(E) Temporary lane restrictions will not be permitted between the hours of 5:00 A.M. and 8:00 P.M. Monday through Friday. **Work which will restrict or interfere with traffic shall not be performed between 12:00 noon on the day preceding and 9:00 A.M. on the day following any consecutive combination of a Saturday, Sunday and legal holiday**. The Engineer will have the right to lengthen, shorten, or otherwise modify the foregoing periods of restrictions as actual traffic conditions may warrant. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of $2,000.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(F) Ramp closures north of Bridge No. 9340 will not be permitted between the hours of 5:00 A.M. and 8:00 P.M. Monday through Friday unless otherwise permitted by the Engineer. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of $2,000.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(G) Ramps south of Bridge No. 9340 will be permitted to be closed and detoured as identified in the traffic control plans for the bridge repair work shown in the Plans and provisions. However, no ramp will be permitted to be closed for more than 30 Calendar Days. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of $500.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(H) All ramps shall be open to traffic and temporary lane restrictions will not be permitted on the weekends of July 13-15 and July 20-22 during the Minneapolis Aquatennial.

(I) Temporary lane restrictions and/or closures for removing and/or erecting overhead structures will only be permitted between the hours of 1:00 A.M. and 4:30 A.M. as approved by the Engineer. If the Contractor requests to close the road and the Engineer approves that it is necessary to temporarily detour traffic in order to remove or set the structures, the Contractor shall furnish the detour as directed by the Engineer. The temporary detour shall be incidental work for which no direct compensation will be made. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of $2,000.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

The Contractor may stop all traffic on any road open to traffic to erect or remove overhead structures for periods of time not to exceed fifteen minutes only from 1:00 A.M. to 4:30 A.M. The Contractor shall allow sufficient clearance time between stopped periods so as to cause as little delay to traffic as possible. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of $2,000.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

(J) No center lane closures will be permitted. Only double lane closures as shown in the Field Manual of the MN MUTCD will be allowed at the times as directed by the Engineer. This may require night lane closures if traffic volumes warrant.

(K) The Contractor shall provide one vehicle or trailer mounted flashing arrow board for each lane of each work area where traffic is restricted. The board shall meet the requirements of the MN MUTCD and shall be equipped with a light that is visible to personnel in the work area to indicate that the unit is in operation. The flashing arrow board shall be incidental to Traffic Control.

It is imperative that the Contractor continually operate each Flashing Arrow Board at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance.

Except as authorized by the Engineer, the Flashing Arrow Board shall be stored off the shoulder when not in use. In the event the Engineer allows the arrow board to remain on the shoulder the arrow board shall be delineated with a minimum of three (3) retroreflective drums or weighted channelizers, as determined by the Engineer.

(L) The Contractor shall furnish flag persons as required to adequately control traffic. Flag persons shall conform to the requirements set forth in the MN MUTCD. All costs incurred to provide such flag persons shall be incidental to the lump sum traffic control.

(M) The Contractor shall provide two-way radios for flag persons.

Flag persons shall wear high visibility retroreflective safety vests, pants and hats at all times while actively flagging on the Project. High visibility apparel shall comply with current Minnesota OSHA Rules 5207.0100 and 5207.1000. The flag persons clothing shall be considered an incidental expense for which no direct compensation will be made.

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

Except as otherwise authorized by the Engineer, the maximum length of the flagging operation shall be no more than 1.6 km **[1 mile]**.

The Contractor shall coordinate the flagging operations in a manner which causes as little delay to the traveling public as possible, and at no time shall the delay exceed 2 minutes. In the event that the Contractor is unable to meet the maximum delay requirements, operations shall shut down until such time a new traffic control plan is developed which does meet the maximum delay requirement.

If hauling operations create hazards for the traveling public, the Contractor will be required to provide additional flaggers, as directed by the Engineer. All costs incurred to provide the additional flaggers shall be incidental to the lump sum traffic control.

(N) The Contractor shall furnish off-duty police officers in uniform with cars and an orange reflectorized vest to direct traffic if deemed necessary and so ordered by the Engineer. "Police Officer" means every officer authorized to direct or regulate traffic or to make arrests for violations of traffic rules. Payment for police officers will be made by the unit hour as provided elsewhere in these Special Provisions.

(O) A Portable Changeable Message sign will be provided in advance of each temporary lane closure to communicate real time information.

(PCMS) Type C Trailer Mounted Message Signs will be permitted. It is imperative that the Contractor continually operate each PCMS at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance. If at any time the Contractor fails to operate a Portable Changeable Message Sign at maximum legibility, as determined by the Engineer, the Contractor will be charged **$250/hour** until the problem is corrected.

Except as authorized by the Engineer, the message sign shall be stored off the shoulder when not in use. In the event the Engineer allows the message board to remain on the shoulder the message sign shall be delineated with a minimum of three (3) retroreflective drums or weighted channelizers, or as determined by the Engineer.

Payment for Portable Changeable Message Signs furnished and installed, as directed by the Engineer, will be made by the each as specified in Section S-88 (PORTABLE CHANGEABLE MESSAGE SIGN) of these Special Provisions.

S-9.5 GENERAL REQUIREMENTS:

(A) All portable sign assemblies shall be perpendicular to the ground. No traffic control device (signs, channelizing devices, arrowboards, etc.) shall be weighted so they become hazardous to motorists and workers. The approved ballast system for devices mounted on temporary portable supports is sandbags, unless it is designed, crash tested, and approved for the specific device. During freezing conditions, the sand for bags shall be mixed with a de-icer to prevent the sand from freezing. The sandbags shall be placed and maintained at the base of the traffic control device to the satisfaction of the Engineer.

When signs will remain in the same location for more than 30 consecutive days the signs shall be post mounted. This would not include portable signs which are set up and taken down at the beginning and end of each work shift.

(B) When signs are installed, they shall be mounted on posts driven into the ground at the proper height and lateral offset as detailed in the MN MUTCD. **When signs are removed, the sign posts and stub posts shall also be removed from the Right of Way within two (2) weeks or the Contractor shall be subject to a daily charge assessed at a rate of $100.00 per day for each day or portion thereof with which the Engineer determines that the Contractor has not complied.**

(C) The Contractor shall be required to cover or remove all traffic control devices which may be inconsistent with traffic patterns during all traffic switches. See Maintenance and Staging of Traffic Control.

(D) Open excavation adjacent to the existing pavement will not be permitted on opposite sides of the roadway at the same time.

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

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

(G) The Contractor will not be allowed to store materials or equipment within 10 m [**30 feet**] of through traffic unless approved by the Engineer. If materials or equipment must be stored within 10 m [**30 feet**] of through traffic, the Contractor shall provide barricades or barriers, as directed by the Engineer, to warn and protect traffic.

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

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

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

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

(I) The Contractor shall store at least **FIFTEEN (15)** extra Type III barricades and **THIRTY (30)** extra retroreflective drums, at a convenient location within the Project limits, to be used at the discretion of the Engineer. No direct compensation will be made to the Contractor for furnishing and erecting these traffic control devices.

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

The Contractor shall provide sufficient numbers of light plants to adequately illuminate the work area as determined by the Engineer. All costs incurred to provide such light plants shall be incidental to the lump sum traffic control.

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

The Contractor shall provide a sufficient amount of 50 mm [**2 inch**] wide highly reflective vehicle marking tape to be applied to Contractor vehicles and equipment, as directed by the Engineer, and as provided by the manufacturer's instructions. This tape shall be considered an incidental expense for which no direct compensation will be made. The tape shall be Reflexite Durabrite Vehicle Marking Tape, 3M Vehicular Conspicuity Tape, or an approved equal. Vehicle examples to be marked with tape are Contractor rollers, paver, millers and other equipment normally found in the lane closure.

(K) All in place signs and delineators mounted on less than three posts (not including back bracing) and which interfere with the Contractor's normal operation, shall be relocated outside of the work area by the Contractor at the direction of the Engineer. Any signs that are removed and may be reused are to be stored in such a manner as to protect the sign from scratching, fading, or other harmful affects until said signs are reinstalled or delivered to Mn/DOT. All signs mounted on three or more posts requiring relocation will be relocated by State forces. The Contractor shall notify the Engineer 14 Working Days prior to the required relocation work. Signs mounted on three or more posts that must be removed but not relocated shall be removed by the Contractor. Upon completion of work at each sign location, or at the direction of the Engineer, the signs shall be replaced as near to their original locations as possible or to a location designated by the Engineer. Signs and structures damaged by the Contractor shall be replaced by him at his own expense. Regulatory signs, not otherwise covered by this Contract, may only be removed or replaced or relocated by Mn/DOT personnel.

(L) **Truck Mounted Attenuators (TMA'S)**

If the Contractor establishes a moving lane closure on a high speed roadway, any vehicle operating totally or partially in a traffic lane shall be equipped with a truck mounted attenuator that meets the requirements of NCHRP 250. The moving lane closure shall meet the requirements described in the appropriate Field Manual layout.

S-9.6 MILLING, SEALCOATING, AND PAVING OPERATIONS

(A) The Contractor shall schedule milling and bituminous paving operations such that milled areas will be covered with a wear course within 24 hours of completion of the milling, except for delays caused by inclement weather.

(B) When traffic is allowed to drive on the milled surface, the Contractor shall furnish and install "GROOVED PAVEMENT" and "BUMP" signs with "Advisory Speed" plates at locations determined by the Engineer. Payment for these signs shall be included in the lump sum payment for traffic control.

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

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

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

(F) The Contractor shall maintain traffic with a minimum of delay during milling and paving operations at intersections controlled by signals or by all-way stop signs. The Contractor shall provide off-duty police officers to direct and control traffic around and through milling and paving operations at those intersections. "Police officer" means every officer authorized to direct or regulate traffic or to make arrests for violations of traffic rules. Payment for police officers will be made by the unit hour as provided elsewhere in these Special Provisions.

(G) The Contractor may close intersecting streets to traffic, other than at intersections controlled by signals or "All Way Stop" signs during milling and paving operations in the intersection, but only if there are adequate alternate routes for the intersecting street traffic. The Contractor shall not close adjacent intersecting streets to traffic concurrently. The Contractor shall notify the local road authorities of its schedule to close intersecting streets 48 hours in advance of the closure.

S-9.7 MAINTENANCE AND STAGING OF TRAFFIC CONTROL

(A) The Contractor shall maintain, at all times, the existing traffic movements at the following intersections: University Avenue; 4th Street SE; Hennepin Avenue E: New Brighton Boulevard and Stinson Boulevard.

(B) Pedestrian traffic shall be maintained and guided through the Project at all times.

(C) Except as otherwise authorized by the Engineer, the Contractor shall maintain a minimum of two km [**1.25 mile**] between temporary lane closures.

(D) The Contractor shall keep the Right-of-Way fence closed up, except during work hours, by means of the in place fence, newly constructed fence, temporary fence (at the Contractor's expense), or a combination thereof.

(E) All signs installed on roads open to traffic that are not consistent with traffic operations shall be covered as directed by the Engineer. The cover should be a plate of solid material covering the entire legend or all of that part of the legend that is inappropriate. This cover shall be bolted to the sign and shall use a minimum of 3 mm [**1/8 inch**] plastic washers between the sign face and the cover. See "Typical-Temporary Construction Sign Panel Overlay (Cover)" (Traffic Engineering Manual Chapter 8) for additional details.

(F) No access to or from any public road will be permitted for the Contractor's equipment, material deliveries, the hauling of excavated materials of any kind, or employees' private vehicles, except at in place public road intersections, or at locations and in such manner as approved by the Engineer.

(G) As each road is completed, the Contractor shall install the final signing and pavement markings required to safely open that road to traffic. This work shall be completed on or before the date of opening as approved by the Engineer. Overhead signs may be temporarily ground mounted at the Contractor's expense.

(H) The Contractor shall at all times maintain a lane width of not less than 3.3 meters [**11 feet**] in each direction.

(I) Street identification signage shall be maintained at all times. Where the only existing signs are small city or county signs located at the intersection, street names and address numbers shall be maintained by temporary installations as required by the Engineer. This is necessary to maintain the 911 emergency system.

(J) The Contractor shall be required to supply manpower to assist Mn/DOT personnel in pavement marking related projects such as, but not inclusive to, collecting data from in place lane lines and marking final pavement marking alignments. This shall also include any lane closures or traffic control necessary to complete these projects safely. Payment for said pavement marking related projects shall be incidental to the pavement marking items for which no direct compensation will be made.

S-9.8 SIGNAL AND LIGHTING SYSTEMS

The Contractor shall not interfere with the operation of any traffic signal system, except as required by the Contract. The Contractor shall notify the Engineer at least 24 hours prior to beginning any work that will interfere with any traffic signal system or its detectors.

