather protection.

Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the excessive moisture levels make the grade unstable. Maintain the surface temperature above freezing for forms, steel, and adjacent concrete that will come in contact with the poured concrete before concrete placement.

Protect the concrete from freezing.

Protect the concrete against damage from construction operations or traffic.

Assume full responsibility for the acceptable production, placement, finishing, and curing of all concrete under the conditions prevailing, regardless of the restrictions imposed. Provide any artificial lighting, rain or cold weather protection necessary at no additional cost to the Department. The Engineer may subject any defects in concrete or concrete surfaces resulting from weather conditions, inadequate lighting, or other causes to 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

G.1 Notice of Inspection

Notify the Engineer at least 24 h before beginning concrete production to allow the Engineer time to provide inspection forces needed for the work and to approve preparations for concrete placement. If the Contractor fails to provide 24 h notice, the Engineer may delay concrete placement in accordance with 1503, "Conformity with Contract Documents" and 1512, "Unacceptable and Unauthorized Work."

If the producer needs to change plants during placement, notify the Engineer and obtain approval before changing the plant.

G.2 Placement Temperatures

Do not place concrete when the air temperature at the point of placement is below 36 °F [2 °C] or is expected to fall below 36 °F [2 °C] within the following 24 h period unless approved cold-weather provisions are in-place. Discontinue concrete placement if the air temperature falls below 36 °F [2 °C].

Maintain concrete at a temperature from 50 °F to 90 °F [10 °C to 30 °C] until placement.

G.3 Delivery Requirements

Place concrete into the work in accordance with the following:

(1) Type 1 Concrete—within 90 min of batching, and

(2) Type 3 Concrete— within 90 minutes of batching when all admixtures are added at the plant at the manufacturer's recommended dosage rates listed on the Approved Products list. If the haul time does not facilitate mixing and placing the concrete within 90 minutes, test the concrete in accordance with 2461.3E1a.

The Contractor may transport Type 3 concrete in non-agitating equipment if the concrete is discharged within 45 min of batching.

Batch time starts when the batch plant or the transit mix truck adds the cement to the other batch materials.

G.4 Field Adjustments

Do not add additional mixing water once the concrete is 60 min old.

Mix the load a minimum of 5 minutes or 50 revolutions at mixing speed after addition of any admixture.

For concrete with slumps of greater than 1 inch (25 mm) do not make water adjustments after approximately 1 cubic yard (**1 m^3**) is discharged.

For concrete with slumps of 1 inch (25 mm) or less, the Engineer will allow water adjustments as necessary to facilitate placement.

The Engineer will test the concrete for compliance with 2461.3.G.6, "Consistency," and 2461.3.G.7, "Air Content," in accordance with the following:

(1) If the test taken by the Engineer passes, the Engineer will continue verification testing in accordance with the Schedule of Materials Control.

(2) If the test taken by the Engineer fails, make adjustments and perform any quality control testing before the Engineer performs a final test. Acceptance or rejection of the truck is based on the Engineer's final test result.

(3) The Engineer will test up to two additional trucks in accordance with items (1) and (2) above.

(4) If the concrete does not meet the specification after those three trucks, the Engineer will reduce their verification testing rate to once per truck for acceptance for the remainder of the pour.

G.5 Test Methods and Specimens

The Engineer will furnish molds based on the maximum size aggregate for the test specimens in accordance with the following:

(1) 4 in × 8 in [100 mm × 200 mm] cylinder molds,

(2) 6 in × 12 in [150 in × 300 mm] cylinder molds for maximum aggregate sizes greater than 1¼ in [31.5 mm], and

(3) 6 in × 6 in × 20 in [150 in × 150 in × 500 mm] beam molds and use other beam mold sizes as approved by the Engineer.

Provide curing tanks of adequate size and number for curing all of the concrete test specimens in accordance with 2031.3.C, "Special Requirements." Supply the curing tanks with heaters to maintain a water temperature of 73 °F ± 3 °F [23 °C ± 2 °C].

If Contractor testing is required by the Contract, perform the following:

(1) Determine the required testing rates in accordance with the Schedule of Materials Control,
(2) Take samples after the first ¼ cu yd [cu. m] and before discharging the last ¼ cu. yd [cu. m] of the batch,
(3) Perform concrete sampling and testing meeting the requirements of the Concrete Manual,
(4) Measure slump and air content, and make strength specimens when placing the concrete,
(5) Record field measurements, including strength specimen identifications on MnDOT Form 2448, *Weekly Concrete Report*, to provide to the Concrete Engineer.

The Engineer will transport the cylinders to the Department's Laboratory for testing.

G.5.a Standard Strength Cylinders

The Department will perform the following for standard strength cylinders:

(1) Cast cylinders for testing at 28 days,
(2) Mark cylinders for identification of the represented unit or section of concrete,
(3) Cure the cylinders meeting the requirements of the Concrete Manual, and
(4) Submit cylinders and a completed cylinder identification card to the Department's Laboratory.

The producer of precast units is responsible for casting standard strength cylinders.

G.5.b Control Strength Cylinders

The Engineer will use control cylinders to determine when the sequence of construction operations is dependent upon the rate of concrete strength development. The Engineer will cast control cylinders to determine when the concrete attains the required strength for all desired control limitations. The Contractor is responsible for any additional control cylinders beyond the requirements of 2461.3.G.5.b (1).

The Department will perform the following for control strength cylinders:

(1) Cast up to three (3) control cylinders.
(2) Cure the cylinders in the same location and under the same conditions as the concrete structure or unit involved meeting the requirements of the Concrete Manual,
(3) Mark control cylinders for identification of the represented unit or section of concrete, and
(4) Submit cylinders and a completed cylinder identification card to the Department's Laboratory.

If the Department is unavailable to test the control cylinders, the Contractor shall submit the control cylinders to an independent testing facility for testing or perform the testing on the control cylinders on a portable mechanical or hydraulic testing machine checked and calibrated with a standard proving ring as approved by the Engineer and in the presence of the Engineer.

The producer of precast units is responsible for casting control strength cylinders.

G.5.c Strength Specimens for Concrete Paving

Use flexural beams to determine strength or provide cylinders as allowed by the Contract or approved by the Engineer.

Cast standard beams or cylinders for testing at 28 days.

Cast a sufficient number of control beams or cylinders to determine when the concrete attains the required strength for all desired control limitations.

Cure the standard beams or cylinders meeting the requirements of the Concrete Manual.

Cure the control beams or cylinders in the same location and under the same conditions as the concrete structure or unit involved meeting the requirements of the Concrete Manual.

The Engineer will test the flexural beams and record the results on MnDOT Form 2162, *Concrete Test Beam Data.*

If using cylinders, the Engineer will submit cylinders and a completed identification card to the Department's Laboratory.

G.6 Consistency

The Engineer will test the concrete for consistency using the slump test during the progress of the work. The Department may reject concrete batches with consistencies outside of the slump range in accordance with Table 2461-10. If any test shows the slump in excess of the upper limit of the slump range, the Engineer will reject the concrete represented by that test unless the Contractor makes adjustments to the concrete before use.

Adjust the slump within the allowable range to optimize both placement and finishing.

If not using a Department approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Approved/Qualified Products List, meet the slump values for the slump range without water reducer in accordance with Table 2461-12.

If using an Department approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Approved/Qualified Products List, meet the slump values for the slump range with water reducer in accordance with Table 2461-12.

Table 2461-12
Slump Range Designation

Slump Designation	Slump Range without Water Reducer, *in [mm]*	Slump Range with Water Reducer, *in [mm]*
1	½ – 1 [12 – 25]	½ – 1 [12 – 25]
2	1 – 2 [25 – 50]	1 – 3 [25 – 75]
3	1 – 3 [25 – 75]	1 – 4 [25 – 100]
4	2 – 4 [50 – 100]	2 – 5 [50 – 125]
5	2 – 5 [50 – 125]	2 – 6 [50 – 150]
6	3 – 6 [75 – 150]	3 – 7 [75 – 175]

Contact the Engineer if encountering unusual placement conditions that render the specified slump range unsuitable. The Department will provide mix composition modifications for Department designed mixes to provide the desired change in consistency while maintaining the other specified properties of the concrete mix. Do not add water solely to temporarily facilitate the placement of concrete.

G.6.a Concrete Placed by the Slip-Form Method

Place concrete that does not slough and is adequately consolidated at a slump value that optimizes placement for the designated mixture.

G.6.b Non-Conforming Material

Only place concrete meeting the slump requirements in the work. If the Contractor places concrete not meeting the slump requirements into the work, the Engineer will not accept non-conforming concrete at the Contract unit price.

For concrete not meeting the required slump, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the Contract item of the concrete in accordance with Tables 2461-13, 2461-14, 2461-15 and 2461-16. When there is not a separate Contract unit price for *Structural Concrete* for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of $100.00 per cu. yd [$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

Table 2461-13
General Concrete*

Outside of Slump Range	Adjusted Contract Unit Price
Below slump range*	The Department will pay 95 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
≤ 1½ in [40 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
1¾ in [45 mm] – 2¼ in [55 mm] above slump range	The Department will pay 50 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
> 2¼ in [55 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer

* If the Contractor places piling or footing concrete below the slump range, the Department will deduct $100 per cu. yd [$130 per cu. m] or the Contractor-provided invoice amount to the relevant Contract unit price of the concrete represented by the slump test, whichever is less. The Department will not reduce Contract unit price for low slump concrete placed with the slip-form method as approved by the Engineer.

Table 2461-14 Bridge Deck Concrete	
Outside of Slump Range	**Adjusted Contract Unit Price**
Below slump range	The Department will pay 95 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
≤ 1½ in [40 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
> 1½ in [40 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer.

Table 2461-15 Low Slump Bridge Deck Concrete From ½ in to 1 in [12 mm to 25 mm]	
Outside of Slump Range	**Adjusted Contract Unit Price**
Below slump range	No deduction for materials placed as approved by the Engineer.
≤ ½ in [12 mm] above slump range	The Department will pay 50 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
> ½ in – ¾ in [12 mm – 20 mm] above slump range	The Department will not pay for concrete placed but will allow the concrete to remain in place as approved by the Engineer.
> ¾ in [20 mm] above slump range	The Department will not pay for concrete. Provide additional testing as directed by the Engineer to determine if the concrete can remain in place or is subject to removal and replacement.

Table 2461-16 Low Slump Concrete — Patching From ½ in to 1 in [12 mm to 25 mm]	
Outside of Slump Range	**Adjusted Contract Unit Price**
Below slump range	No deduction for materials placed as approved by the Engineer
≤ ½ in [12 mm] above slump range	The Department will pay 75 percent of the relevant Contract unit price for materials placed as approved by the Engineer.
≥ ¾ in [20 mm] above slump range	The Department will pay 25 percent of the relevant Contract unit price for materials placed as approved by the Engineer.

G.7 Air Content

Maintain the air content of Type 3 general concrete at the specified target of 6.5 percent ±1.5 percent of the measured volume of the plastic concrete in accordance with 1503, "Conformity with Contract Documents."

Make any adjustments immediately to maintain the desired air content.

Measure the air content at the point of placement but before consolidation.

G.7.a Non-Conforming Material

Only place Type 3 concrete meeting the air content requirements in the work. If the Contractor places Type 3 concrete not meeting the air content requirements into the work, the Engineer will not accept non-conforming concrete at the Contract unit price.

For concrete not meeting the required air content, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the Contract unit price for the Contract item of the concrete in accordance with Table 2461-17. When there is not a separate Contract unit price for *Structural Concrete* for an item of work or the concrete is a minor component of the Contract unit price, the Department will reduce payment based on a concrete price of $100.00 per cu. yd [$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

Table 2461-17 General Concrete (Target Air Content 6.5%)	
Air Content, %	**Adjusted Contract Unit Price**
> 10.0	The Department will pay 75 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
>8.0 – 10.0	The Department will pay 95 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
5.0 – 8.0	The Department will pay 100 percent of the Contract unit price for the concrete represented, for material placed as approved by the Engineer.
>4.0 – <5.0	The Department will pay 75 percent of the Contract unit price for the concrete represented for material placed as approved by the Engineer.
>3.5 – 4.0	The Department will pay 25 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the surface is exposed to freeze-thaw cycling, coat the concrete with an approved epoxy penetrant sealer from the Approved/Qualified Products List.
≤ 3.5	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer will not pay for the concrete and if the Engineer determines the surface is exposed to salt-brine freeze-thaw cycling, coat with an approved epoxy penetrant sealer from the Approved/Qualified Products List.

G.8 Allowable Testing Tolerances

Allowable tolerances are based on the results from two different testers and two different pieces of equipment from the same sample. Perform the test within the allowable tolerances in accordance with Table 2461-18.

Table 2461-18 Allowable Testing Tolerances	
Test	**Allowable Tolerance**
Air content, % volume of concrete	1.0
Average slump:	
≤ 4 in [100 mm]	1.0 in [25 mm]
4 in – 6 in [100 mm – 150 mm]	1.5 in [38 mm]

Table 2461-18 Allowable Testing Tolerances	
Test	**Allowable Tolerance**
≥ 6 in [150 mm]	2.0 in [50 mm]
Unit weight, per cu. ft [cu. m], calculated to an air-free basis	1.0 lb/cu. ft [16 kg/cu. m]
Compressive strength 3,000 psi – 8,000 psi [20.6 MPa – 55.2 MPa], average of 3 tests	500 psi [3.4 MPa]

2461.4 METHOD OF MEASUREMENT

The Engineer will measure fresh concrete produced as required by the Contract by the theoretical volume. The Engineer will deduct accountable waste from the concrete measurement.

The Engineer will measure concrete mixtures on the basis of the dimensions of the structure shown on the plans. If the plans do not include a Contract item for concrete used in miscellaneous items, include the cost of the concrete with the relevant Contract items.

2461.5 BASIS OF PAYMENT

The Department will include the cost of the Certified Ready-Mix Plant Program with other relevant Contract items.

The Contract cubic yard [cubic meter] price for *Concrete, Mix No.* ___ includes the cost of production, placement, finishing, curing, and protection of concrete.

The Department will pay for structural concrete on the basis of the following schedule:

Item No.:	Item:	Unit:
2461.501	Concrete, Mix No.___	cubic yard [cubic meter]

2571 PLANT INSTALLATION AND ESTABLISHMENT (2013 VERSION)

2571.1 DESCRIPTION

This work consists of providing, planting, and establishing trees, shrubs, vines, and perennials of the species, variety, grade, size, or age, and root category specified for the locations shown on the plans, including planting or transplanting plants provided by the Department.

Perform this work in accordance with the current edition of the Inspection and Contract Administration Manual for Mn/DOT Landscape Projects (ICAMMLP).

2571.2 MATERIALS

A Nursery Plant Stock 3861

Provide plants of the species shown on the plans in the variety, grade, and size, or age indicated.

A.1 Investigations and Supply of Planting Stock and Materials

By submitting a proposal and accepting award of the contract in accordance with 1205, "Examination of Plans, Specifications, Special Provisions and Site of Work," the Contractor assures familiarity with the project site and contract documents, commitments from suppliers, and delivery of the plant stock and materials required to complete the contract.

A.2 Plant Stock and Materials Documentation

Provide the following plant stock and materials documentation:

(1) At or before the preconstruction conference, provide the Engineer with a Mn/DOT-preliminary *Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment* (copy of form provided in the current edition of ICAMMLP).

(2) At least one week before plant stock delivery to the project, provide the Engineer with the following:

(2.1) A copy of a valid nursery stock, dealer or grower certificate, registered with the Minnesota Department of Agriculture (MDA), a current nursery certificate or license from a state or provincial Department of Agriculture for each plant stock supplier, or both;

(2.2) Documentation certifying that plant material shipped from out-of-state nursery vendors subject to state and federal quarantines, is free of currently regulated pests, including Emerald Ash Borers, and Gypsy Moths. To determine if Minnesota vendors are subject to quarantines, call the MDA Supervisor of Nursery Inspection and Export Certification at (651) 201-6388; and

(2.3) An updated *Certificate of Compliance*, signed by the Contractor's authorized representative.

(3) Upon delivery of plant stock and materials to the project, provide the Engineer with the following:

(3.1) Bills of lading or shipping documents for plant stock and landscape materials delivered to the project, and

(3.2) An updated and signed *Certificate of Compliance*, if necessary, to reflect deviations from the original *Certificate of Compliance* documentation submitted at or before the preconstruction conference.

(4) As a condition for authorization of payments, provide the Engineer with vendor invoices or billing statements for plant stock and materials used on the project.

The Engineer will consider work performed with plant stock, materials, or equipment that was misrepresented in the documentation, as unauthorized work.MnDOT 2571 January 23, 2013 Page 2 of 12

If the Contractor does not provide the documentation required by this section, the Engineer may consider subsequent work unauthorized and the Department may assess a daily charge of $200.00, on a calendar day basis, until the Contractor achieves compliance.

A.3 Substitutions

The Engineer may allow substitutions in accordance with 1605, "Substitute Materials." Before requesting substitutions, provide written documentation that plants shown on the plans are not available in quantities to fulfill the contract requirements from the individual suppliers on the *Partial List of Nursery Dealers and Growers* in the most current edition of the ICAMMLP. The Engineer, in consultation with the project designer, may authorize

specific substitute plants or may extend the contract time to ensure availability of the plants shown on the plans. Provide substitutions equal to or better than the initially specified materials.

B Department Furnished Stock and Transplant Stock

Obtain Department provided stock and transplant stock from sources shown on the plans or specified by the special provisions.

C Incidental Materials and Work

The Department considers incidental materials and work, specified, non-specified, replacement, or miscellaneous, to include materials and work that are incidental to payment for the individual plant installation contract items and for which the Department does not make direct payment.

C.1 Specified Incidental Materials and Work

Supply, install, and maintain incidental materials as required for plant installation and establishment in accordance with the special provisions, plans, and standard planting details.

C.2 Non-specified Incidental Materials and Work

Supply, install, and maintain non-specified incidental materials for plant installation and establishment success in accordance with product labeling, manufacturer's instructions, and applicable laws, regulations and ordinances.

C.3 Replacement Materials and Work

Provide materials and work to replace unacceptable or missing plants, materials, and incidental items in accordance with the special provisions, plans, and standard planting details. Provide replacement materials and work that is equal to or better than the initially specified materials and work.