The Contractor shall furnish off-duty police officers with cars for directing and controlling traffic during such times as the existing or temporary signal system at each location is out of operation. "Police officer" means every officer authorized to direct or regulate traffic or to make arrests for violations of traffic rules. Off-duty police officers shall be furnished in such numbers as deemed necessary by the Engineer to direct traffic. Payment for police officers will be made by the unit hour as provided elsewhere in these Special Provisions.

The Contractor shall maintain roadway and street lighting by means of the in place lights, the newly constructed lights, or a combination thereof, except as otherwise authorized in writing by the Engineer.

The Contractor shall make the lighting system associated with feedpoint W5N the first priority to be installed and operational.

S-9.9 ADDITIONAL TRAFFIC CONTROL DEVICES

In addition to the traffic control devices shown on the Traffic Control Layouts, and/or Field Manual, the Engineer may require more traffic control as traffic conditions may warrant. These items are not intended for temporary lane closures.

NOTE: These provisions will apply ONLY when the Plan contains Item(s) for 2563.601 (Traffic Control) and/or if "Traffic Control Layouts" are included in the Plan or attached to this Proposal.

(A) General Requirements:

The Contractor shall furnish the additional traffic control devices as ordered by the Engineer.

The devices shall be installed and maintained in a functional and/or legible condition, at all times, to the satisfaction of the Engineer.

(B) Measurement:

Flashers, barricades, reflectorized drums, portable changeable message signs, 1220 x 1220 mm [**48 x 48 inch**] signs, and flashing arrow boards will be measured by the number of individual units of each type multiplied by the number of Calendar Days each unit is in service.

Standard signs of each type, other than 1220 x 1220 mm [**48 x 48 inch**] signs will be measured by the face area of signs furnished multiplied by the number of Calendar Days each square meter [**square foot**] of sign is in service.

Special construction signs will be measured by the face area thereof furnished and installed as specified.

Flag Persons and Police Officers will be measured by the length of time each is in service on the job. Police Officers shall be equipped with a car at all times on the job and the car shall be incidental in the payment for the Police Officer.

(C) Payment:

Payment for additional traffic control devices of each type, at the appropriate pre-determined Unit Day price set forth below, shall be compensation in full for all costs of furnishing, installing, maintaining, and subsequently removing and disposing of the device.

Payment for standard signs of each type, other than 1220 x 1220 mm [**48 x 48 inch**] signs, will be made at the appropriate pre-determined Square Meter/Day [**Square Foot/Day**] price which shall be payment in full for all costs of furnishing, installing, maintaining and subsequently removing and disposing of the signs.

The pre-determined Square Meter [**Square Foot**] price for "Construction Signs - Special" shall be payment in full to furnish, install, maintain and remove such signs. All materials required to furnish and install these signs will remain the property of the Contractor.

Payment for Flag Persons and Police Officers will be by the Unit Hour for each hour or portion thereof that each is in service on the Project.

Payment for all additional traffic control devices, as ordered by the Engineer, will be made in accordance with the following schedule:

ADDITIONAL TRAFFIC CONTROL DEVICES

Item No.	Item	Unit	Predetermined Price
2563.610	Flag Person	Hour	30.00
2563.610	Police Officer	Hour	*
2563.613	Type I Barricade (Diamond Grade) w/Steady Burn Light	Unit Day	$1.05
2563.613	Type III Barricade (Diamond Grade)	Unit Day	2.75
2563.613	Direction Indicator Barricade	Unit Day	1.25
2563.613	Reflectorized Plastic Safety Drum	Unit Day	0.85
2563.613	Reflectorized Plastic Safety Drum w/Down Arrow	Unit Day	0.95
2563.613	Weighted Traffic Channelizer	Unit Day	0.40
2563.613	Flasher Type A (Low Intensity)	Unit Day	0.50
2563.613	Flasher Type B (High Intensity)	Unit Day	1.75
2563.613	Flasher Type C (Steady Burn)	Unit Day	0.90
2563.613	1220 x 1220 mm [**48 x 48 inch**] Standard Sign (Diamond Grade)	Unit Day	1.75
2563.613	1220 x 1220 mm [**48 x 48 inch**] Standard Sign w/Support (Diamond Grade)	Unit Day	2.20
2563.613**	Portable Changeable Message Sign	Unit Day	225.00
2563.613***	Flashing Arrow Board (one shift)	Unit Day	33.00
2563.613***	Flashing Arrow Board (24 hour day)	Unit Day	45.00
2563.617****	Standard Signs	m^2/Day	1.08
2563.617****	Standard Signs	**SQ.FT./Day**	**0.10**
2563.617****	Standard Signs w/support	m^2/Day	1.72
2563.617****	Standard Signs w/support	**SQ.FT./Day**	**0.16**
2563.604	Construction Signs - Special (Diamond Grade)	m^2	199.10
2563.618	Construction Signs - Special (Diamond Grade)	**SQ.FT.**	**18.50**

* Shall be paid at the invoice price plus 10%

** (PCMS) Type C Trailer Mounted Message Signs will be permitted. It is imperative that the Contractor continually operate each PCMS at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance. If at any time the Contractor fails to operate a Portable Changeable Message Sign at maximum legibility, as determined by the Engineer, no payment will be made for each day that the Message Sign is deemed inadequate.

*** It is imperative that the Contractor continually operate each Flashing Arrow Board at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance. If at any time the Contractor fails to operate the Flashing Arrow Board at maximum legibility, as determined by the Engineer, no payment will be made for each day that the Flashing Arrow Board is deemed inadequate.

**** Other than 1220 X 1220 mm **[48 X 48 inch]** Signs, with or without support.

NOTE: These predetermined unit prices apply only if not listed as separate bid items.

Barricades, drums and signs by the Unit Day shall be paid for up to 90 days per device. After 90 days, payment per Unit Day will continue at a reduced price of 40% of the Unit price.

S-10 (1505) COOPERATION BY CONTRACTORS

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

S-10.1 The State intends to call for bids on additional contracts for the following, the work of which will be performed concurrently with the work under this Contract:

S.P. 0280-54 (35W)
East side from Opal Street NE to Sunset Avenue NE
In Blaine
Noise Wall
Letting Date: 2/23/07

S.P. 0280-55 (35W)
At CSAH 23 (Lake Drive) Interchange
In Lino Lakes
Bridge Replacement, Interchange Reconstruction
Letting Date: 2/15/07

S.P. 1981-102 (35W)
From Burnsville Parkway to CSAH 42
In Burnsville
Grade, Surface, Extend Southbound Lane
Letting Date: 4/27/07

S.P. 2782-281 (35W)
35W/62 Improvements, 66th Street to 42nd Street
In Minneapolis
Anticipated Letting Date: 3/30/07

S-10.2 The Contractor shall coordinate his/her work and cooperate with the holders of those separate contracts, both present and future, and their forces in a manner consistent with the provisions of Mn/DOT 1505.

S-11 (1507) UTILITY PROPERTY AND SERVICE

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

S-11.1 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-11.2 The following utility owners have existing facilities that will not 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.

City of Minneapolis Mr. David Sonnenberg Public Works Director 350 South 5th Street Minneapolis, MN Phone: 612/673-2443 Fax: 612/673-3565	**CenterPoint Energy Resources Corp.** d/b/a/ CenterPoint Energy Minnesota Gas Mr. Andrew Balgobin Administration Engineer P.O. Box 1165, 700 West Linden Avenue Minneapolis, MN 55440-1165 Phone: 612/321-5426 Fax: 612/321-5480
Department of Transportation Mr. Marlin Reinardy 6000 Minnehaha Avenue St. Paul, MN 55111 Phone: 612/735-2309 Fax: 612/735-2386	**Xcel Energy** Mr. Scott Johnson Highway and Railroad Liaison 250 Marquette Avenue Suite 800 Minneapolis, MN 55401 Phone: 612/330-6078 Fax: 612/573-9171

See http://www.dot.state.mn.us/tecsup/utility/ for utility company information.

S-11.3 The following utility owners have existing facilities in the area of construction. These utilities will **not be affected** by work under this Contract. The utilities listed below are for informational purposes only.

American Fiber Systems Inc. Shawn Olson, City Manager 13746 - 214th Court Elk River, MN 55330 Phone: 763/441-7952 Fax: 763/441-7956 Cell: 612/910-0261	**AT&T Corporation** Joel Prigge Operations Supervisor 795 Jefferson Ave. W. St. Paul, MN 55102 Phone: 612/344-3327	**AT&T Corporation - Local Services** Randy Gezella Operations Supervisor 13320 – 15th Ave. N. Plymouth, MN 55441 Phone: 763/559-8123
Burlington Northern Santa Fe Railroad Lynn Leibfried Manager-Public Projects 80 – 44th Ave. NE Minneapolis, MN 55421 Phone: 763/782-3492	**Call-Net Communications, Inc. aka Sprint-Canada** Brent Beaver, Senior Engineer 2550 Victoria Park Ave., Suite 250 VP 520 Toronto, On M2J5E6 Phone: 416/496-1644 ext. 5203 Fax: 416/496-4975	**Century Tel of Minnesota, Inc.** Mark Tupper District Manager 204 N. St. Paul Ave. PO Box 408 Fulda, MN 56131 Phone: 507/425-2993 Fax: 507/425-2966

CNCS Inc. **Canadian Pacific Railway** Jim Kreiger Public Works Engineer 501 Marquette Avenue Soo Line Building Minneapolis, MN 55402 Phone: 612/904-5994	**Comcast Cable Communications Inc.** Ron Gullberg Construction Manager 9705 Data Park Minnetonka, MN 55343 Phone: 952/607-4011 Fax: 952/697-4363 Cell: 612/369-3192	**Enventis Telecom** Paul Bachman Director-Engineering 21 West Superior St. Duluth, MN 55802-2093 Phone: 218/740-6139 Fax: 218/720-2765
Global Crossing North America Phone: 920/459-2600	**Hennepin County Public Works** Jay Baldwin Engineering Tech 1600 Prairie Drive Medina, MN 55340-4521 Phone: 763/745-7742 Fax: 763/478-4003	**McLeod USA** Brant Sanders Field Operations 2996 Centre Pointe Drive Roseville, MN 55113 Phone: 952/238-4511 Fax: 651/582-0500 Cell: 612/919-6928
Metropolitan Council, Environmental Services Scott Dentz Manager, Interceptor Engineering 3565 Kennebec Drive St. Paul, MN 55122 Phone: 651/602-4503	**Metro Transit – Light Rail** Phone: 612/341-5633 Metro Transit Phone: 612/349-7317	**Onvoy** Dan Nestico Manager of Engineering 300 South Highway 169, Suite 700 Minneapolis, MN 55426 Phone: 763/230-4488 Fax: 763/230-4270
Qwest Corporation Judy Sondag Director of Engineering Suite 300, 2800 Wayzata Blvd. Minneapolis, MN 55405 Phone: 612/381-5551 Fax: 612/381-5584 -OR- Ross Larson Manager-Engineering 390 Commerce Dr. Woodbury, MN 55125 Phone: 651/714-7541 Fax: 651/730-1385	**Sprint Communications Company, L.P.** Dan Hilliard OSP Project Engineer III Fiber Operations Western Division 849 Earl St. St. Paul, MN 55106 Phone: 651/772-6714 Fax: 651/772-6724	**Time Warner Telecom** Bob Strong OSP Engineer 5480 Feltl Road Minnetonka, MN 55343 Phone: 952/351-2353 Fax: 952/351-2317 Cell: 612/805-6827
University of Minnesota Phone: 612/624-0001	**WilTel Communications, LLC** Judith Lake Project Coordinator 100 South Cincinnati Ave. Tulsa, OK 74103 Phone: 918/547-9919 Fax: 918/547-8018	**WorldCom (MCI/Worldcom)** Darin Zumach Manager MCI 2400 Glenville Richardson, TX 75082 Phone: 763/591-4187 Fax: 763/543-1928
XO Communications Herb Hewitt CO Technician Supervisor 1200 Washington Ave. N. Minneapolis, MN 55401 Phone: 612/312-1590		

See http://www.dot.state.mn.us/tecsup/utility/ for utility company information.

S-11.4 The State's Contractor shall coordinate his/her work and cooperate with the foregoing utility owners and their forces in a manner consistent with the provisions of Mn/DOT 1507 and the applicable provisions of Mn/DOT 1505.

S-12 (1507) USE OF WATER FROM CITY HYDRANTS

All water taken from City of Minneapolis hydrants shall be metered and a charge will be made for the amount used. The Contractor must make arrangements with the Public Works and Utilities Department to get the necessary permit, valve and meter, prior to using the hydrant for drawing water.