C.4 Miscellaneous Incidental Materials, Equipment and Work

Miscellaneous incidental materials, equipment, and work include the following:

(1) Mobilization,

(2) Traffic control,

(3) Protection and restoration of vegetation and property,

(4) Layout and staking,

(5) Soil cultivation,

(6) Compost,

(7) Mulch,

(8) Rodent protection,

(9) Staking and guying,

(10) Seedling shelters,MnDOT 2571 January 23, 2013 Page 3 of 12

(11) Temporary erosion control,

(12) Mowing,

(13) Application of herbicides, insecticides, fungicides, and water and

(14) Other materials, equipment, and work necessary to install, maintain, and establish plants as shown on the plans and in a healthy, vigorous, and weed-free condition.

2571.3 CONSTRUCTION REQUIREMENTS

A General

A.1 Landscape Specialist

Provide a Landscape Specialist, certified by the Department, to perform or supervise plant installation and establishment work. Provide documentation of the Certified Landscape Specialist at or before the preconstruction conference. Landscape specialists may obtain certification by completing the one-day Department Landscape Project Inspection and Administration Training Class and passing a test administered by the Department's

Landscape Architecture and Forestry Units. Full certification is valid for 3 years. Landscape Specialists may obtain provisional certification for 1 year by passing a test without completing the training class.

A.2 Notices by Contractor

Notify the Engineer at least 3 calendar days before planned deliveries of initial and replacement planting stock to the project to allow for inspection scheduling. Notify the Engineer at least 24 hours before beginning or changing distinct operations. Include the following in the notice:

(1) The project number,

(2) Engineer's name,

(3) Notification date,

(4) Intended dates and times for the operations, and

(5) The planned locations of work.

Provide notifications in writing, using confirmable e-mail, or facsimile transmissions.

A.3 Unauthorized Work and Penalties for Non-compliant Operations

The Engineer will consider work performed as follows to be unauthorized work:

(1) Without required and acceptable documentation and notifications,

(2) Without supervision by a certified landscape specialist,

(3) Without conducting required and acceptable competency tests, or

(4) In conflict with the working hours of 1803, "Prosecution of Work."

In the case of non-compliant operations, the Department may assess a daily charge of $200.00, on a calendar day basis, until the Contractor achieves compliance.

A.4 Required Equipment

Provide equipment meeting the requirements of 1805, "Methods and Equipment," and with the following available on the project at all times:

(1) At least one portable compaction tester capable of measuring compaction in the soil to at least 18 in [450 mm] deep,

(2) At least one soil recovery probe for assessment of soil moisture conditions, and

At least one tree caliper with measurement readings in inches.

B Preconstruction Work MnDOT 2571 January 23, 2013 Page 4 of 12

Preconstruction work includes:

(1) Attending a preconstruction conference,

(2) Submitting preconstruction documentation,

(3) Mobilizing equipment and supplies to the project,

(4) Protecting existing vegetation, resources, and property in accordance with the plans, special provisions, and 1712, "Protection and Restoration of Property," 2031, "Field Office and Laboratory," 2557, "Fencing," and 2572, "Protection and Restoration of Vegetation."

C Staking Planting Holes and Beds

Stake the exact locations and layouts for the Engineer's approval.

To remedy unanticipated, localized problems and seasonal conditions that may hinder plant establishment, the Contractor may request the Engineer's approval to perform the following in accordance with the standard planting details and options shown on the plans:

(1) Relocate plantings,

(2) Make plant substitutions, or

(3) Modify soil or drainage characteristics.

Locate plantings to provide the following:

(1) A clear sight distance of at least 1,200 ft [360 m] in front of traffic signs and extending 50 ft [15 m] beyond the signs; and

(2) Clear zones and safety sight corners and lines shown on the plans free of plants.

D Preparing Planting Holes and Planting Beds

To prevent site compaction and damage, do not work in planting holes and bed areas if the soil moisture is greater than field capacity.

D.1 Utilities

Before cultivating soil or excavating holes on the project, meet the requirements of 1507, "Utility Property and Service."

The Contractor may request the Engineer's approval to relocate plantings to avoid unanticipated conflicts with utilities.

D.2 Weed Control and Soil Cultivation

Apply herbicide to actively growing vegetation beginning in spring or fall. Before cultivating individual planting holes and bed areas, kill turf and weed growth within the limits of planting areas that will receive mulch in accordance with the following:

(1) Mow existing vegetation to at least 3 in [75 mm] at least one week before spraying herbicide. Remove the cuttings. Allow the vegetation to re-grow to a height from 4 in to 8 in [100 mm to 200 mm] before applying the herbicide.

(2) At least three days before applying herbicide, submit to the Engineer, labels of the intended herbicides and a copy of a valid MN Pesticide Applicator License, including Category A and Category J.

(3) Spray and kill turf and weeds, including the top growth and roots, only within designated areas using a non-selective, non-residual post emergent herbicide containing 41 percent glyphosate as the active ingredient. Ensure personnel, licensed by the MDA and experienced in the use of MnDOT 2571 January 23, 2013 Page 5 of 12

chemical pesticides perform the work in accordance with the manufacturer's instructions and recommendations. Apply the herbicide to dry foliage on actively growing vegetation. Apply the herbicide in August or early September before the fall or spring Plant Installation Period (PIP) as required by the contract. If an August or September application is not possible for the spring PIP, apply the herbicide in late April or early May. If precipitation occurs within 6 hours after applying herbicide, reapply herbicide as needed to achieve 100 percent kill.

(4) Before beginning soil cultivation work, schedule and perform a Competency Test to the satisfaction of the Engineer. The Engineer considers a satisfactory Competency Test one that demonstrates acceptable soil cultivation, incorporation of soil additives, compaction levels, and soil drainage in one planting bed area and one individual tree planting area.

(5) Before placing soil additives as shown on the plans, use a spading machine to deep cultivate the planting hole and bed areas by loosening the soil to at least 12 in [300 mm] deep and a compaction level of no more than 200 psi [1,400 kPa] to this depth, as measured from the finished grade elevation of the soil. The Engineer may approve other equipment to address site constraints, if requested by the Contractor. For hydraulic spade-type, machine-moved tree-transplanting, the Engineer will not require planting hole cultivation, other than loosening the soil outside the soil-ball perimeter in accordance with the standard planting details shown on the plans.

(6) Unless otherwise shown on the plans, add 4 in [100 mm] of Grade 2 compost, in accordance with 3890, "Compost" and other soil additives shown on the plans or as requested by the Contractor and approved by the Engineer, over the cultivated planting hole and bed areas and use a spading machine to incorporate it to a depth of at least 12 in [300 mm], as measured from the finished grade elevation of the soil.

(7) Use a compaction tester to ensure compaction in the planting hole and bed areas does not exceed 200 psi [1,400 kPa] to a depth of at least 16 in [400 mm]. If Contractor-operations result in zones of hardpan or excessively compacted soil, repeat deep cultivation or de-compact the subsoil in accordance with 2105.3.G.2,

"Compaction Testing and the Grading and Base Manual " specifically the requirements for turf establishment areas, at no additional cost to the Department.

(8) Ensure drainage in the planting hole and bed areas. For suspected drainage problems, perform a percolation test by filling a 16 in [400 mm] deep planting hole with water and measuring the time it takes the water to drain from the hole. The Engineer considers adequate drainage equal to or greater than a percolation rate of ½ in/h [12 mm/h]. If drainage does not meet these requirements, request approval from the Engineer to relocate or delete affected planting locations or proceed with Extra Work using one or a combination of the planting details for poorly drained soils, as shown on the plans.

(9) Apply temporary erosion control measures in accordance with the NPDES permit, SWPPP notes, and 2573, "Storm Water Management." The Contractor may use Type 6 wood chip mulch at a depth no more than 1 in [25 mm] for temporary erosion control in prepared planting bed areas.

D.3 Wet Soils, Rock, and Debris

If the Contractor encounters excessively wet soils, bedrock, or excessive quantities of boulders and construction debris, the Contractor may request the Engineer's approval to relocate or delete plantings, or modify soil or drainage characteristics in accordance with the alternative options in the standard planting details shown on the plans.

E Delivery and Storage of Plants

Before installation, the Engineer will provide for inspection and acceptance of plant stock delivered to the project in accordance with the current edition of the ICAMMLP and 3861, "Plant Stock."

Install plant stock on the day of delivery to the project unless using temporary storage methods. Before installation, keep the roots of plants completely covered with a moisture-holding material consisting of wood chips, straw, sawdust, moss, or soil. Keep the moisture-holding material continuously moist and protect it from drying winds, direct sunlight, excessive heat, freezing, low humidity, inadequate ventilation, and animal or human harm. The Engineer will consider plants with damage that occurred or was discovered during temporary storage, unacceptable. Do not store plants from one planting season to the next.MnDOT 2571 January 23, 2013 Page 6 of 12

E.1 Pruning — Top Growth and Roots

Immediately before planting, prune the roots of bare-root plants, except seedlings, and the top growth of deciduous plants. Cut-back broken or badly bruised roots and dry root tips to sound, healthy tissue. Prune to remove dead, rubbing, damaged, diseased, and suckering branches, and to improve plant symmetry, structure, and vigor. Prune coniferous trees and shrubs only to remove damaged growth or a competing leader.