S-13 (1514) MAINTENANCE DURING CONSTRUCTION

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

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

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

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

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

S-14 (1517) CLAIMS FOR COMPENSATION ADJUSTMENT

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

S-14.1 **NOTICE OF CLAIM:**

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

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

S-14.2 **SUBMISSION OF CLAIMS:**

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

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

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

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

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

S-14.3 **DECISION ON CLAIMS:**

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

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

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

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

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

S-14.4 **MEDIATION:**

Notwithstanding the formal claims procedures set forth in this Special Provision, the parties may at any time enter into nonbinding mediation by mutual agreement. If the parties agree to mediation, then the time requirements set forth above in Section S-14.3 (A) and (B) are suspended until the mediation is completed. The time and place for mediation, as well as selection of the mediator, shall be established by mutual agreement. The mediator's costs shall be divided equally between the Contractor and the Department. This payment shall be accomplished by the Contractor paying in full all costs and fees for the mediator and then submit the bill to the Engineer for 50 percent reimbursement. Either party may terminate mediation at any time.

S-14.5 **RIGHTS OF ARBITRATION:**

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

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

S-14.6 **ARBITRATION OF CLAIMS AND DISPUTES:**

(A) For purposes of this section, a claim for adjustment in compensation shall mean an aggregate of operative facts which give rise to the rights which the Contractor seeks to enforce. Stated another way, a claim is the event, transaction, or set of facts that give rise to a claim for compensation. Any Contractor having a claim in excess of $75,000.00 may waive or abandon the dollar amount in excess of $75,000.00 so as to bring the claim within the scope of this section. However, the arbitration award shall not exceed $75,000.00. Various damages claimed by the Contractor for a single claim may not be divided into separate proceedings to create claims within the $75,000.00 limit.

(B) More than one separate claim may be presented at each arbitration hearing if agreed to by the Department, the Contractor, and the Arbitrator.

(C) Selection of the Arbitrator/ Optional Use of the American Arbitration Association:

a. Selection of the arbitrator shall be conducted by one representative of the Department and one representative of the Contractor. A single person shall represent the prime and all subcontractors involved in the claim. Separate representation for subcontractors during the selection of the arbitrator is not allowed.

b. The parties may mutually agree to have the arbitration process administered by the American Arbitration Association ("AAA").

c. The arbitration shall be administered by a single arbitrator.

d. The parties shall select an arbitrator by mutual agreement, or, if the parties have agreed to use the AAA to administer the process, shall select an arbitrator from a list of arbitrators provided by the Association in accordance with the Association's procedures.

(D) Arbitration Proceedings and Decision

a. All arbitration of claims shall be conducted in Minneapolis, Minnesota, or another mutually agreed upon location.

b. Regardless of whether the parties have agreed to use AAA to administer the process, the arbitration proceeding shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect and in accordance with the requirements below. The arbitration procedures set-forth in this Special Provision shall take precedence over conflicting American Arbitration Association requirements.

c. If mutually agreed to by both parties, the arbitration proceeding shall follow the Fast Track rules of the American Arbitration Association.

d. Unless otherwise agreed to by the parties, the arbitration hearing shall be bifurcated into a liability phase and, if needed, a valuation phase. No evidence or testimony regarding the value of the claim shall be presented during the liability phase.

e. The Contractor shall first present evidence to support the claim. The Department will then present evidence supporting its defense. Witnesses shall submit to questions or examinations. The arbitrator has the discretion to vary this procedure and shall afford a full and equal opportunity to all parties to be heard. Exhibits, when offered by either party, may be received in evidence by the arbitrator.

f. The arbitrator shall entertain motions, including motions that dispose of all or part of a claim or that may expedite the proceedings.

g. There shall be no ex parte communication between any party and an arbitrator.

h. When satisfied that the presentation of the parties is complete, the arbitrator shall declare the liability phase of the arbitration hearing closed. The arbitrator shall then determine whether Mn/DOT is liable.

i. If the Department is found to be liable, the arbitration proceeding shall continue before the same arbitrator to resolve all damages issues. The proceedings for this portion of the arbitration shall follow the procedures outlined in Section S-14.6(D)e of this Special Provision.

j. Within three Calendar Days after the close of the damages portion of the hearing, each party shall submit to the arbitrator their last best offers. The arbitrator shall be limited to awarding only one of the two figures submitted. In no event shall a claim award in arbitration exceed $75,000.

k. The decision or award of the arbitrator shall be:

i. In writing showing the basis for the decision or award. The arbitrator shall use the Contract and Minnesota law, or, in the absence of Minnesota law on the issue(s), other persuasive authority, as the basis for the decision.
ii. Final and binding on both the Department and the Contractor.

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

(E) Arbitration Costs

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

b. Each party shall bear its own preparation costs.

S-15 (1601) SOURCE OF SUPPLY AND QUALITY

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

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

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

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

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

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

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

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

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

S-16 (1602) NATURAL MATERIAL SOURCES

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

S-16.1 The expansion of any existing natural material sources, or the creation of new Natural Material Sources, will be subject to the requirements of the Farmland Protection Act of 1981 (FPPA or the ACT). Coordination to comply with FPPA shall be the responsibility of the Contractor. Contact the Soil Conservation Service (SCS) office for the county in which the source is located for further information.

S-17 (1606) STORAGE OF MATERIALS

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

S-17.1 The Contractor is hereby advised that the only materials that will be allowed to be stockpiled within Project Limits are materials which will be incorporated into the Project and then only in the quantity needed. Materials cannot be stockpiled which are for use on other projects. This specification applies to manufactured and natural materials (including material stockpiled for crushing).

S-17.2 The Contractor will be allowed to store the selected salvage guardrail plate beam for reinstallation on the Project site. The designated storage area will be selected by the Project Engineer for an area accessible to the Contractor during all stages of the construction Project. All removed wood post, bolts, miscellaneous hardware, damaged and rusted plate beam will become property of the Contractor and be removed from the site.

S-17.3 Soils material removed from designated areas under the plate beam guardrail on the Project shall be handled according to the following provisions unless otherwise directed by the Engineer. The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR Part 1910 and all subsequent revisions thereof. **This material will be kept separated from any other materials in a location selected by the Engineer until all type material on the Project is ready to be hauled off site. Removal of this material from the Project Site will be paid for under Item 2105.607 (Excavation Special).** See Section S-49 (EXCAVATION SPECIAL) of these Special Provisions for details.

S-17.4 The Contractor will be allowed to store the Salvaged Grate Castings in a designated area selected by the Project Engineer until removed under Item 2104.601 (Haul Salvaged Materials).

S-18 (1701) LAWS TO BE OBSERVED (CULTURAL RESOURCES)

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

S-18.1 It will be Mn/DOT's responsibility to obtain a SHPO concurrence for Mn/DOT owned or leased Natural Material Sources if listed in the Construction Plan. It will also be Mn/DOT's responsibility to obtain a SHPO concurrence for all Right of Way needed for this Project.

S-18.2 If the Contractor operations require the excavation and dispose of material off Mn/DOT Right of Way, the Contractor is advised of the following:

If the area to be used is outside any previous SHPO concurrence area, it will be subject to the review of the Mn/DOT Cultural Resources Unit (CRU) and the State Historical Preservation Office (SHPO). It shall be the Contractor's responsibility to request a determination of effect and SHPO concurrence from the CRU, at Contractor's expense, before any material from the requested sources can be used on State Projects or any disposal can be made. Any time delays are the responsibility of the Contractor and are not a basis for claim for damages due to delay of Contract.

A) It is the Contractor's responsibility to request a determination of effect and SHPO concurrence from Mn/DOT's Cultural Resources Unit at:

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

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

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

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

B) The Contractor shall give the Project Engineer a copy of the Mn/DOT CRU determination of effect letter. If this letter states that there are **no historic properties affected**, no further action is required by the Contractor. The Contractor is hereby advised that if the fill or extraction activities take place in Carlton, Cook, Itasca, Koochiching, Lake, Pine, or St. Louis counties, up to 45 days may be needed to complete tribal consultation. Also, all fill or extraction activities south of I-94 may require 30 days for tribal consultation.

HOWEVER

C) When the Mn/DOT CRU requires a Cultural Resource Field Survey, the Contractor shall secure professional services to conduct a survey and prepare a report for the Mn/DOT CRU.

1. A list of acceptable Archaeologists will be furnished to the Contractor by the Mn/DOT CRU.

2. When a Cultural Resource Field Survey is required, Contract time will be adjusted in accordance with Mn/DOT 1806 for any suspension of work required to comply with these requirements. No monetary claims due to delays or loss of time for off-site construction activity will be allowed.

3. The cost of the cultural resources survey and report are the Contractors responsibility.

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

S-19 (1702) PERMITS, LICENSES, AND TAXES

The provisions of Mn/DOT 1702 are supplemented with the following:

S-19.1 The Contractor shall communicate with the appropriate agency or agencies and procure at his own expense all required permits. Two (2) copies of all permits and authorizations obtained shall be forwarded to the Engineer prior to commencing any operations requiring a permit.

S-19.2 These permits shall include, but not be limited to, the following:

(A) **City of Minneapolis Noise Permit**, when required.
The Contractor at his sole expense is required to obtain a noise permit from the City of Minneapolis Inspections Department (612/673-3000). The Contractor will be required to procure separate noise permits for each day that work is planned on a Saturday, Sunday, or federal holiday, and beyond the hours of 7:00 A.M. - 6:00 P.M. Monday - Friday.

(B) **Minnesota Department of Natural Resources**
A temporary Appropriation of Waters of the State Non-Irrigation Permit for the construction dewatering.

S-19.3 Any delays to the work due to the Contractor's inability to obtain one of these permits will not extend his Contract completion date. The Contractor is advised to apply for all permits in a timely manner.

S-19.4 All costs incurred by compliance with the above requirements shall be considered an incidental expense for which no direct compensation will be made.

S-20 (1706) EMPLOYEE HEALTH AND WELFARE

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

S-20.1 All construction operations shall be conducted in compliance with applicable laws, regulations and industry standards as described in Mn/DOT 1706. The Contractor shall be considered to be **fully responsible** for the development, implementation and enforcement of all safety requirements on the Project, notwithstanding any actions Mn/DOT may take to help ensure compliance with those requirements.

S-20.2 The Contractor shall submit a written safety program to the Engineer at the pre-construction conference addressing safety issues for all Project activities. This program shall contain name(s) of person(s) responsible for all safety requirements and this Contractor's Designee(s) shall be available at all times that work is being performed. The Contractor's designee(s) shall be responsible for correcting violations on the Project as observed by the Engineer or his/her representative.

S-20.3 The Contractor shall not use any motor vehicle equipment on this Project having an obstructed view to the rear unless:

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

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

S-20.4 **A $500.00 monetary deduction (per incident) will be assessed by Mn/DOT for violations of safety standards and requirements that have the potential for loss of life and/or limb of Project personnel or the public.** The areas of special concern include, but are not limited to excavation stability protection, fall protection, protection from overhead hazards, vehicle backup protection (see S-20.3 above), confined space safety, blasting operations, and personal safety devices.

S-20.5 None of the monetary deductions listed above shall be considered by the Contractor as allowance of noncompliance incidents of these safety requirements on this Project.

S-21 (1707) PUBLIC CONVENIENCE AND SAFETY

Metro Transit has bus service in the Project area which will be affected by this construction. The Contractor shall notify the following Metro Transit representative prior to the start of the Project:

Lee Bennett
Assistant Manager of Street Operations
Telephone: 612/349-7310

S-22 (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 Manuals Parts I and II, the Traffic Engineering Manual, and the following:

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

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

S-23 (1712) PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

Bidders are advised that they may review any environmental documents and permits concerning this Project prior to bidding. The Department's contact persons in the District are as follows:

Environmental Documents:

Elizabeth Benjamin
Metro District
Resident Engineer
Mendota Resident Office
2229 Pilot Knob Road
Mendota Heights, MN 55120.
Telephone: 651/406-4835
FAX: 651/406-4724.

Permits:

Bruce Irish
Metro District
Water Resource Unit
1500 County Road B2
Roseville, MN 55113
Telephone: 651/634-2156
Fax: 651/634-2411.

S-24 (1717) AIR, LAND AND WATER POLLUTION

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

S-24.1 EXTREME WEATHER EVENT

If localized flooding is caused by an extreme weather event and results in discharge into surface water, by deliberate pumping or diverted flow, the Contractor shall provide for end of trench or pipe filtration or treatment systems. The filtration/treatment system shall be capable of preventing visibly turbid discharge from entering surface water. This work shall be completed in accordance with applicable laws pertaining to discharge into surface waters and as directed by the Engineer. The Contractor will receive compensation as Extra Work in accordance with Mn/DOT 1904.

S-25 (1717) NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

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

S-25.1 By signing the Proposal and completing the NPDES permit application, the Contractor is a co-permitee with the Department to ensure compliance with the terms and conditions of the General Storm Water Permit (MN R100001) and is responsible for those portions of the permit where the operator is referenced. This Permit establishes conditions for discharging storm water to waters of the State from construction activities that disturb 0.4 hectares [**1 acre**] or more of total land area. A copy of the "General Permit Authorization to Discharge Storm Water Associated with a Construction Activity Under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System Permit Program" is available at http://www.pca.state.mn.us/water/stormwater/stormwater-c.html or by calling 651-296-3890.