Prune in accordance with the horticultural practices specified in the current edition of the ICAMMLP and the standard planting details on the plans.

Do not prune oak trees during the oak wilt season from April through July, to prevent the spread of oak wilt disease. Immediately treat accidental cuts or wounds to oaks with a wound dressing in accordance with the standard planting details shown on the plans. Keep wound-dressing material on the project during the oak wilt season.

E.2 Buried Root Flares

The Engineer will consider container-grown and balled and burlapped plant stock unacceptable if provided with more than 4 in [100 mm] of soil depth above the root flare. The Engineer may accept plants provided with no more than 4 in [100 mm] excess soil above the root flare if the excess soil can be removed without damaging the root system of the plants.

E.3 Excessive Roots

Reject containerized or balled and burlapped plants with roots extending at least 4 in [100 mm] beyond the container or burlap.

F Installation of Plants

F1 General

Before proceeding with plant installation work, schedule and perform a competency test demonstrating acceptable plant installation methods to the Engineer's satisfaction and in accordance with the plans and standard planting details, for each plant pay item and root category on the project. The Engineer considers a satisfactory competency test to be one that demonstrates acceptable handling of plants, digging of holes and beds, and installation of plants, initial watering, installation of protection materials and mulching.

Before digging planting holes, rake temporary erosion control wood chip mulch off prepared planting areas to prevent wood chip contamination of the planting soil in the holes.

The Contractor may re-spread wood chip mulch formerly used as temporary erosion control around plants to a depth no greater than 1 in [25 mm] following plant installation, if newly provided and acceptable Type 6 mulch is applied over the top to the depth shown on the standard planting details in the plans.

Dig planting holes to the configuration and minimum dimensions shown in the standard planting details on the plans. If the soil moisture is greater than field capacity, do not work in planting holes and beds.

Ensure drainage in the planting hole and bed areas. For a suspected drainage problem, perform a percolation test by filling a 16 in [400 mm] deep planting hole with water and measuring the time it takes the water to drain from the hole. The Engineer considers adequate drainage equal to or greater than a percolation rate of ½ in/h [12 mm/h]. If drainage does not meet these requirements, request approval from the Engineer to relocate or delete affected planting locations or proceed with extra work using one or a combination of the planting details for poorly drained soils as shown on the plans.

F.2 Individual Plant Stock Types and Installation Requirements

Install plants in accordance with the steps and requirements in the standard planting details shown on the plans and specific to each plant stock type.

G Watering

During the PIP, provide watering equipment and forces on the project capable of completely watering plants as often as necessary to maintain soil moisture in the root zones.

Within 2 hours of installation, saturate the backfill soil of each plant with water. After settling, provide additional backfill to fill in the voids.

H Mulch

Before placing mulch, fine grade and level the planting bed soils with hand tools. Place mulch material in accordance with the standard planting detail shown on the plans no more than seven days after plant installation. The Engineer will consider placement of mulch, contaminated with soil or other materials and not complying with the requirements of 3882, "Mulch Materials," unacceptable. Remove unacceptable mulch from the project.

I Protection of Installed Trees

Use protective materials to ensure the healthy growth and survival of installed trees.

I.1 Staking and Guying

Unless staking and guying is shown on the plans, only stake and guy trees if necessary to maintain the trees in a plumb condition. The following circumstances may warrant staking and guying:

(1) Excessive soil moisture,

(2) Light-textured soil,

(3) Steep slopes,

(4) Exposure to excessive wind, and

(5) The likelihood of vandalism.

Install staking and guying in accordance with the standard planting details shown on the plans.

Remove staking and guying within 1 year of initial installation.

I.2 Rodent Protection

Place rodent protection around deciduous, pine, and larch trees in accordance with the standard planting details shown on the plans.

I.3 Tree Painting

Paint trees in accordance with the standard planting details shown on the plans.

I.4 Seedling Tree Shelters

Install seedling tree shelters in accordance with the standard planting details shown on the plans.

J Cleanup and Restoration Work

Perform the following cleanup and restoration work on an ongoing basis and as the final step of the initial planting operations:

(1) Remove excess materials, rocks and debris from the project;MnDOT 2571 January 23, 2013 Page 8 of 12

(2) Repair turf in disturbed areas with seed mixes as shown on the plans or to match in-place turf;

(2.1) Immediately before sowing seed or laying sod, prepare soil as specified in 2575.3.B, "Grading Preparations Prior to Seeding;"

(2.2) Uniformly broadcast a Type 4 natural base fertilizer, as specified by 3881.2.B.4, "Type 4 — Natural Based Fertilizer," that provides nitrogen at an application rate of 43 lb/acre;

(2.3) Lay sod, or uniformly broadcast seed at 1.5 times the rate specified in Table 2575-1, "Seed Mixture Application Rates." Provide seed in accordance with the requirements of 3876, "Seed" and perform seeding in accordance with Table 2575-2, "Season of Planting;"

(2.4) Rake and firm seeded areas to ensure seed contact with the soil;

(2.5) Broadcast or disc anchor Type 1 mulch in all seeded areas;

(3) Install erosion control measures to prevent erosion.

K Plant Establishment Period

K.1 Establishment Period

A Plant Establishment Period (PEP) of at least 2 calendar years begins on the date that initial planting operations on the project are completed and continues until final acceptance of the project, unless otherwise shown on the plans.

K.2 Establishment Work

Keep plants in a healthy growing condition in accordance with the current edition of the ICAMMLP throughout the establishment period and submit Mn/DOT *Landscape Contractor Scouting Reports* in accordance with item 1 of 2571.3.K.2.a, "All Plants." Perform plant establishment work throughout the growing seasons from April through October and as necessary during the dormant seasons from November through March. The Engineer may perform random inspections throughout the PEP to verify compliance. The Engineer will consider the Contractor non-compliant if the Contractor does not maintain plants throughout the PEP and does not submit scouting reports.

The Department may assess a daily charge of $200.00 for non-compliance, on a calendar day basis, until the Contractor achieves compliance.

K.2.a All Plants

In plant establishment work, perform the following:

(1) Scout to assess the condition of the plants and the planting site and factors that may influence plant health, vigor, and establishment success. Scout these conditions at least every two weeks during the growing season and at least every month during the dormant season;

(2) Submit a written scouting report to the Engineer via e-mail by the 1st and 15th of each month during the growing season from April to October and by the 1st of each month during the dormant season from November to March. The Engineer will use the report-frequency and content to assess plant establishment compliance. The

report may include scanned copies of the plan sheets with the Contractor notes, copies of the report form found in the current edition of the ICAMMLP, or both. Include the following in the report:

(2.1) The project number;

(2.2) Engineer's name;

(2.3) Name of Contractor's responsible scout or representative;

(2.4) Dates work was performed;

(2.5) Work locations;

(2.6) Work completed;

(2.7) Prevailing weather conditions;

(2.8) Soil moisture assessments;

(2.9) Insect, animal, vehicular, weather, or other damage;MnDOT 2571 January 23, 2013 Page 9 of 12

(2.10) Disease problems;

(2.11) Treatment recommendations' and

(2.12) Assessment of overall plant conditions including weed competition and control.

(3) Maintain soil moisture in accordance with 2571.3.G, "Watering" and the watering guidelines of the standard planting details shown on the plans;

(4) Repair, adjust, or replace staking and guying, mulch material, planting soil, rodent protection, seedling tree shelters, tree paint, and other incidental items in accordance with the plans;

(5) Maintain healthy, vigorous plants. free of harmful insects, fungus, and disease;

(6) Remove dead, dying, and unsightly plants. Provide and install replacement plants in accordance with 2571.2.K.2.b, "Replacement Requirements;"

(7) Maintain plants in a plumb condition at the planting depth shown on the planting details in the plans;

(8) Maintain planting areas in a weed-free condition as follows:

(8.1) Remove weeds, top growth and roots, within the mulch limits by hand pulling. Pre-water mulched areas to ensure weed top growth and roots are entirely removed. Ensure weeding operations do not contaminate the mulch or project with weed seed, weed-laden soil or propagating weed parts. Remove State and County-regulated noxious weeds to at least 5 ft [900 mm] beyond the mulch limits. Remove weed parts or weed-laden material from the project to avoid the spread of weed infestations;

(8.2) Do not spray chemicals for weed control in mulched planting areas during the PEP. The Contractor may apply a non-selective, non-residual post-emergent herbicide containing 41 percent glyphosate, as the active ingredient with a surfactant on a spot treatment basis with a brush or wick applicator. The Contractor may also apply a broad-spectrum dichlobenil based granular, pre-emergent herbicide in accordance with product labeling and manufacturer's recommendations;

(8.3) Do not weed whip or weed clip as weed control;

(8.4) Mow turf bands around the mulch limits at least 5 ft [900 mm] beyond the limits and at least 4 in [100 mm] high if the turf height exceeds 9 in [230 mm] adjacent to mulched planting areas;

(8.5) Mow turf areas installed as part of the project when the growth exceeds 18 in [500 mm] high. Mow turf from 6 in [150 mm] to 12 in [300 mm] high. Control State and County-listed noxious weeds;

(9) Prune to remove dead, rubbing, damaged or diseased branches, unwanted suckers, and to improve plant form and structure;

(10) Prevent or repair rutting and other damage that may lead to soil erosion and weed infestation;

(11) Perform plant establishment operations consistent with plant care and horticultural practices detailed in the current edition of the ICAMMLP; and

(12) Remove excess material, obsolete temporary erosion control devices, rocks, and debris from the project.