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

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

S-25.2 The Contractor shall be solely responsible for complying with the requirements listed in Part II.B and Part IV of the General Permit.

The Contractor shall be responsible for providing all inspections, documentation, record keeping, maintenance, remedial actions, and repairs required by the permit. All inspections, maintenance, and records required in the General Permit Paragraphs IV.E, shall be the sole responsibility of the Contractor. The word "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 Contractor shall immediately rectify any shortcomings noted by the Engineer. All meetings with the MPCA, Watershed District, WMO, or any local

authority shall be attended by both the Engineer and the Contractor or their representatives. No work required by said entities, and for which the Contractor would request additional compensation from Mn/DOT, shall be started without approval from the Engineer. No work required by said entities and for which the changes will impact the design or requirements of the Contract documents or impact traffic shall be started without approval from the Engineer.

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

S-25.3 Emergency Best Management Practices must be enacted to help minimize turbidity of surface waters and relieve runoff from extreme weather events. It is required to notify the MPCA Regional Contact Person within 2 days of an uncontrolled storm water release. The names and phone numbers of the MPCA Regional Contract personnel can be found at: http://www.pca.state.mn.us/water/stormwater/stormwater-c.html. The Contractor is reminded that during emergency situations involving uncontrolled storm water releases that the State Duty Officer must be contacted immediately at 1-800-422-0798 or 1-651-649-5451.

S-25.4 The Contractor shall review and abide by the instructions contained in the permit package. The Contractor shall hold Mn/DOT harmless for any fines or sanctions caused by the Contractor's actions or inactions regarding compliance with the permit or erosion control provisions of the Contract Documents.

S-25.5 The Contractor is advised that Section 1 of the NPDES application form makes reference to a Storm Water Pollution Prevention Plan (SWPPP). This Projects' SWPPP is addressed throughout Mn/DOT's Standard Specifications for Construction, as well as this Project's Plan and these Special Provisions. The following table identifies NPDES permit requirements and cross-references where this Contract addresses each requirement.

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

S-26 IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

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

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

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

S-27 (1802) QUALIFICATION OF WORKERS

The provisions of Mn/DOT 1802 are hereby supplemented with the following:

It is crucial that quality workmanship be performed on Concrete Rehabilitation Pavement Projects. Therefore, all Contractors, supervisors, foremen, sub-foremen and other key personnel such as operators, finishers, steel setters, sandblasters, joint sealers, etc., involved in the field supervision and/or actual rehabilitation operations, exclusive of delivery work, shall be required to attend, within five working days of being employed on the Project, a Concrete Pavement Rehabilitation Session. These sessions, consisting of a short slide/tape presentation, will be made available for viewing prior to the start of work on the Project at the Contractors local field office and/or through the Project Engineer. Verification of attendance at one of these sessions shall satisfy this requirement for all subsequent projects in this calendar year.

S-28 (1802) TRAINING FOR CONSTRUCTION TRUCK OPERATORS

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

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

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

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

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

S-29 (1803) PROSECUTION OF WORK

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

S-29.1 The Contractor will be subject to an hourly charge for failure to furnish, install and/or maintain the proper Portable Concrete Barrier attenuation required on this Project. Non-compliance charges, for each incident, will be **assessed at a rate of $250.00 per hour**, for each or any portion thereof, which the Engineer determines that the Contractor has not complied.

S-29.2 The Contractor will be permitted to close and detour I-35W between the hours of 8:00 P.M. Friday evening and 5:00 A.M. Monday morning on three (3) weekends in each direction. Closures of both I-35W northbound and southbound will not be permitted on the same weekend. The Contractor may select from the following weekends: June 22-25, June 29- July 2, July 6-9, July 27-30, August 10-13, August 17-20, September 7-10 and September 14-17. The Contractor must notify the Engineer at the preconstruction conference which weekends are selected. These weekends may only be changed due to inclement weather. **If the Contractor is negligent in adhering to the established time schedules, they shall be subject to an hourly charge assessed at a rate of $5,000.00 per hour for each hour I-35W is closed beyond the permitted times.**

S-29.3 The Contractor shall stage their construction operations such that no work is being performed on routes where traffic is detoured for other construction operations.

S-29.4 The Contractor will not be permitted to close the exit ramps from I-35W northbound to University Avenue and I-35W southbound to 4th Street at the same time.

S-29.5 The Contractor will not be permitted to close the entrance ramps from University Avenue to I-35W southbound and 4th Street to I-35W northbound at the same time.

S-29.6 Consecutive entrance and exit ramps will not be permitted to be closed at the same time.

S-29.7 The Contractor shall submit a Traffic Control Plan to the Engineer at least 14 days prior to any ramp or roadway closures, which are permitted but not identified in the Plans, for review and approval. All costs associated with preparation of the Traffic Control Plans and installation, maintenance and removal of the necessary traffic control devices are considered incidental to Lump Sum Traffic Control.

S-29.8 The Contractor shall not remove any concrete pavement for full depth repairs that cannot be patched back in by the end of the Contractor's work shift.

S-29.9 At least three (3) working days prior to closing any ramp the Contractor shall notify Lee Bennett of Metro Transit at 612-349-7310 and Doug Maday of Minneapolis Public Works at 612-673-5755 so that emergency services operations can plan accordingly.

S-29.10 The Contractor may close the frontage roads between University Avenue and 4th Street while construction operations are in progress for the milling and overlaying of the roadways. The frontage roads must be opened up at the end of each day when there are no active construction operations.

S-29.11 The Contractor may close the frontage roads between New Brighton Boulevard and Stinson Boulevard while construction operations are in progress for the milling and overlaying of the roadways. The frontage roads must be opened up at the end of each day when there are no active construction operations.

S-29.12 Job site progress meetings will be held weekly by the Engineer and Contractor for the purpose of reviewing the progress of the job and updating the schedule.

S-30 (1803) CRITICAL PATH METHOD (CPM) SCHEDULE

Mn/DOT 1803.1 Progress Schedule is hereby replaced with these Special Provisions.

S-30.1 **The Contractor shall complete and update a computerized Critical Path Method (CPM) Schedule as described herein to the Engineer for acceptance.** Whenever the term "Schedule" is used in the Special Provisions, it shall mean Critical Path Method Schedule. The Work under this Contract shall be planned, reported and accomplished using the Critical Path Method (hereinafter referred to as CPM) and shall precedence diagram method (PDM) of scheduling. **All work associated with these requirements is considered incidental for which no direct payment will be made.**

S-30.2 DEFINITIONS

The following definitions used in this Section are intended to supplement or supersede definitions provided with "Primavera Project Planner" (P3), version 3.1 and shall have the following intents and meanings:

(A) Accept, Accepted or Acceptance: Formal determination in writing by Mn/DOT that a particular matter or item appears to meet the requirements of the Contract Documents.

(B) As-Built Schedule: The as-built schedule records actual dates, work days, non-workdays, re-work and/or out of sequence work.

(C) As-Planned Schedule: The as-planned schedule shall represent the Contractor's best judgment and intended plan for completion of the Work in compliance with Contract Documents. The as-planned schedule shall take into account all foreseeable activities; to include but not limited to activities by any separate contractors, interface dates with utility owners/railroads/municipalities/agencies, submittal and submittal review.

(D) Baseline Schedule: The Baseline Schedule is the first accepted As-Planned schedule, which incorporates as-built activities from the preliminary schedule; and fully identifies Work from NTP2 to Project completion.

(E) Controlling Item of Work: The non-completed Activity(s) with the earliest start date that resides on the Critical Path(s) of the current Working Schedule.

(F) CPM Schedule: Computerized Resource/Cost loaded schedule in CPM format.

(G) CPM Format: The structure of the computerized schedule. CPM Format defines the construction logic in terms of all of the activities with their logical dependencies. All activities shall be logically tied to a predecessor and successor with the exception of the first and last activities respectively.

(H) Critical Activity: An Activity with zero or negative Float.

(I) Critical Path(s): The chain of continuous activities controlling the last activity of the schedule and/or Milestone(s). See also Longest Path.

(J) Date Constraint: A constraint placed on an activity that overrides or impedes logic and/or restricts or distributes float to control a network and/or sub-network of logic. A Date Constraint shall only be used on contractual obligate date(s).

(K) Float: The amount of days the start of an activity can be delayed without affecting a Milestone and/or the Project finish date. See also Total Float.

(L) Free Float: The amount of days available to an activity without delaying the early start of a successor activity. Free Float is uniquely available to an activity.

(M) Impact Schedule: A schedule prepared to demonstrate the impacts of a change, or a proposed change from the last accepted working schedule. An accepted Impact Schedule becomes the current Working Schedule and is submitted via a Time Impact Analysis.

(N) Longest Path: The Critical Path of the last activity of the schedule. See also Critical Path.

(O) Milestone: A Milestone is a contractual obligated deadline and shall be designated with an Activity Type of Milestone. Milestones are the only activities allowed a date constraint. The Contractor may use Activity Coding to designate other activities of interest.

(P) Near Critical Activities: Activities equal or less than 10 days total float.

(Q) Preferential Sequence: Preferential Sequence is a sequence of Work chosen by the Contractor that otherwise could be performed different than the sequence chosen.

(R) Preliminary Schedule(s): The schedule(s) submitted to accurately identify items of Work between Notice to Proceed 1 and Notice to Proceed 2; while representing a reasonable plan for the remainder of work.

(S) Revision Schedule: Any accepted schedule that substantially differs from the plan depicted in the accepted Baseline Schedule. An Accepted Revision Schedule becomes the current Working Schedule and is submitted via an Impact Schedule.

(T) Sequestered Float: The causation of a withdraw into seclusion to screen from view and make smaller a value of float other than that as shown in the schedule as a result of manipulation and techniques of network logic intentional or unintentional, that diminishes, sequesters or removes float that otherwise be available to both parties.

(U) Total Float: Number of days by which a part of the Work in the Schedule may be delayed from its Early Dates without necessarily extending the Contract Time or Milestone. See also Float.

(V) Two Week Look-Ahead Schedule: Schedule which spans a forward looking, rolling period of at least fourteen (14) calendar days.

(W) Working Schedule: The current accepted Schedule. The Working Schedule shall be used for planning the remainder of the Work; as well as recording actual start/finish dates of activities, and work/non work days.

S-30.3 COMPUTER SOFTWARE

Mn/DOT uses "Primavera Project Planner" (P3), version 3.1 for Windows. If the Contractor utilizes software other than "Primavera Project Planner" (P3) the schedule shall be submitted in "Primavera Project Planner" (P3) format. The Contractor is responsible for any conversion discrepancies.

Within fourteen (14) Calendar Days after issuance of the Contract approval the Contractor shall furnish to the Engineer two (2) licensed software packages and two (2) operating manuals of Schedule Analyzer Pro Version 3.13 software. All costs for furnishing the schedule analyzer software and manuals to the Engineer shall be an incidental expense for which no direct compensation will be made.

S-30.4 SCHEDULE CALCULATIONS

The following scheduling settings will govern and the schedule will be calculated in "Primavera Project Planner" (P3), version 3.1.

Interruptible Activities

The schedule method shall be set to interruptible activities

Total Float Calculations

Total Float will be calculated utilizing the Finish Dates. Hammocks will be ignored when determining float and critical path(s).

Progress Override

The schedule will be calculated utilizing Progress Override. This method assumes that once an activity is started that work may continue without concern for uncompleted predecessor activities. It is the responsibility of the Contractor to work in sequence or submit a Time Impact Analysis in accordance with Time Impact Analysis section. Any illogical results of Progress Override shall be corrected prior to submission of any Time Impact Analysis.

S-30.5 QUALIFICATIONS

The Contractor Scheduler shall be responsible for all aspects of planning, developing, evaluating, analyzing, maintaining and reporting CPM Schedules. The individual shall possess demonstrated proficiency in CPM Schedule methodology.

S-30.6 GENERAL REQUIREMENTS

Changes to the Schedule shall be closely coordinated with the Engineer and are subject to the Engineer's acceptance

Errors or omissions within Schedules shall not relieve the Contractor from finishing all work within the time limit specified for completion of the Contract. If, after a Schedule has been accepted by the Engineer, and either the Contractor or the Engineer discovers that any aspect of the Schedule has an error or omission, it shall be corrected and the effects indicated in accordance with the "Time Impact Analysis" section contained herein.

Outside Impacts to the Project Schedule: any condition or Work that impacts the Contractor's commencement of an activity shall be identified, such as work under another contract, which affects the Project.

No claims for delays or time extensions requested by the Contractor will be considered unless an acceptable Baseline Schedule has been submitted and the Working Schedule has been regularly updated.