K.2.b Replacement Requirements

Within the first year of the 2-year PEP, determine which plants need replacing. Replace dead, defective, or missing plants and incidental materials in accordance with initial installation requirements, including plants lost due to accidents, vandalism, theft, rodent damage, damage caused by the Contractor, or if ordered by the Engineer, at no additional cost to the Department. Conduct plant replacement operations during the month of May within the first year of the PEP. At least one week before plant replacement, submit a summary report of proposed plant replacements to the Engineer. Include by attachment, copies of plan sheets with the proposed replacement quantities and locations identified and a Mn/DOT *Certificate of Compliance for Plant Stock, Landscape Material, and Equipment*, in the report. Using brightly colored paint, mark on site plants requiring replacement.

Provide replacement plants and incidental materials that are equal to or better than the initial material required by the contract.

If less than a full year remains in the PEP, do not replace plants unless the PEP is extended by a supplemental agreement or change order to provide at least one full year of establishment care.MnDOT 2571 January 23, 2013 Page 10 of 12

L Acceptance of Work

For acceptance at full payment, ensure each plant meets the *Criteria For Accepting Plant Size* shown in the current edition of the ICAMMLP.

L.1 Acceptance of Preconstruction Work

The Engineer will accept the preconstruction work after the Contractor secures commitments for required materials, submits a Mn/DOT *Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment*, participates in a preconstruction conference, obtains the Engineer's approval for the progress schedule, moves equipment and supplies to the project, and provides protection for existing plants.

L.2 Acceptance of Preparation of Planting Holes and Beds

For the Engineer's acceptance of preparation of planting holes and beds, complete a competency test, other specified staking, initial weed control, soil cultivation including incorporation of additives, and temporary erosion control work.

L.3 Acceptance of Initial Planting Operation

The Engineer will provisionally accept initial planting operations based on the following:

(1) Plant stock acceptance,

(2) Completion of a competency test,

(3) Installation of individual plants, and

(4) All incidental material and work items shown in the initial planting operations chapter of the current edition of the ICAMMLP, including initial but not limited to watering, tree protection materials, mulching, proper drainage, pruning, staking and guying, tree painting, fertilizing, erosion control, seeding and clean up.

L.4 Final Acceptance

As a condition for terminating the PEP and conducting the final inspection, the Engineer may require the Contractor to bring the plant establishment work into compliance.

On or about the date of termination of the PEP, the Engineer will perform a final inspection of the project.

The Engineer will determine which plants to accept for payment at the contract unit price, at a reduced payment, or with no payment.

Upon final acceptance, the Engineer will not require further Contractor-care of plantings.

The Engineer will make final acceptance at the completion of the two-year PEP and based on a final inspection of the completed project.

2571.4 METHOD OF MEASUREMENT

The Engineer will measure plants separately by the number of acceptable plants for each contract item in accordance with 2571.5.G, "Payment Schedule."

2571.5 BASIS OF PAYMENT

The Department will make payment for plant installation and establishment at a percentage of the contract unit price per item unit of measure for all costs relating to furnishing, installing, and maintaining, the required plants and associated incidental materials as specified and shown on the plans.MnDOT 2571 January 23, 2013 Page 11 of 12

The Engineer may require additional materials and work beyond that specified or shown in the contract. The Department will make payment for the additional materials and work as extra work.

The Department may make full payment, reduced payment or no payment of no more than the maximum eligible partial payment percentage at any payment phase (initial, interim, final) based on the performance of the Contractor (see Payment Checklist in the current edition of the ICAMMLP).

A Full Payment

The Department will make full payment of 100 percent of the contract unit price for each plant the Engineer considers acceptable, upon inspection, if the Contractor fully achieves all Payment Criteria as defined in the Payment Checklist in the current edition of the ICAMMLP.

B Reduced or No Payments

The Department will make a reduced payment or no payment of the contract unit prices for each plant if the Contractor does not achieve all Payment Criteria, as defined in the Payment Checklist in the current edition of the ICAMMLP.

C Initial Payment

The Department will make partial payment up to 70 percent of the contract unit price for each plant for completion of the following work:

C.1 Preconstruction Work

The Department will pay no more than 10 percent of the contract unit price for each plant with the completion and acceptance of preconstruction work as defined in the *Preconstruction Work Checklist* in the current edition of the ICAMMLP.

C.2 Preparation of Planting Holes and Beds

The Department will pay no more than 15 percent of the contract unit price for each plant with the completion and acceptance of preparation of planting holes and beds work as defined in the *Preparation of Planting Holes and Beds Checklist* in the current edition of the ICAMMLP.

C.3 Initial Planting Operations

The Department will pay no more than 45 percent of the contract unit price for each plant with the completion and acceptance of initial planting operations work as defined in the *Initial Planting Operations Checklist* in the current edition of the ICAMMLP.

D Interim Payment

At the end of the first calendar year of the PEP, and after completion and acceptance of the Contractor's work and continuous compliance with the plant establishment requirements as defined by the *Plant Establishment-Year One Checklist* in the current edition of the ICAMMLP, the Engineer may authorize no more than 15 percent of the contract unit price for each plant.

E Final Payment

The Department will make final payment after final inspection and acceptance of the completed project at the end of the PEP. The Engineer may authorize no more than 15 percent of the contract unit price for each plant as defined by the *Plant Establishment Year 2 Checklist* in the current edition of the ICAMMLP. The total final MnDOT 2571 January 23, 2013 Page 12 of 12

payment includes the Plant Establishment Year 2 payment, assessments and reduced payments, if any, and bonus payment, if eligible.

The Department will not pay for replacement plants, unless authorized by the Engineer.

The Department may continue to withhold any percentage of initial and interim payments from the final payment.

The Department will not reimburse any assessments charged during the contract period at the final payment. If the final voucher shows that the total of initial and interim payments made exceeds the total amount due the Contractor, promptly refund the Department for the overpayment.

F Bonus Payment

When 90 percent or more of all plants installed within the initial plant installation period (PIP) and related contract operations have been continuously acceptable throughout the contract period, the Department will make a bonus payment of 10 percent of the total final contract unit price for plant installation and establishment.

The Department considers replacement plants, replaced during the initial PIP, to be initially installed plants. Replacement plants made during the PEP are not eligible for bonuses.

G Payment Schedule

The Department will pay for plant installation and establishment on the basis of the following schedule: **Item No.**	**Item**	**Unit**
2571.501	Coniferous tree (size & root category)	tree
2571.502	Deciduous tree (size & root category)	tree
2571.503	Ornamental tree (size & root category)	tree
2571.504	Coniferous shrub (size & root category)	shrub
2571.505	Deciduous shrub (size & root category)	shrub
2571.506	Vine (age or size & root category)	vine
2571.507	Perennial (age or size & root category)	plant
2571.541	Transplant tree (spade size*)	tree
2571.544	Transplant shrub	shrub
2571.546	Transplant vine	vine
2571.547	Transplant perennial	plant

NOTE: State Root Category: Seedling, Bare Root, Machine Moved, Container Grown, Balled and Burlapped

* Spade size: 42 in [1.1 m], 60 in [1.5 m], 78 in [1.9 m], 85 in [2.1 m], 90 in [2.3 m].

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

MINNESOTA · REVENUE **IC134**

Withholding Affidavit for Contractors

This affidavit must be approved by the Minnesota Department of Revenue before the state of Minnesota or any of its subdivisions can make final payment to contractors.

Please type or print clearly. This will be your mailing label for returning the completed form.

Company name	Daytime phone	Minnesota tax ID number
Address	Total contract amount $	Month/year work began
City State Zip Code	Amount still due $	Month/year work ended

Project Information

Project number | Project location

Project owner | Address | City | State | Zip code

Did you have employees work on this project? ☐ Yes ☐ No If no, who did the work?

Contractor type

Check the box that describes your involvement in the project and fill in all information requested.

☐ **Sole contractor**

☐ **Subcontractor**

Name of contractor who hired you

Address

☐ **Prime contractor**—If you subcontracted out any work on this project, all of your subcontractors must file their own IC134 affidavits and have them certified by the Department of Revenue *before* you can file your affidavit. For each subcontractor you had, fill in the information below and attach a copy of each subcontractor's certified IC134. If you need more space, attach a separate sheet.

Business name	Address	Owner/Officer

Sign here

I declare that all information I have filled in on this form is true and complete to the best of my knowledge and belief. I authorize the Department of Revenue to disclose pertinent information relating to this project, including sending copies of this form, to the prime contractor if I am a subcontractor, and to any subcontractors if I am a prime contractor, and to the contracting agency.

Contractor's signature | Title | Date

Mail to: Minnesota Revenue, Mail Station 6610, St. Paul, MN 55146-6610

Certificate of Compliance

Based on records of the Minnesota Department of Revenue, I certify that the contractor who has signed this certificate has fulfilled all the requirements of Minnesota Statutes 290.92 and 270C.66 concerning the withholding of Minnesota income tax from wages paid to employees relating to contract services with the state of Minnesota and/or its subdivisions.

Department of Revenue approval | *Date*

Stock No. 5000134 (Rev. 1/07)

Instructions for Form IC134

Who must file

If you are a prime contractor, a contractor or a subcontractor who did work on a project for the state of Minnesota or any of its local government subdivisions — such as a county, city or school district — you must file Form IC134 with the Minnesota Department of Revenue.

This affidavit must be certified and returned before the state or any of its subdivisions can make final payment for your work.

If you're a prime contractor and a subcontractor on the same project

If you were hired as a subcontractor to do work on a project, and you subcontracted all or a part of your portion of the project to another contractor, you are a prime contractor as well. Complete both the subcontractor and prime contractor areas on a single form.

When to file

The IC134 cannot be processed until you finish the work. If you submit the form before the project is completed, it will be returned to you unprocessed. Mail Form IC134 to the address at the bottom of the form.

If you are a subcontractor or sole contractor, send in the form when you have completed your part of the project.

If you are a prime contractor, send in the form when the entire project is completed and you have received certified affidavits from all of your subcontractors.

How to file

If you have fulfilled the requirements of Minnesota withholding tax laws, the Department of Revenue will sign your affidavit and return it to you.

If any withholding payments are due to the state, Minnesota law requires certified payments before we approve the IC134.

Submit the certified affidavit to the government unit for which the work was done to receive your final payment. If you are a subcontractor, submit the certified affidavit to your prime contractor to receive your final payment.

Minnesota tax ID number

You must enter your Minnesota tax ID number on the form. You must have a Minnesota tax ID number if you have employees who work in Minnesota.

If you don't have a Minnesota ID number, you must apply for one. Call 651-282-5225.

An applications (Form ABR) is also available on our website at www.taxes.state.mn.us.

If you have no employees and did all the work yourself, you do not need a Minnesota tax ID number. If this is the case, enter your Social Security number in the space for Minnesota tax ID number and explain who did the work.

Information and assistance

If you need help or more information to complete this form, call 651-282-9999.

Additional forms are available on our website at www.taxes.state.mn.us or by calling 651-296-4444. TTY: Call 711 for Minnesota Relay.

We'll provide information in other formats upon request to persons with disabilities.

Use of information

The Department of Revenue needs all the information to determine if you have met all state income tax withholding requirements. If all required information is not provided, the IC134 will be returned to you for completion.

All information on this affidavit is private by state law. It cannot be given to others without your permission, except to the Internal Revenue Service, other states that guarantee the same privacy and certain government agencies as provided by law.

FORM OF PROPOSAL

To the City of Rochester Council Members:

According to the advertisement of the Rochester City Council inviting proposals for the improvement of the section of highway hereinbefore named, and in conformity with the Contract, Plans, Specifications and Special Provisions pertaining thereto, all on file in the office of the Auditor of the City of Rochester:

(I)(We) hereby certify that (I am)(we are) the only person(s) interested in this proposal as principal(s); that this proposal is made and submitted without fraud or collusion with any other person, firm or corporation at all; that an examination has been made of the site of the work and the Contract form, with the Plans, Specifications and Special Provisions for the improvement.

(I)(We) understand that the quantities of work shown herein are approximate only and are subject to increase or decrease; that all quantities of work, whether increased or decreased within the limits specified in MnDOT 1903, are to be done at the unit prices shown on the attached schedule; that, at the time of opening bids, totals only will be read, but that comparison of bids will be based on the correct summation of item totals obtained from the unit prices bid, as provided in MnDOT 1301.

(I)(We) propose to furnish all necessary machinery, equipment, tools, labor and other means of construction and to furnish all materials specified, in the manner and at the time prescribed, all according to the terms of the Contract and Plans, Specifications, and the Special Provisions forming a part of this.

(I)(We) further propose to do all Extra Work that may be required to complete the contemplated improvement, at unit prices or lump sums to be agreed upon in writing before starting such work, or if such prices or sums cannot be agreed upon, to do such work on a Force Account basis, as provided in MnDOT 1904.

(I)(We) further propose to execute the form of Contract within 10 days after receiving written notice of award, as provided in MnDOT 1306.

(I)(We) further propose to furnish a payment bond equal to the Contract amount, and a performance bond equal to the Contract amount, with the aggregate liability of the bond(s) equal to twice the full amount of the Contract if the contract is less than or equal to five million dollars ($5,000,000.00), or if the contract is in excess of five million dollars ($5,000,000.00) the aggregate liability shall be equal to the amount of the contract, as security for the construction and completion of the improvement according to the Plans, Specifications and Special Provisions as provided in MnDOT 1305.

(I)(We) further propose to do all work according to the Plans, Specifications and Special Provisions, and to renew or repair any work that may be rejected due to defective materials or workmanship, before completion and acceptance of the Project by the City of Rochester.

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(I)(We) agree to all provisions of Minnesota Statutes, Section 181.59.

(I)(We) further propose to begin work and to prosecute and complete the same according to the time schedule set forth in the Special Provisions for the improvement.

(I)(We) assign to the City of Rochester all claims for overcharges as to goods and materials purchased in connection with this Project resulting from antitrust violations that arise under the antitrust laws of the United States and the antitrust laws of the State of Minnesota. This clause also applies to subContractors and first tier suppliers under this Contract.

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

ABBREVIATIONS OF SCHEDULE OF PRICES

NOTICE TO BIDDERS

Particular note should be made in regard to the clarity of numerals (figures) and to the procedure for alterations and the required certificate as directed by Section 1301.

The following abbreviations may be used in item description and unit of measure in the Schedule of Prices.

A	Arch
A-S	Antiseepage
AB	Asbestos Bonded
ACT	Actuated
AGG	Aggregate
ALUM	Aluminum
ASB	Asbestos
ASPH	Asphaltic
ASSY	Assemblies
B+B	Balled & Burlapped
BC	Bituminous Coated
BIT	Bituminous
BLDG	Building
BR	Bridge
CAL	Caliper P-A
CB	Catch Basin
CEM	Cement
C and G	Curb and Gutter
CI	Cast Iron
C-I-P	Cast-in-Place PREC
CL	Class
COMM	Commercial
CONC	Concrete
COND	Conductor
CONN	Connection
CONST	Construct
CONT	Continuously RMC
CP	Cattle Pass
CTD	Coated RDWY
CU FT	Cubic Feet
CU YD	Cubic Yard
CULV	Culvert SPE
CWT	Hundred Weight
DES	Design SQ YD
DBL	Double STA
DI	Drop Inlet
DIAM	Diameter
DRWY	Driveway
EXC	Excavation
EXP	Expansion
FAB	Fabric
FE	Fence
FERT	Fertilizer
F+I	Furnish & Install
FOUND	Foundation
FT LG	Feet Long
FURN	Furnish
GA	Gauge UNDERGRD
GRAN	Granular
HI	High
INP	In Place
INST	Install

JA	Jacked
LIN FT	Linear Feet
LG	Long
MAINT	Maintenance
MATL	Material
MGM	1000 Board Feet
MET	Metal
MOD	Modification
MPA	Metal Pipe Arch
MTD	Mounted
NON	MET Non Metallic
NON PERF	Non-Perforated
NON REINF	Non-Reinforced
OH	Overhead
Pipe-Arch	
PAVT	Pavement
PERF	Perofrated
PL	Plate
PNEUM	Pneumatic
Precast	
PREST	Prestressed
PVC	Poly Vinyl Chloride
RCPA	Reinforced Concrete Pipe Arch
REINF	Reinforced
RELO	Relocation
RESTOR	Restoration
Rigid Metallic Conduit	
RNMC	Rigid Non Metallic Conduit
Roadway	
S-G	Sand& Gravel
SIG	Signal
Special	
SQ FT	Square Feet
Square Yard	
Station	
STD	Standard
STL	Steel
STKPL	Stockpile
STR	Strength
STRUCT	Structural
SPPA	Structural Plate Pipe Arch
SYS	System
T	Traffic
TBR	Timber
TEMP	Temporary
THERMO	Thermoplastic
TRTD	Treated
Underground	
UNTRTD	Untreated
VAR	Variable
VM	Vehicular Measure
WEAR	Wearing

ATTACHMENT CM 32--34

CM 32-34 March 26, 1969

THE FOLLOWING CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS SHALL BE EXECUTED BY THE BIDDER.