S-30.7 NAMING CONVENTION

The file naming convention **for as-**planned **schedules shall be a four character naming convention. The file and** revision **naming convention shall be as noted below.**

(A) Preliminary Schedule

The Preliminary Schedule(s) shall be assigned a four (4) alphanumeric file name and a revision number, starting with file name "PR00" and revision "Rev. 0". If the Department does not accept the schedule the Contractor shall resubmit the same file name but the revision number shall incremented by one (1), e.g., "PR00", Rev. 1".

(B) Baseline Schedule

The Baseline Schedule shall be assigned a four (4) alphanumeric file name and a revision number, starting with file name "BL00" and revision "Rev. 0". If the Department does not accept the schedule the Contractor shall resubmit the same file name but the revision number shall incremented by one (1), e.g., "BL00", Rev. 1".

(C) Impact Schedule

Impact Schedules are submitted via a Time Impact Analysis in accordance with "Time Impact Analysis" Section contained herein. Impact Schedules shall be assigned a four (4) alphanumeric file name, starting with file name "I001" and incremented by one (1) for every submitted Impact Schedule.

(D) Revision or Recovery Schedule

The first accepted Impact Schedule (new Working Schedule) shall be assigned a four (4) alphanumeric file name starting with file name "RE00", however, the revision shall indicate the accepted Impact Schedule's file name, e.g. file name "RE00" and revision "I001"

Subsequent updates to each type of schedule shall have a file name incremented by one (1), with revision started back at "Rev.0" e.g., "BL01", "Rev.0". If the Department does not accept the next update, the Contractor shall resubmit the same file name but the revision number shall incremented by one (1), e.g., "BL01", Rev. 1". If the Department accepts the update then the file name for the next submitted working schedule shall be incremented by one (1), e.g.,"BL02" with the revision started back at "Rev. 0".

S-30.8 BASELINE SCHEDULE, PRELIMINARY SCHEDULE, and NOTICE TO PROCEED(S)

This Project contains Notice to Proceed 1 (NTP1) and Notice to Proceed 2 (NTP2) criteria; whereas NTP1 is a condition of the Preliminary Schedule acceptance and NTP2 is a condition of Baseline Schedule acceptance.

The Contractor shall submit to the Engineer a Preliminary Schedule within eight (8) calendar days of issuance of Contract Award. Acceptance of the first Preliminary Schedule shall be a condition of Contract Approval and Notice to Proceed 1 (NTP1). Upon receipt of NTP1 the Contractor and the Contractor's qualified scheduler shall meet with the Engineer a minimum of weekly until the Baseline Schedule is accepted by the Engineer to discuss Schedule development and resolve Schedule issues. The Preliminary Schedule(s) is meant to communicate the Contractor's general plan of work, and allow the Contractor to proceed with limited amount of work as parties work toward Baseline Schedule acceptance/NTP2. NTP2 will not be extended past 20 calendar days from NTP1. The Baseline Schedule shall be submitted and accepted before any work impacts traffic. Any said work performed before acceptance of the baseline will be subject to the noncompliance section contained in these special provisions. Contract time will not be extended if NTP2 is delayed due to the submittal and acceptance of the Baseline Schedule.

(A) Preliminary Schedule(s)

The first Preliminary Schedule may be in the form of a bar (Gantt) chart; and does not have to strictly adhere to the requirements of the Baseline schedule, as long as it sufficiently details a rolling 20 day look-ahead period while representing a reasonable plan for the remainder of work. Activities within the 20 day look-ahead period shall include, at a minimum, the applicable level indicated in the "Level of Detail" section contained herein, unless changes are approved by the Engineer in accordance with Level of Detail" section contained herein.

Schedule submittals shall show the status of work actually completed, with data dates of the 15th and last day of every month. The Contractor shall meet with the Engineer to review the schedule; the schedule should be received by the Engineer as soon as possible after the applicable data date, but in no instance shall be later than four (4) calendar days.

(B) Baseline Schedule

Acceptance of the Baseline shall be a condition of Notice to Proceed 2 (NTP2). The Baseline Schedule is the first accepted As-Planned schedule, which incorporates as-built activities from the preliminary schedule; and fully identifies Work from NTP2 to Project completion. The Baseline Schedule shall not extend beyond any Contractual completion dates. The Baseline Schedule shall not attribute negative float or utilize any other prohibited scheduling techniques. The Baseline Schedule shall include the entire scope of work and how the Contractor plans to complete all work contracted.

The Baseline Schedule shall show the activities that define the critical path(s). Multiple critical paths and near-critical paths shall be kept to a minimum. A total of not more than twenty (20) percent of the Baseline Schedule activities shall be critical or thirty (30) percent near critical, unless otherwise authorized by the Engineer.

The Baseline shall include, at a minimum, the applicable level indicated in the "Level of Detail" section contained herein, unless changes are approved by the Engineer. Failure to include any element of required Work in the Project schedule shall not relieve the Contractor from completing all Work necessary to complete the Project on time.

S-30.9 SCHEDULE UPDATES

The Contractor shall submit an updated Working Schedule which accurately reflects the status of work actually completed, with data dates of the 15th and last day of every month. The Contractor shall meet with the Engineer to review each update; the schedule should be received by the Engineer as soon as possible after the applicable data date, but in no instance shall be later than four (4) calendar days. Schedule updates shall be made to the previous accepted Working Schedule. Schedule updates shall include: (1) updating as-built dates; (2) reasonably recorded activity percent complete.

The Engineer may elect to allow the Contractor to include modifications such as adding or deleting activities or modifying activity descriptions, durations or logic without submitting a "Time Impact Analysis" as long as, in the sole opinion of the Engineer, the modifications do not: (1) alter the critical path(s) or near critical path(s); or (2) extend the scheduled completion date or Milestone(s) compared to that shown on the current accepted Working Schedule; or (3) disrupt the integrity or comparative relationship between the last accepted Working Schedule; or (4) consume "unreasonable" amount of Total Float. The Contractor shall minimize the number of changes and state in writing, within the update narrative, the reasons for any changes to Schedule or planned work. If in the opinion of the Engineer any proposed changes in planned work will result in (1), (2), (3), or (4) stated in this paragraph, then the Contractor shall submit a "Time Impact Analysis" as described herein.

S-30.10 ACCEPTANCE OF SCHEDULE

The Engineer may request supporting data to verify accuracy of the schedule. The review of a portion of the Schedule, or an incomplete Schedule submittal will not indicate acceptance of the entire Schedule; the schedule ultimately accepted by Mn/DOT will be returned to the Contractor as "Accepted-As-Noted" or "No Exceptions Taken", with the file name and revision number referenced. Acceptance of the Schedules by the Engineer in no way justifies the schedules, but simply indicates concurrence in reasonableness and feasibility on the assumption that the Contractor shall make every effort required to meet Contract obligation. The Engineer's review and acceptance of Schedules will not waive any Contract requirements and shall not relieve the Contractor of any obligation or responsibility for submitting complete and accurate information. By review and acceptance of the Schedule Mn/DOT does not endorse or otherwise certify the validity or accuracy of any part of the Schedules. It is further understood that the acceptance of a Schedule shall not be considered an "approval". The responsibility for validity and accuracy of all Schedules is the sole responsibility of the Contractor.

(A) Preliminary and Baseline Schedules

The Engineer will accept or return comments on submitted schedules within seven (7) calendar days after being received. Schedules that are not accepted shall be corrected by the Contractor within seven (7) calendar days after the Engineer has returned comment

(B) Schedule Updates

The Engineer will accept or return comments on submitted schedules within seven (7) calendar days after being received. Schedules that are not accepted shall be corrected by the Contractor within seven (7) calendar days.

(C) Impact Schedules

The Engineer will accept or return comments on submitted schedules within fifteen (15) calendar days after being received. Schedules that are not accepted shall be corrected by the Contractor within seven (7) calendar days. It is the Contractor responsibility to meet with the Engineer as often as necessary to satisfy the Engineer's comments within said seven (7) calendar days.

S-30.11 TWO (2) WEEK LOOK-AHEAD SCHEDULE:

The Contractor shall prepare and submit a detailed two (2) week schedule to the Engineer each week until all work is completed. The detailed two (2) week Schedule may be a hand or computer generated bar chart which spans a forward looking, rolling period of at least fourteen (14) calendar days. The two (2) week look-ahead schedule shall provide a greater breakdown of the Activities from the current Working Schedule. The two (2) week Schedule shall specifically reference the Working Schedule's activity ID numbers and define specific daily operations at each specific location to be performed during the two (2) week period. The detailed two (2) week Schedule shall include, at a minimum, the applicable level indicated in the "Level of Detail" section contained herein, unless changes are approved by the Engineer.

S-30.12 SCHEDULE RECOVERY

Unless otherwise directed in writing by the Engineer, whenever the current working schedule indicates negative float greater than five (5) percent of the remaining calendar days before a contractual obligate milestone, but in no case greater than negative forty (40) working days, the Contractor shall submit, within seven (7) calendar days, a Time Impact Analysis (TIA) as described in "Time Impact Analysis" section herein; whereas the impact schedule shall recover the negative float regardless of fault of either party for past delays. The Contractor shall submit a written recovery statement describing the Contractor's opinion for the cause for the slippage and the proposed actions by the Contractor to recover. The requirement to recover negative float regardless of fault is not a directive by Mn/DOT to accelerate the Work but rather a directive to provide a proposal. If in the opinion of the Contractor, the fault is the result of a party other than the Contractor, than any cure involving acceleration, at a cost to Mn/DOT, shall be directed in writing from Mn/DOT prior to any execution of acceleration thereof.

S-30.13 SCHEDULE SUBMISSION

The Contractor shall include the following for each Schedule submittal:

(A) A written narrative to accompany the required reports, graphics and files. The narrative shall include and discuss: (1) a bar chart of all Activities on the longest path, (2) a separate bar chart for each Critical Path, (3) a bar chart of all Near Critical Activities, (4) a 30 day look-ahead bar chart, (5) delays and recovery plan if applicable, listing the affected activity ID(s) of the Schedule (to include weather impacts). (6) upcoming and pending coordination required with Mn/DOT, or utilities or other third parties, (7) potential problem areas, (8) description and reason for any changes made to the schedule and the affects the changes have on Milestones or Project Completion Date.

(B) Bar Charts shall contain the following information

1. Activity ID and Activity Description.
2. Original and Remaining Duration.
3. Early start and late finish dates of activities.
4. Activity and Total Float.
5. Predecessors and Successors.
6. Include a title block and a timeline on each page. As a minimum the title block shall include file name and revision; the timeline shall include start date, finish date, data date, and run date.

(C) One (1) CD-R (read only) containing a backup of the "Primavera Project Planner" (P3), in compressed format (PRX files). As an alternative the Contractor may send the backup file as an e-mail attachment to the Engineer. It is the Contractor's responsibility to ensure that the e-mailed file has been received by the Engineer.

Schedule submittals will only be considered complete when all documents and data have been provided as described above.

S-30.14 TIME IMPACT ANALYSIS

The Engineer may adjust Contract days for ordered changes that affect the Contract Completion date(s), in conformance with Mn/DOT 1806.2 as modified by these Special Provisions.

The Contractor shall submit a Time Impact Analysis (TIA) to determine the effect of any delay event or any ordered or proposed change to the current working schedule. A Time Impact Analysis (TIA) includes an Impact Schedule, any associated cost burden or savings, and a narrative report developed specifically to demonstrate effects of deviations from the current working schedule. To include: (1) A detailed factual statement of the impact, and its cause, providing all necessary dates, locations, and items of work affected and included in each impact. (2) The dates or dates on which actions resulting in the impact occurred or conditions resulting in the impact became evident. (3) Identification and copies of all pertinent documents relating to such impact. (4) Basis for entitlement and identification of the provisions of the Contract which support the impact. (5) All, if any, concurrent Contractor caused delays during the time frame of the impact. (6) Effected activity ID(s) of the Schedule for which the impact is to be presented. (7) Any additional information requested by the Mn/DOT and/or Engineer

Delay Event or Ordered Change

- The analysis shall use the accepted Working Schedule that has the closest data date prior to the event and shall be updated to the day before the event being analyzed. The TIA shall include an Impact Schedule developed from incorporating the event into the accepted Schedule.
- If the impact Schedule shows that incorporating the event extends a critical path beyond the Contract Completion Date or Milestone of an accepted Schedule, the difference between scheduled late completion dates of the two Schedules may be considered for an adjustment of Contract time. Changes that do not affect the controlling operation on a critical path will not be considered as the basis for a time adjustment. The burden of proof for demonstrating acceleration or inefficiency costs shall be the responsibility of the Contractor.

Proposed Change

- The analysis shall use the current accepted Working Schedule. The TIA shall include an Impact Schedule developed from incorporating proposed changes into the current Working Schedule.
- If the impact Schedule shows that incorporating the event extends a critical path beyond the Contract Completion Date or Milestone of an accepted Schedule, the difference between scheduled late completion dates of the two Schedules may be considered for an adjustment of Contract time or acceleration costs. Changes that do not affect the controlling operation on a critical path will not be considered as the basis for a time adjustment. The burden of proof for demonstrating acceleration or inefficiency costs shall be the responsibility of the Contractor.