The bidder hereby certifies the he/she has _____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114 or 11246, and that he/she has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

_____
(Company)

By: _____

_____
(Title)

Date: _____

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41CFR 60-1.7(b)(1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are exempt from the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

Schedule of Prices

BIDDER MUST FILL IN UNIT PRICES IN NUMERALS; MAKE EXTENSION FOR EACH ITEM AND TOTAL. FOR COMPLETE INFORMATION CONCERNING THESE ITEMS, SEE PLANS AND SPECIFICATIONS, INCLUDING SPECIAL PROVISIONS.					
Item No.	Description	Units	Quantity	Unit Price	Total Price
Project 6201-3-02					
1 STREET (350)					
2021.501/00010	MOBILIZATION	LS	1.00		
2101.502/00010	CLEARING	TREE	10.00		
2101.507/00010	GRUBBING	TREE	10.00		
2104.501/00022	REMOVE CURB AND GUTTER	L F	4,162.00		
2104.505/00100	REMOVE PAVEMENT	S Y	6,963.00		
2104.505/00108	REMOVE CONCRETE DRIVEWAY PAVEMENT	S Y	432.00		
2104.505/00110	REMOVE CONCRETE PAVEMENT	S Y	572.00		
2104.505/00120	REMOVE BITUMINOUS PAVEMENT	S Y	5.00		
2104.513/00011	SAWING BIT PAVEMENT (FULL DEPTH)	L F	84.00		
2104.523/00539	SALVAGE SIGN	EACH	23.00		
2105.501/00010	COMMON EXCAVATION (P)	C Y	3,579.00		
2105.522/00031	SELECT GRANULAR BORROW MOD (CV) (P)	C Y	170.00		
2105.525/00030	TOPSOIL BORROW (CV) (P)	C Y	311.00		
2105.604/00035	GEOTEXTILE FABRIC TYPE V (P)	S Y	8,100.00		
2211.501/00050	AGGREGATE BASE CLASS 5	TON	100.00		
2211.503/00050	AGGREGATE BASE (CV) CLASS 5 (P)	C Y	1,760.00		
2301.501/00010	CONCRETE PAVEMENT	S Y	508.00		
2301.513/00010	STRUCTURAL CONCRETE HE	C Y	121.00		
2301.529/00011	REINFORCEMENT BARS (EPOXY COATED)	LB	135.00		
2301.538/00010	DOWEL BAR	EACH	93.00		

BIDDER MUST FILL IN UNIT PRICES IN NUMERALS; MAKE EXTENSION FOR EACH ITEM AND TOTAL. FOR COMPLETE INFORMATION CONCERNING THESE ITEMS, SEE PLANS AND SPECIFICATIONS, INCLUDING SPECIAL PROVISIONS.					
Item No.	Description	Units	Quantity	Unit Price	Total Price
2301.602/00016	DRILL & GROUT DOWEL BAR (EPOXY COATED)	EACH	72.00		
2301.602/00021	DRILL & GROUT REINF BAR (EPOXY COATED)	EACH	126.00		
2360.501/12200	TYPE SP 9.5 WEARING COURSE MIX (2,B)	TON	686.00		
2360.502/22200	TYPE SP 12.5 NON WEAR COURSE MIX (2,B)	TON	858.00		
2531.501/02320	CONCRETE CURB & GUTTER DESIGN B624	L F	4,292.00		
2531.507/00060	6" CONCRETE DRIVEWAY PAVEMENT	S Y	545.00		
2531.507/00070	7" CONCRETE DRIVEWAY PAVEMENT	S Y	164.00		
2545.523/00041	1.5" NON-METALLIC CONDUIT	L F	4,000.00		
2563.601/00010	TRAFFIC CONTROL	LS	1.00		
2564.531/00130	SIGN PANELS TYPE C	S F	52.00		
2564.602/00015	INSTALL SIGN	EACH	23.00		
2571.502/02200	DECIDUOUS TREE 2" CAL BR	TREE	16.00		
2571.602/00051	TREE PROTECTION TYPE I	EACH	26.00		
2571.602/00052	TREE PROTECTION TYPE II	EACH	6.00		
2571.602/00053	TREE PROTECTION TYPE III	EACH	39.00		
2573.530/00010	STORM DRAIN INLET PROTECTION	EACH	17.00		
2573.601/00020	EROSION CONTROL SUPERVISOR	LS	1.00		
2573.602/00020	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH	2.00		
2575.505/00060	SODDING TYPE MINERAL	S Y	3,729.00		
2582.602/03120	PAVT MSSG (SHARROW) EPOXY (WR)	EACH	32.00		
2582.603/61104	4" SOLID LINE WHITE-EPOXY (WR)	L F	4,630.00		
2582.603/62204	4" BROKEN LINE YELLOW-EPOXY (WR)	L F	780.00		

BIDDER MUST FILL IN UNIT PRICES IN NUMERALS; MAKE EXTENSION FOR EACH ITEM AND TOTAL. FOR COMPLETE INFORMATION CONCERNING THESE ITEMS, SEE PLANS AND SPECIFICATIONS, INCLUDING SPECIAL PROVISIONS.					
Item No.	Description	Units	Quantity	Unit Price	Total Price
2582.618/00140	CROSSWALK MARKING-EPOXY (WR)	S F	721.00		
S100.509/00005	BREAKER RUN PLACED (P)	C Y	1,350.00		
Total 1 STREET (350)					
2 PED FACILITIES (550)					
2104.505/00021	REMOVE CONCRETE WALK	S Y	362.00		
2521.501/00040	4" CONCRETE WALK	S F	900.00		
2521.501/00060	6" CONCRETE WALK	S F	1,821.00		
2531.618/00010	TRUNCATED DOMES	S F	128.00		
Total 2 PED FACILITIES (550)					
3 STORM SEWER (450)					
2104.501/00016	REMOVE SEWER PIPE (STORM)	L F	744.00		
2104.509/00101	REMOVE MANHOLE	EACH	6.00		
2104.509/00102	REMOVE CATCH BASIN	EACH	12.00		
2503.602/00042	CONNECT TO EXISTING STORM SEWER	EACH	1.00		
2506.602/00025	CONNECT INTO EXISTING MANHOLE	EACH	1.00		
S100.516/00125	FURNISH & INSTALL 12IN REINFO-RCED CONCRETE PIPE CLASS 5	L F	332.00		
S100.516/00183	FURNISH & INSTALL 18IN REINFO-RCED CONCRETE PIPE CLASS 3	L F	231.00		
S100.545/10006	CONSTRUCT STRUCTURE TYPE 1 0FT TO 6FT DEEP	STR	16.00		
S100.545/40406	CONSTRUCT STRUCTURE TYPE 4 (48IN) 0FT TO 6FT DEEP	STR	7.00		
S100.548/00010	FURNISH & INSTALL CASTING ASSEMBLY	EACH	1.00		
Total 3 STORM SEWER (450)					
4 SANITARY SEWER (250)					
2104.501/00017	REMOVE SEWER PIPE (SANITARY)	L F	1,959.00		
2104.509/00101	REMOVE MANHOLE	EACH	6.00		
S100.507/00010	SOLID ROCK EXCAVATION	C Y	196.00		
S100.509/00020	SELECT MATERIAL FOR BACKFILL (LV)	C Y	100.00		
S100.511/00010	AGGREGATE FOR PIPE FOUNDATION GRADATION A	C Y	100.00		
S100.522/00080	FURNISH & INSTALL 8IN ALTERNATE PRESSURE PIPE SEWER	L F	1,959.00		

BIDDER MUST FILL IN UNIT PRICES IN NUMERALS; MAKE EXTENSION FOR EACH ITEM AND TOTAL. FOR COMPLETE INFORMATION CONCERNING THESE ITEMS, SEE PLANS AND SPECIFICATIONS, INCLUDING SPECIAL PROVISIONS.					
Item No.	Description	Units	Quantity	Unit Price	Total Price
S100.545/30010	CONSTRUCT STRUCTURE TYPE 3 6FT TO 10FT DEEP	STR	4.00		
S100.545/30013	CONSTRUCT STRUCTURE TYPE 3 10FT TO 13FT DEEP	STR	2.00		
S100.548/00010	FURNISH & INSTALL CASTING ASSEMBLY	EACH	1.00		
S100.578/00010	FURNISH & INSTALL MANHOLE WATERPROOFING-INTERIOR	EACH	1.00		
Total 4 SANITARY SEWER (250)					
5 WATERMAIN (150)					
W200.507/00010	SOLID ROCK EXCAVATION	C Y	225.00		
W200.511/00010	AGGREGATE FOR PIPE FOUNDATION GRADATION A	C Y	100.00		
W200.528/00040	FURNISH & INSTALL 4IN DUCTILE IRON PIPE CLASS 52	L F	40.00		
W200.528/00060	FURNISH & INSTALL 6IN DUCTILE IRON PIPE CLASS 52	L F	146.00		
W200.528/00080	FURNISH & INSTALL 8IN DUCTILE IRON PIPE CLASS 52	L F	49.00		
W200.528/00120	FURNISH & INSTALL 12IN DUCTILE IRON PIPE CLASS 52	L F	14.00		
W200.528/00160	FURNISH & INSTALL 16IN DUCTILE IRON PIPE CLASS 52	L F	2,268.00		
W200.550/00040	FURNISH & INSTALL 4IN GATE VALVE AND BOX	EACH	1.00		
W200.550/00060	FURNISH & INSTALL 6IN GATE VALVE AND BOX	EACH	8.00		
W200.550/00080	FURNISH & INSTALL 8IN GATE VALVE AND BOX	EACH	1.00		
W200.550/00120	FURNISH & INSTALL 12IN GATE VALVE AND BOX	EACH	1.00		
W200.550/00160	FURNISH & INSTALL 16IN GATE VALVE AND BOX	EACH	7.00		
W200.560/00020	FURNISH & INSTALL HYDRANT ASSEMBLY	EACH	5.00		
W200.562/00010	FURNISH & INSTALL WATER MAIN FITTINGS	LB	5,476.00		
W200.564/00030	REMOVE HYDRANT ASSEMBLY	EACH	4.00		
W200.564/00040	REMOVE EXISTING WATERMAIN	L F	95.00		
W200.564/30060	REMOVE 6IN GATE VALVE AND BOX	EACH	9.00		
W200.564/30100	REMOVE 10IN GATE VALVE AND BOX	EACH	1.00		