Engineer's Request

- The Engineer may also require a TIA whenever, in the opinion of the Engineer, work is progressing substantially different from the working schedule.
- The Contractor shall submit a TIA within seven (7) calendar days of receiving a written request, or published meeting minutes from the Engineer.

The Engineer may accept the Impact Schedule as the new working schedule while parties negotiate associated cost burden or savings. All accepted Impact Schedules shall become the next Working Schedule and referenced in accordance with the "Naming Convention" section herein.

S-30.15 FLOAT SUPPRESSION / SEQUESTERED FLOAT

The use of float suppression techniques, causing the sequestration of float, to include but not limited to date and float constraints are expressly prohibited. The only allowed date constraint is Project finish or Milestone(s). Use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to the benefit of both Mn/DOT and the Contractor. Use of any of float suppressing techniques will be cause for rejection of schedule submittal. The Contractor shall adjust or remove any float suppression techniques as a prerequisite to a request for a schedule-related increase in compensation or a request for extension of time.

Lags/Leads are subject to the consent of the Engineer. The Contractor shall remove any Lags/Leads and replace with an activity identifying the Lag/Lead upon request of the Engineer, regardless of prior acceptance on previous schedules

The Contractor shall not engage in float suppression manipulations which have the net effect of sequestering float time. Examples of manipulations and networking techniques disallowed under this provision includes, but not necessarily limited to:

- The use of lags/leads to sequester available float.
- Logic relationships that provide no tangible or sequential value between unrelated activities.
- Logic relationships that demand completion of an activity that could otherwise continue beyond a successors start or finish.
- Extended durations

The Contractor acknowledges and agrees that mitigation for delays due to changes and differing site conditions will require that the Contractor revise preferential sequences which had the net effect of sequestering float. It is expressly agreed and understood that the Contractor shall not be entitled to any compensation or damages on account of delays which could have been avoided by revising activity time or logic used to sequester float and will exclude the Contractor's right to recover any delay damages or compensation from Mn/DOT.

S-30.16 EARLY COMPLETION

Should the Contractor intend to, or completes the Work, or any portion thereof, earlier than any Contract Completion Dates (CCD), it is understood that Project benefits from the increase in shared total float. Furthermore, the Contractor shall agree that all impacts shall only be based on impacts to the original CCD or a revised CCD executed by a change order, not the Planned Early Finish date of the Project Schedule; regardless of any early completion incentives offered to complete earlier than any CCD. Any request to change contractual dates shall be submitted in accordance with the "Time Impact Analysis" section contained herein. The Engineer will have the sole discretion to accept such early completion plan by the Contractor. The Engineer will have no duty or obligation to agree to, or to cooperate with the Contractor regarding any early completion plan or proposal by the Contractor and will not be liable for any damages of the Contractor because of the rejection by the Engineer of said plan.

S-30.17 USE OF FLOAT

The Contractor acknowledges that all float is a shared commodity available to the Project and is not for the exclusive benefit of any party; but is an expiring resource available to accommodate changes in the Work, however originated, or to mitigate the effect of events which may delay performance or completion of all or part of the Work within the Late Dates. Contract time extensions for Contract performance will be granted only to the extent that delays or disruptions to effected work paths exceed total float along those paths of the current Working schedule in effect at the time of delay or disruption. Delays and disruptions which cause the date of Work to exceed current Contract completion or Milestone date must be beyond control and without fault or negligence of the Contractor or any subcontractor at any tier. In the event that delays or disruptions are an Excusable Delay and impact an already negative float path the Contractor will not receive a time extension, or compensation unless and until the

activity with the highest negative float is driven even further negative and only to the extent that the activity with the highest negative float was not concurrent with other delays. If the activities with the lowest positive float, or highest negative float, are during a concurrent delay, than the compensable amount is the difference in the concurrent delay(s).

It is understood that identified contingencies, as described in the "Calendar and Identified Contingency" section, become available total float as time elapses and the contingency was not used.

S-30.18 CALENDARS AND IDENTIFIED CONTINGENCY

Each activity shall be assigned the appropriate calendar. The Project calendars shall indicate planned work and nonworking days. Each calendar, with the exception of the calendar utilized for tracking calendar days, shall include scheduled non workdays including contingencies. It is the responsibility of the Contractor to estimate the amount of weather and duration contingency. The Engineer reserves the right to accept or reject the estimated amount of contingency in accordance with "Acceptance of Schedule" section contained herein.

The Schedule shall utilize a minimum of the following calendars:

1. calendar to indicate calendar days (cure time, etc).
2. calendar for work that can progress year round.
3. calendar for each major item of Work affected by weather and/or seasonal limitations.

Additional calendars may be necessary; such as activities that may proceed past a specified date or temperature requirement, if specified precautions are taken (e.g. cold weather calendar).

The Contractor shall submit a statement indicating duration (in hours) of their planned work day as it relates to the work week, e.g., M-F (10 hours) and Saturday (6 hours) for every calendar.

S-30.19 NON-COMPLIANCE

The Contractor's refusal, failure or neglect to diligently pursue timely acceptance of any schedule, or TIA shall constitute reasonable evidence that the Contractor is not prosecuting the Work, or separable part, with the diligence that will insure its completion within the applicable Contract Time and shall constitute sufficient basis for the Engineer to exercise options available in the "Non-Compliance" section contained herein. The Engineer may use one or a combination of the following. The Engineer will use their best judgment in determining which of the following option(s) will best facilitate compliance:

(A) 100 Percent Withholding

The Engineer may withhold an amount up to, or equal to, 100 percent of the estimated value of work performed during the estimated period if the Contractor fails or, refuses or neglects to provide the required Schedule information required herein, including Updates, Narrative Reports, Time Impact Analysis or Recovery Schedule.

(B) Prepared Schedule

Mn/DOT reserves the right to have the Engineer, or Mn/DOT's authorized representative either prepare or assist the Contractor in the preparation of an acceptable As-Planned or As-Built Schedule and the Contractor shall reimburse Mn/DOT for all associated costs. In the event the Contractor fails to pay those costs within thirty (30) days after receipt of an invoice from Mn/DOT, Mn/DOT will be entitled to withhold a set-off against any amounts recommended for payment. The assistance with schedule preparation will not relieve the Contractor's responsibilities for determination of the methods, techniques and sequences for the performance of the Work.

(C) Monetary Deduction

The Engineer may **assess a non recoverable monetary deduction of $500/day** for every day past an applicable submittal deadline.

S-30.20 LEVEL OF DETAIL

The duration of each activity shall include the necessary work days to actually complete the work defined by the activity; contingency shall not be built into the durations but shall be accounted for in accordance with "Identified Contingency and Calendars" section contained herein.

Each Activity shall: (1) contain a unique activity description that contains a verb, (2) be a duration of not more than twenty (20) working days nor less than five (5) days, unless otherwise authorized by the Engineer, (3) have at least one predecessor and one successor activity, except for Project start and finish respectively, (4) identify the contractor/subcontractor responsible for the work activity.

The level of detail described below is an expected minimum but can be improved upon or changed. Proposed modifications shall be submitted to the Engineer for approval before implementation.

(A) "Working Schedule"

- Schedule Milestones and Events: Construction and maintenance of traffic events, including completion of construction on roadway sections, building and removing temporary detours and bridges, traffic shifts, and road closures shall be adequately shown in the schedule. All Contractual Interim Milestones shall be included within the Schedule.
- Mobilization
- Shop and working drawings preparation, submittal and processing for all elements requiring shop or working drawing.
- Utility notification and relocation, by utility.
- Material on Hand (Procured Items) requests and payments
- Substantial Completion
- PunchList

(B) "Two Week Look-Ahead"

Bridges:

- Deck Repair, per structure
- Milling, per structure
- Low Slump Overlay, per structure
- Railing, per structure
- End posts, per structure
- Joint repairs/replacement, per structure
- Bearings, per structure

Roadway:

- Traffic switches.
- Submission of job mix formula for asphalt pavement.
- Delivery schedule for items such as drainage pipe, guardrail, sign structures and signs, permanent lighting facilities, and permanent traffic signals.
- Internal access and haul roads (location and duration in-place).
- Clearing and grubbing by stationing and roadway.
- Excavation.
- Embankment placed for each roadway.
- Drainage – by run with structures for each roadway.
- Subgrade for roadway.
- Base for roadway.
- Curb, barrier wall and sidewalks for each roadway.
- Pavement (asphalt and/or concrete) for each roadway.
- Bridge approach slabs per location.
- Guardrail for each roadway.
- Roadway lighting for each roadway.
- Signing for each sign structure location and for each roadway.
- Striping for each roadway.
- Traffic signals per location.
- Topsoil, sodding, seeding and mulching for each roadway.
- Landscaping.
- Finishing roadway and final cleanup.

S-31 (1806) DETERMINATION AND EXTENSION OF CONTRACT TIME

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

S-31.1 Construction operations shall be started on or before June 4, 2007 or 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-31.2 All work required under this Contract, except maintenance work and Final Clean Up shall be completed on or before September 21, 2007.

S-31.3 All work required under this Contract, including maintenance work and Final Clean Up shall be completed on or before October 26, 2007.

S-31.4 In addition to the requirements indicated above, all work required to get the lighting system associated with feedpoint W5N operational shall be completed within 21 Calendar Days after work commences on the outside lane and shoulder of I-35W northbound and southbound or the Contractor will be assessed a monetary deduction as shown in Section S-32.2 (FAILURE TO COMPLETE THE WORK ON TIME) of these Special Provisions.

S-31.5 Ramps south of Bridge No. 9340 that are identified as closed and detoured in the traffic control plans shall not be closed for more than 30 Calendar Days.

S-31.6 No work which will restrict or interfere with traffic shall be performed between 12:00 noon on the day preceding and 9:00 A.M. on the day following any consecutive combination of a Saturday, Sunday, and legal holiday without written permission from the Engineer.

(A) If the Contractor chooses not to work at all on the day preceding the holiday period, no working day charges will be assessed.

(B) If the Contractor chooses to work prior to 12:00 noon on the day preceding the holiday period or if the Contractor obtains written permission to work after 12:00 noon on the day preceding the holiday period, working day charges will be assessed only for the actual hours worked.

S-31.7 The provisions of Mn/DOT 1806.1C(3) are modified to the extent that the term "(C) during the inclusive period from November 15 to April 15"; is deleted. A similar phrase set forth in the second paragraph of Mn/DOT 1807.2 is also deleted.

S-31.8 The provisions of Mn/DOT 1806.1C(3) (b) are modified to the extent that the term "(b) On Saturdays, Sundays, and legal holidays" is changed to read "(b) On Sundays and legal holidays". Working Day charges will be assessed six (6) days per week, Monday through Saturday.

S-31.9 The provisions of Mn/DOT 1806.1C(1), Working Day Charges, are modified to the extent that eight (8) hours are changed to read ten (10) hours. Working day charges will be based on a ten (10) hour working day.

S-32 (1807) FAILURE TO COMPLETE THE WORK ON TIME

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

S-32.1 Liquidated damages will be assessed in accordance with the provisions of Mn/DOT 1807, except that in addition to the charges shown in the Schedule of Liquidated Damages the State will deduct from any monies due or coming due to the Contractor an amount equal to $7,000.00 per Calendar Day for failure to complete all the work, with the exception of maintenance and Final Cleanup, under the Contract in the time specified therefore, until that work is, in all things, completed to the satisfaction of the Engineer. The State may reduce the liquidated damages to$500.00 when the only remaining items are maintenance or Final Cleanup.

S-32.2 In addition to the requirements indicated above, the State will assess the Contractor a monetary deduction in an amount equal to $500.00 for each Calendar Day that any work specified in Section S-31.4 (DETERMINATION AND EXTENSION OF CONTRACT TIME) of these Special Provisions remains incomplete after the expiration of the working period provided therefore.

S-32.3 For informational purposes only, bidders are advised that in addition to the requirements of Mn/DOT 1807, other Sections of these Special Provisions, as shown below, contain requirements for assessment of monetary deductions to this Contract:

1404	MAINTENANCE OF TRAFFIC AND (2563) TRAFFIC CONTROL
1706	EMPLOYEE HEALTH AND WELFARE
1803	PROSECUTION OF WORK
1803	CRITICAL PATH METHOD (CPM) SCHEDULE
2105	DEWATERING
2533	CONCRETE MEDIAN BARRIER, DESIGN 8337
2563	PORTABLE CHANGEABLE MESSAGE SIGN

S-32.4 The liquidated damages and monetary deductions as set forth above may apply equally, separately, and may be assessed concurrently.

S-33 (1903) COMPENSATION FOR INCREASED OR DECREASED QUANTITIES

Quantities shown in the Plan are estimates only. Increases or decreases in final quantities shall not be grounds for unit bid price adjustment requests. Quantities requested for work not covered by unit bid prices will be paid for as Extra Work in accordance with Mn/DOT 1904.

S-33.1 The provisions of Mn/DOT 1903 regarding overruns and under runs shall not apply to the following items of work under this Contract:

2102.502	Pavement Marking Removal-Temporary
2102.502	Pavement Marking Removal-Permanent
2104.501	Remove Guardrail-Plate Beam
2105.607	Excavation Special
2301.603	Joint Repair (Type A-1H) 1/2"
2301.603	Joint Repair (Type B-3)
2301.603	Crack Repair (Type B-1)
2301.603	Crack Repair (Type A-4H)
2301.603	Longitudinal Joint Repair (Type A-5H) 1/2"
2301.603	Contraction Joint Repair (Type C-3D)
2301.603	Edge Repair (Type B-2C)
2301.603	Expansion Joint Special (Type C-3BS)
2301.604	Pavement Replacement (Type CX)
2301.604	Pavement Replacement Single Lane (Type D-1)
2301.604	Pavement Replacement Two Lane (Type D-2)
2301.608	Seal Concrete Pavement Joint (3725)
2301.618	Spot Surface Repair (Type B-2A)
2301.618	Surface Repair (Type B-2B)
2301.618	Repair Special (Type B-2E)
2533.603	Relocate Concrete Median Barrier
2533.603	Concrete Median Barrier Design 8337
2550.603	Fiber Optic Encasement
2554.602	Impact Attenuator Barrels
2554.602	Relocate Impact Attenuator Barrels
2563.601	Traffic Control
2563.602	Raised Pavement Marker Temporary
2563.602	Median Barrier Delineator
2563.602	Portable Changeable Message Sign
2573.530	Storm Drain Inlet Protection
2581.501	Removable Preformed Plastic Marking
2582.502	4" Solid Line White-Paint
2582.502	4" Broken Line White-Paint
2582.502	4" Solid Line Yellow-Paint

S-34 (1904) EXTRA AND FORCE ACCOUNT WORK

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

S-34.1 The Contractor is required to submit force account work itemized statements of costs in accordance with Mn/DOT 1904 to the Engineer on Mn/DOT form TP-21659 (Summary of Daily Force Account). Copies of this form can be obtained from the Engineer.

S-34.2 The following sentence shall be added to the second paragraph of Mn/DOT 1904:

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

S-35 (1905) ELIMINATION OF WORK

Should any Contract items be eliminated from the Contract or any work be deleted or ordered terminated on a Contract Item before completion of the construction unit, the Contractor will **NOT** be reimbursed for any costs incurred prior to notification.

S-36 (1910) FUEL ESCALATION CLAUSE

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

S-37 (2011) CONSTRUCTION SURVEYING

The provisions of Mn/DOT 1508 are hereby modified and supplemented as follows:

S-37.1 GENERAL SURVEY SPECIFICATIONS

This Contract provides for the Contractor to accomplish the Construction Surveying for this Project. Mn/DOT 1508 is herewith modified to the extent that the Contractor shall meet all the requirements of, and provide all the services listed in, Mn/DOT 1508 which would otherwise be provided by Mn/DOT. Furthermore, in accordance with Mn/DOT 1401, the Contractor is advised that the Contract may not fully describe every detail or make specific allowances for all probable exceptions and contingencies related to the Construction Surveying requirements for this Project. Additional best management practices (BMP's) for Construction Surveying are identified in Appendix A of the Mn/DOT Surveying and Mapping Manual, in addition to the requirements shown below:

S-37.2 SURVEYING TO BE PERFORMED BY Mn/DOT

(A) Mn/DOT will set the initial horizontal and vertical control points in the field for the Project as indicated in the Plans. Upon request, Mn/DOT will also provide electronic data on the control so established. This electronic data will be provided in the format that was used in the accomplishment of the surveys for the Construction Plan, and in Construction Plan development itself. However, due to the many different processes that the design survey data goes through and the large variety of sources of input in the final production of the Plan itself, no warrantee is made as to the value or adaptability of the electronic data to the Surveyor. No warrantee is made that the data systems used by Mn/DOT or any consultants employed by Mn/DOT for Surveying or Construction Plan preparation will be compatible with the systems used by the Contractor's Surveyor. Information shown on the printed "Plan" shall always govern over any electronic "Plan" data.

At the discretion of the Mn/DOT Engineer, spot checks may be performed upon the Contractor's surveying calculations, records, field procedures, and actual staking. If the Engineer determines that the work is not being performed in a manner that will assure proper controls and accuracy, the Engineer will order the Contractor to redo such work, to the standards specified in the Contract, at no additional cost to Mn/DOT.

If Mn/DOT sustains undue costs in checking excessive amounts of Contractor Construction Surveying, or must perform survey work that is the Contractor's responsibility, the Engineer may deduct Mn/DOT's cost from monies due or becoming due the Contractor in accordance with the following rates:

	Hourly Rates
Registered Engineer or Licensed Land Surveyor	$80.00
4-person crew and equipment	$240.00
3-person crew and equipment	$180.00
2-person crew and equipment	$125.00
1-person with equipment	$75.00

or as incurred by Mn/DOT should it become necessary, due to Mn/DOT resource commitments, to have such work performed by a consultant under contract to Mn/DOT.

S-37.3 CONSTRUCTION SURVEYING BY THE CONTRACTOR

(A) Contractor Construction Surveying Requirements

Construction Surveying is defined as accurately providing all necessary computations, stakes and marks to establish lines, slopes, elevations, points, continuous profile grades in accordance with Mn/DOT 1508 and the requirements shown in the Plan for Construction Staking; so that the Contractor's forces are able to construct all required work for the Project in accordance with the Contract requirements; and so that Mn/DOT Engineers and Inspectors are able to complete all necessary inspection and Contract Administration duties. The staking shall include, but not be limited to, clearing and grubbing, removals, grading, culverts, embankments, borrow, aggregate base course, pavements, bridges, utilities, signs, pavement markings, erosion control and turf establishment items to complete the Project as represented in the Plans. The Surveying must be done in a way that is timely, and that is reflective of the continuing and ongoing nature of construction and inspection activities which will generally require frequent, separate Project visits by the Contractor's survey crew to the Project to accommodate the various stages of construction and inspection activities that will occur.

The Surveyor shall be prepared to make all necessary surveying checks for field verification of actual conditions and shall make the necessary minor surveying and staking adjustments to fit the construction to actual field conditions. In addition, some Plan details may be dependent upon actual field conditions at the time of construction. It may be necessary to perform some field survey or office computations in order to stake these components. All work referred to in this paragraph is considered part of the work of Construction Surveying and no additional payment will be made for this work.

The Contractor shall retain a Professional Land Surveyor or Professional Engineer, licensed in the State of Minnesota, to directly supervise the Construction Surveying. Any determination of, or marking of, Right-of-Way must be performed under the supervision of a Licensed Land Surveyor. Additionally, for those projects let after August 31, 2007, an individual holding a NSPS - ACSM Level III certification in Construction Surveying, an LSIT, or a licensed Surveyor/Engineer, shall be on the Project site at all times to directly supervise the survey crew(s).

The Contractor shall:

1. Be responsible for the preservation of all reference points, monuments, government land corners, horizontal and vertical control points, stakes, and marks that are established by Mn/DOT or others within the Project limits. If the Contractor or its surveyor fails to preserve these items and if they must be reestablished by Mn/DOT, the Engineer will deduct a charge from monies due or becoming due the Contactor according to the Department's costs as shown elsewhere in these Special Provisions.

2. Be responsible to review, balance, adjust, correct, and investigate Mn/DOT provided data and to perform work on survey data and control points that may be necessary to use the survey points and data, all at no extra cost to Mn/DOT, unless it is determined by the Mn/DOT Engineer that latent errors existed in the information provided by Mn/DOT.
3. Start and end all level runs, traverses, or GPS control surveys, from known control. Complete all control surveys at no worse than the standards specified for supplemental control in Chapter 2, Mn/DOT Surveying and Mapping Manual.
4. Unless otherwise agreed to, set all stakes and marks in accordance with the Staking Information Sheets included in the Plan.
5. Furnish and install traffic control devices in accordance with the Field Manual for Temporary Traffic Control Zone Layouts, Part VI, (MN MUTCD), when crew members are exposed to traffic.
6. Perform all Construction Surveying for all Project construction as shown in Mn/DOT 1508, and shall install reference points as needed for the use of any public utility crews that are staking or accomplishing utility relocation or construction associated with this Contract.

    a. From Horizontal and Vertical Control Points established by the Engineer.
    b. According to the Plan, Proposal and Standard Specifications.
    c. According to the Mn/DOT Surveying and Mapping manual.
    d. According to actual existing field conditions.

7. Perform Bridge and Structure Construction staking which includes setting and reestablishing Working Points and Reference Points by XYZ coordinates to provide line and grade during all stages of work, and at all substructures and segments of Bridge or Structure Construction, as shown below:

    a. Establish Working Points or Reference Points, approved by the Engineer, on the ground as shown on the Bridge Layout sheet in the Plans.
    b. Transfer of required points from the ground to the top of footing after completion of concrete footing construction. If the structure is a curved wall or bridge edge of slab, curb, coping, median, or railing, the Contractor's Surveyor shall mark a curved line on the footings, forms, or deck slab, to the proper degree of curvature within 3 mm in 3 meters, 1:1000 **(1/8 inch in 10 feet)**, as needed for construction and inspection activities.
    c. Transfer required points to the top of all finished structures.
    d. Transfer required points to the superstructure deck forming. (Mn/DOT personnel will complete all work associated with beam stool elevations.)

8. Bear all costs, including but not limited to the cost of actual reconstruction of Contract work, that may be incurred due to errors in Contractor's Construction Surveying.
9. Document surveying during construction in a form acceptable to the Engineer and allow the Engineer access to surveying notes and calculations. The survey documentation includes:

    a. Control station monumentation with reference ties.
    b. Field notes that were used to set construction stakes, control the Project, and document monument locations. The Contractor shall use bound, hard cover field books for recording survey data and field notes; store field notes on an electronic medium; or use both methods. If an electronic medium is used, the raw field data files must be available. When using an electronic medium, the Contractor shall make all files and data available in the Standard formats used by the Department.

10. Present the Engineer with the as-built Survey Data. The as-built Survey Data shall include the following:

    a. Changes from the Plan
        i. Alignment
        ii. Profile
        iii. Sewer
        iv. (List other items as desired)
    b. Locations of utilities relocated or emplaced as part of the Project
    c. Identify any alignment, Right-of-Way, property, or control monumentation destroyed during the Project
    d. Any alignment, Right-of-Way, property, or control monumentation that was placed during the Project and that still exists at Project completion.
    e. The information shall include the x, y and, if applicable, the z coordinates in the Project datum. If the original item had no coordinate reference, then show the revised centerline station and offset.
    f. The information shall be provided in both electronic (Microstation and GeoPak) and hard copy format.
    g. In the case of new monumentation, there should also be a report describing how the monumentation was placed. This will include copies of any fieldwork (traverse or leveling) as well as any adjustments used. It shall also include tie sheets, to include a description of the physical object placed as the monument.

11. Furnish survey documentation and as-built Survey Data to the Engineer within the time limits indicated in the surveying work schedule.

(B) Contractor Construction Surveying Activities

1. The Contractor shall give the Engineer a 14 calendar day written notice before the Contractor needs Mn/DOT to establish any horizontal and vertical control points shown in the Plan for Construction Surveying.

2. At the preconstruction conference, the Contractor shall submit to the Engineer for approval a written Construction Surveying Work Plan and Schedule detailing:

    a. Pertinent information as to how the requirements in these specifications, and the requirements in Appendix A of the Mn/DOT Surveying and Mapping Manual, are being met by the Contractor's Surveyor.
    b. A Project specific Construction Surveying Work Schedule for the Construction Surveying and how it relates to the time frame for construction activities and Mn/DOT inspection needs.
    c. A proposed method of communications between the Contractor, Surveyor, and Mn/DOT Project Personnel.
    d. How and when the Contractor's Surveyor will make delivery of the as-built Survey Data to Mn/DOT.

3. During the course of construction, the Contractor shall give notice of commencement of any Construction Surveying activities according to Mn/DOT 1803.2.

S-37.4 METHOD OF MEASUREMENT

The Engineer will measure Construction Surveying on a lump sum basis.

S-37.5 BASIS OF PAYMENT

Mn/DOT will pay for Construction Surveying on a Lump Sum Basis at the Contract unit bid price. Payment shall be compensation in full for all surveying work including materials, surveying equipment, labor, office work, and any incidental costs required by the Contract.