BIDDER MUST FILL IN UNIT PRICES IN NUMERALS; MAKE EXTENSION FOR EACH ITEM AND TOTAL. FOR COMPLETE INFORMATION CONCERNING THESE ITEMS, SEE PLANS AND SPECIFICATIONS, INCLUDING SPECIAL PROVISIONS.					
Item No.	Description	Units	Quantity	Unit Price	Total Price
W200.564/30120	REMOVE 12IN GATE VALVE AND BOX	EACH	1.00		
Total 5 WATERMAIN (150)					
6 SERVICE CONNECTION (094)					
C150.503/10004	4IN SANITARY SEWER SERVICE CONNECTION	L F	10.00		
C150.503/10006	6IN SANITARY SEWER SERVICE CONNECTION	L F	10.00		
C150.504/10009	3/4IN WATER SERVICE CONNECTION	L F	100.00		
C150.504/10010	1IN WATER SERVICE CONNECTION	L F	100.00		
C150.504/10090	3/4IN WATER SERVICE CONNECTION (DIRECTIONAL DRILL)	L F	100.00		
C150.504/10100	1IN WATER SERVICE CONNECTION (DIRECTIONAL DRILL)	L F	100.00		
C150.550/00009	3/4IN CURB STOP AND BOX	EACH	1.00		
C150.550/00010	1IN CURB STOP AND BOX	EACH	1.00		
C150.568/00010	REBUILD EXISTING SEWER SERVICE CONNECTIONS	EACH	10.00		
C150.568/00020	REBUILD EXISTING WATER SERVICE CONNECTIONS	EACH	22.00		
C150.569/00010	RECONNECT EXISTING SEWER SERVICE CONNECTIONS	EACH	68.00		
C150.569/00020	RECONNECT EXISTING WATER SERVICE CONNECTIONS	EACH	42.00		
Total 6 SERVICE CONNECTION (094)					
Grand Total					

SURETY DEPOSITS

New Law requires surety deposits for many out-of-state Contractors

A portion of payments made to out-of-state Contractors must be deposited with the state of Minnesota in many instances under a new law passed by the 1989 Legislature.

The law requires that 8 percent of each payment paid to out-of-state Contractors for work done in Minnesota must be withheld as a surety deposit on any contract that can reasonably be expected to exceed $100,000.

This requirement may be waived, however, if certain conditions are met.

Following are some guidelines to use with the new law.

Once an out-of-state Contractor enters into a contract that is for more than or can be expected to be more than $100,000, the Contractor will have to file form SD-E (Exemption from Surety Deposits for Out-of-State Contractors) with the Department of Revenue. The department will use the form to determine if the Contractor is exempt from the 8 percent surety deposit requirements.

The department will grant an exemption if:

The Contractor gives the department a cash surety or bond, secured by an insurance company licensed in Minnesota, which guarantees the Contractor will comply with all provisions of Minnesota withholding, sales, and corporate income tax laws, or

The Contractor has done construction work in Minnesota at any time during the three calendar years before entering into the contract and has fully complied with Minnesota withholding, sales, and corporate income tax laws.

If the Contractor is exempt, the department will certify the form and return a copy to the Contractor, who will then be responsible to provide a copy to whoever hired them.

If the Contractor is not exempt, the department will notify whoever hired the Contractor to withhold the 8 percent surety deposit from each payment made to the Contractor. The person or company hiring the Contractor will use form SD-D to make the surety deposits.

The Department of Revenue will retain the surety deposits until the Contractor's state tax obligations are considered fulfilled. The department will then refund, with interest, any amounts held as surety.

Out-of-state Contractors working for Minnesota subdivisions will still have to file the Withholding Affidavit for Contractors (form IC-134) in addition to complying with the new provisions.

If you need more forms of information, please call (612) 296-6181 from the Twin Cities area and (toll-free) 1-800-657-3777 from elsewhere.

You may also write to: Minnesota Department of Revenue
Taxpayer Information Division
Mail Station 4450
St. Paul, MN 55146-4450

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

TO WHOM IT MAY CONCERN:

A new Minnesota Law effective January 1, 1990, now governs contracts over $100,000.00 for non-Minnesota Contractors.

We have been informed by the Minnesota Department of Revenue that certain requirements have not been met. Therefore, we are withholding an 8% surety deposit from your payment.

You are eligible to have these funds returned when the state tax obligations are met.

Gross Amount

8% Surety Deposit _____

Net Amount Paid

If you have any questions, contact Mr. Dan Weber at (507) 328-2409.

Letting Date:_____
State Project No.:_____
Bond No.:_____

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, that We, _____ _____, as Principal, and _____, _____, as Surety, are jointly and severally held and firmly bound unto the State of Minnesota, Department of Transportation, as Obligee, in the sum of five percent (5%) of the total amount of the proposal price.

The CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall be awarded a contract, upon the accompanying proposal dated _____ for the performance of STATE PROJECT _____ _____

and shall, within the time stated in the proposal, enter into a contract for the performance of the work and give bond as required by law, then this obligation shall be void; otherwise, the Principal and Surety shall pay unto the Obligee the amount of this bond, not as a penalty, but as liquidated damages sustained by the Obligee as the result of such failure on the part of the Principal to execute said contract and bond.

SIGNATURES

Date_____, 20_____

_____
(Name of Contractor/Principal)

By:_____
(Officer).

By:_____
(Officer)

_____
(Name of Surety)

By:_____
(Attorney-in-Fact)

(Surety Corporate Seal)

-1-

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

ACKNOWLEDGEMENT IN A REPRESENTATIVE CAPACITY
(Corporation, LLC, Partnership or Other Entity)

STATE OF _____
COUNTY OF _____
This instrument was acknowledged before me on _____ by _____
(date) (name)
and _____ as _____ and _____
(name) (title) (title)
of _____.
(name and designation of party on behalf of whom the instrument was executed)

Notary Signature: _____
Title: Notary
Commission Expiration: _____

(Notary Stamp/Seal)

ACKNOWLEDGEMENT IN AN INDIVIDUAL CAPACITY

STATE OF _____
COUNTY OF _____

This instrument was acknowledged before me on _____ by _____
(date) (name)
and _____ .
(name)

Notary Signature: _____
Title: Notary
Commission Expiration: _____

(Notary Stamp/Seal)

ACKNOWLEDGEMENT OF SURETY

STATE OF _____
COUNTY OF _____
This instrument was acknowledged before me on _____ by _____
(date) (name)
as Attorney-in-Fact of _____.
(name of surety)

Notary Signature: _____
Title: Notary
Commission Expiration: _____

(Notary Stamp/Seal)

NOTICE TO PERSONAL SURETIES: Bond will not be accepted unless accompanied by a sworn financial statement of each of the sureties.

NOTICE TO CORPORATE SURETIES: This bond will not be accepted unless executed by a Minnesota agent, or a duly licensed non-resident-producer, or attorney-in-fact whose name and address must be noted below.

Full Name of Surety Company _____

Home Office Address (Street) _____

City, State and Zip Code _____

Name of Attorney-in-Fact _____

Name of Local Agent and Agency or _____

Non-Resident Producer and Agency

Address of Local Agency or _____

Non-Resident Producer Agency (street)

City, State and Zip Code _____

Approved and filed _____, 20_____

_____
Commissioner of Transportation
Pursuant to Delegation of Authority

Department of Public Works
201 4th Street SE, Room 108
Rochester, MN 55904-3740
(507) 328-2400

FORM 21126D (FF REV. 1-09)

State Project No. **J7215**

GRAND TOTAL $ _____

PROPOSAL GUARANTY as required by 1208 of the Specifications: "A (certified check) (bond), prepared as required by 1208 of the Specifications and payable to the City of Rochester, Minnesota, in an amount equal to at least (5%) percent of the total amount of the bid is submitted herewith as a proposal guaranty.

NON-COLLUSION AFFIDAVIT: If a Non-Collusion affidavit is found in this Proposal it must be signed by each bidder.

RECEIPT OF ADDENDA as required by 1210 of the Specifications:
The undersigned hereby acknowledges receipt of and has considered:

Addendum No. ___ Dated _____ Addendum No. _____ Dated _____

Addendum No. ___ Dated _____ Addendum No. _____ Dated _____

Signed _____

RECEIPT OF PLAN:
The undersigned hereby acknowledges receipt of and has considered: **(J7215) 53** Total Sheets.

Signed _____

EXECUTION OF PROPOSAL as required by 1206 of the Specifications:

This proposal dated the _____ day of _____, 20____

Signed: _____, P.O. Address _____ as an individual.

Signed: _____, P.O. Address _____ as an individual.

Doing business under the name and style of _____

Signed: _____, for _____ a partnership.

NAME BUSINESS ADDRESS

Signed: _____, for _____ a corporation,
Incorporated under the laws of the State of _____

Name of President _____ Business Address _____

Name of Vice-President _____ Business Address _____

Name of Secretary _____ Business Address _____

Name of Treasurer _____ Business Address _____

(NOTE: Signatures shall comply with 1206 of the Specifications.)