(A) Payment Schedule

Mn/DOT will authorize partial payment for 10 percent of the Contract unit bid price for Construction Surveying after completion of the first day of Contractor Surveying in the field. When Construction Surveying is more than 10 percent complete, Mn/DOT will authorize partial payment in the same percentage as the percentage of Construction Surveying accomplished, as determined by the Engineer, up to 90 percent of the lump sum bid price. The Contractor will receive the final 10 percent of the lump sum bid price when the survey computations, notes, miscellaneous documents, and as-built Survey Data as specified have been received and accepted by the Engineer within the time limits specified by the Survey Work Schedule. If the Contractor fails to provide acceptable documentation and the as-built Survey Data within the time limits specified, Mn/DOT reserves the right to reduce the lump sum payment for Contractor Construction Surveying by a percentage of up to 10 percent of the lump sum bid price.

(B) Payment for Extra Work

When the Engineer determines that extra or additional Construction Surveying beyond the scope of the original Contract is required and orders the Contractor to accomplish this work, compensation will be made as Extra Work in accordance with Mn/DOT 1904 and at the same rate shown for a Mn/DOT survey crew above. If the Construction Surveying is accomplished by a subcontract, the prime Contractor allowance will be five (5) percent.

(C) Payment

Payment for Construction Surveying will be made on the basis of the following:

Item No.	Item	Unit
2011.601	Construction Surveying	Lump Sum

S-38 (2031) FIELD OFFICE AND LABORATORY

The provisions of Mn/DOT 2031 shall be supplemented by the following:

S-38.1 The Contractor shall provide one (1) on-site field office and one (1) field laboratory for this Project. The field office and laboratory shall conform to the following provisions:

(A) Field Office

Size/Type/Location/Usage

The outside dimensions of at least 3.6 meters (**12 feet**) by 15.24 meters (**50 feet**) (exclusive of hitch). The trailer shall be divided to accommodate the following rooms:

1. Two (2) 3.6 meter by 3.0 meter (**12 feet by 10 feet**) offices, one at each end.
2. One (1) 3.6 meter by 9.1 meter (**12 feet by 30 feet**) conference room.

Office Furniture and Equipment

1. The following furniture and equipment shall be furnished as part of the **field office:**
2. Four (4) office desks with a minimum surface area of 750 mm x 1500 mm (**30 inches x 60 inches**). Each desk will have a swivel desk chair with arms.
3. One (1) fireproof file cabinets with at least 4 drawers.
4. Two (2) desk top calculator/adding machine (with tape), with a minimum 10 digits for print/display.

5. Four (4) 2.4 meter x 0.76 meter (**8 feet x 2.5 feet**) conference room tables with at least 16 chairs.
6. The field office shall include one (1) facsimile machine plus all paper and supplies. The facsimile machine shall, as a minimum, be capable of:
   a. 30 page auto document feeder
   b. Transmission speed- 6 seconds per page average
   c. 30 pages of delay transmission memory
   d. Telephone hand set with Fax/Phone switching
7. The field office shall include one (1) dry toner photocopying machine with auto feed capable of reproducing 8-1/2" by 11" up to and including 11" by 17" sheets of paper. The Contractor shall provide all paper and supplies for the copier.
8. Should the above facsimile and/or copier equipment become damaged beyond repair or stolen, the Contractor shall provide an equivalent replacement within three (3) working days of the loss of use of the equipment during the life of the Contract. Replacement shall be incidental within the above specified time at no direct cost to the State during the life of the Contract.
9. The above facsimile and copier equipment will be returned to the Contractor ninety (90) days after final acceptance of all Contract work is made in accordance with Mn/DOT 1216.2.
10. The Contractor shall provide four (4) telephone lines. The lines shall be dedicated as follows

    One (1) line shall be dedicated towards the facsimile,
    Two (2) telephone service lines with local touch tone service and call waiting,
    One (1) line towards Internet access with a phone jack located in each office.

    The Contractor shall also provide two (2) answering machines or voice mail with a date and time stamp.

11. The Contractor shall pay for telephone installation, basic monthly phone service and eventual removal of the telephone lines. The State will pay for long distance charges. The Contractor shall bill Mn/DOT by sending an invoice and a copy of the long distance charges.

S-38.2 The field laboratory facility shall meet the requirements of Mn/DOT 2031, and shall be provided with Type DX service. It is understood that the furnishing of these laboratories in separate from, and in addition to, the other field office provided for elsewhere in this Contract.

S-38.3 All Field Offices and laboratories shall be provided for the full life of the Contract including periods of work suspension.

S-38.4 The Contractor shall maintain access to the field offices at all times, including removal of any debris from the access and parking areas. Access roads and parking areas will have stabilized gravel surfacing. The entire field office area shall be fenced with 6 feet high chain link fence, and have a 20 foot entrance gate.

S-38.5 The Contractor shall install the field offices and laboratory on State owned property at a location determined by the Engineer prior to the start of construction.

S-38.6 In the event that no satisfactory location for a field office/laboratory exists within the Right-of-Way limits of the Project and an off Right-of-Way location is chosen, this location shall be approved to the satisfaction of the Engineer.

S-38.7 The field offices and laboratory shall have operational electric power and telephone service prior to beginning operations on the Project. The electric power may be supplied by temporary usage of a generator of sufficient capacity to operate air conditioning unit and lights.

S-38.8 The Contractor shall provide a hot and cold water source in each field office and laboratory.

S-38.9 The heating and cooling systems for field office and field lab shall be electric.

S-38.10 Compensation for all field offices, utilities and equipment shall be included in the one price for Item 2031.501 (Field Office Type D-Modified). Compensation for the lab shall be included in the price for Item 2031.503 (Field Laboratory Type DX)

S-39 (2051) MAINTENANCE AND RESTORATION OF HAUL ROADS

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

S-39.1 In addition to the amount the Contractor bids for Item 2051.501 (Maintenance and Restoration of Haul Roads), the State agrees to reimburse the Contractor at the predetermined unit prices set forth below for materials ordered by the Engineer. All materials ordered by the Engineer for the Maintenance and Restoration of haul roads will be measured as set forth in the applicable section of the Standard Specifications.

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

2118.501	Aggregate Surfacing, Class 1	$6.62/t	**$6.00/ton**
2130.501	Water	$2.50/m^3	**$10.00/1000(M)gal.**
2131.502	Calcium Chloride Solution	$0.14/liter	**$0.50/gal.**
2211.501	Aggregate Base, Class 5	$6.62/t	**$6.00/ton**
2360.501	Type SP 12.5 Wearing Course Mixture (4, B)	$27.50/t	**$24.95/ton**
2357.502	Bituminous Material for Tack Coat	$0.13/liter	**$0.50/gal.**

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

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

The above shall be performed to restore visible damage.

S-40 (2102) PAVEMENT MARKING REMOVAL

The provisions of Mn/DOT 2102 are modified and/or supplemented with the following:

S-40.1 In addition to the requirements above, the Contractor is responsible for determining what work areas have lead concentration above OSHA's Permissible Exposure Limit. That information is to be provided to the Project Engineer and Mn/DOT's Inspectors.

(A) Site access

To ensure that no one is accidentally exposed to lead, people are not permitted into areas of high lead concentration without protection. Signs are used to indicate where unprotected people must not go. The signs shall say:

Warning. Lead Work Area. Poison. No Smoking or Eating.

(B) Protective Clothing

The Contractor must provide protective clothing for Mn/DOT inspectors in any area with lead exposure above 30 $\mu g/m^3$ or where the lead concentration is unknown. The clothing can be disposable or reusable. It must include coveralls or equivalent, shoe covers, and head covers. The Contractor is responsible for laundering the clothing and for providing clean clothing at least weekly or for daily disposal of the clothing. If the contaminated clothing can be reused, the Contractor is responsible for storing it.

(C) Wash facilities

The Contractor must provide soap, water, and towels to enable Mn/DOT's inspectors to wash at the site. If showers are provided for the Contractor's employees, they must be available for Mn/DOT's inspectors, also.

The Contractor must provide a means to remove surface contamination from the inspector's clothing. That may be a HEPA vacuum, a downdraft booth (with the exhaust captured and cleaned), or other effective means that do not increase the concentration of airborne lead.

(D) Inspection Delay

Mn/DOT's inspectors will not enter a blasting containment area until at least fifteen minutes after blasting and other lead dust-producing activities have stopped, to permit the dust to settle. There will be no extra payment or penalty against Mn/DOT for this delay.

S-41 (2104) REMOVING PAVEMENT AND MISCELLANEOUS STRUCTURES

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

S-41.1 Measurement and payment for the removal and disposal of materials will be made only for those Items of removal work specifically included for payment as such in the Proposal and as listed in the Plans. The removal of any unforeseen obstruction requiring in the opinion of the Engineer equipment or handling substantially different from that employed in excavation operations, will be paid for as Extra Work as provided in Mn/DOT 1403.

S-41.2 All removals shall be disposed of by the Contractor outside the Right of Way in accordance with Mn/DOT 2104.3C3 to the satisfaction of the Engineer.

S-41.3 If the Contractor is required to dispose of treated wood the following shall apply:

TREATED WOOD DISPOSAL

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

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

For each site the Contractor shall:

- Describe the method of material pickup and the expected material condition, i.e.: specific lengths, etc.
- Describe the method of waste material transport and waste material disposal site.
- Dispose treated wood in a MPCA permitted lined solid waste landfill (not a demolition landfill).
- The Contractor has the option to chip creosote treated wood on site. After the wood is chipped on site, it can be transported off site and incinerated at a MPCA permitted incinerator. Call 651.366.3630 for list of incinerators permitted to burn creosoted treated wood. This applies to creosote treated wood only.

- Within 30 days after the treated wood is transported off site, the Contractor shall provide the Project Engineer with disposal records. Records include manifests, scale tickets, and invoices. Records shall indicate type of treated wood, quantity, date, and location of disposal.

S-42 (2104) SAWING CONCRETE PAVEMENT (FULL DEPTH)

This work shall consist of sawing existing concrete walk and curb & gutter at various locations as shown in the Plan to produce a neat line from which to extend the new work. This work shall be performed in accordance with the applicable Mn/DOT Standard Specifications and the following:

Measurement will be made by the length of concrete saw cut. Payment will be made under Item 2104.511 (Sawing Concrete Pavement (Full Depth)) by the linear foot, which shall be compensation in full for all costs incidental thereto.

S-43 (2104) SALVAGE CASTING

This work shall consist of salvaging existing drainage grate castings in accordance with the applicable Mn/DOT Standard Specifications and the following:

S-43.1 The Contractor shall salvage existing drainage grate castings before removing median drainage structures and store at a location within the Projects limits indicated by the Engineer.

S-43.2 Frame castings shall become property of the Contractor and shall be disposed of outside the Right of Way in accordance with Mn/DOT 2104.3C3 to the satisfaction of the Engineer.

S-43.3 There will be no compensation for salvaged grates that have been damaged.

S-43.4 Payment will be made under Item 2104.523 (Salvage Casting) at the Contract bid price per Each, which shall be payment in full for all costs relative to salvaging the grate castings and storing at a location within the Projects limits indicated by the Engineer. Removing the grate castings from the Project will be paid for separately under Item 2104.601 (Haul Salvaged Material) by the Lump Sum.

S-44 (2104) HAUL SALVAGED MATERIALS

This work shall consist of loading and hauling salvaged materials, not required for installation elsewhere under this Contract, to the designated storage area(s) and depositing said materials thereat in a manner satisfactory to the Engineer.

S-44.1 The designated storage area(s) shall be designated by the Engineer, or as listed below:

(A) **Castings**
Mn/DOT Oakdale Maintenance Dept.
3485 Hadley Avenue
Oakdale, Mn.
Contact: Dave Hagle
651/775-0366

(B) **Lighting and Signing Material**
The Contractor is directed to Division SL (Special Provisions for Lighting Construction) and Division SS (Special Provisions for Signal Construction), which are attached to this Proposal, for additional requirements and locations.

S-44.2 The Contractor shall carefully clean and bundle, if appropriate, the salvaged materials to the satisfaction of the Engineer prior to loading.

S-44.3 The Contractor shall give the Engineer at least 24 hours notice before salvaged materials are to be delivered to the storage area so that arrangements can be made to have a yard man available to accept the salvaged materials.

S-44.4 It shall be the Contractor's responsibility to neatly stockpile the material at the storage site with his forces as directed by the Engineer.

S-44.5 Salvaged material shall arrive at the storage area in carefully segregated lots so that it can be easily and quickly placed in its proper storage location. The Contractor shall unload the salvaged material and place it at the locations in the yard designated by the yard man.

S-44.6 No measurement will be made of the individual items, but the haul of all such items shall be construed to be included in the single lump sum for which payment is made.

S-44.7 Payment will be made under Item 2104.601 (Haul Salvaged Material) at the Contract lump sum bid price, which shall be payment in full for all costs relative to hauling the materials to, and depositing the materials, at the locations specified.

S-45 (2105) EXCAVATION AND EMBANKMENT

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

S-45.1 Mn/DOT 2105.2A2 Rock Excavation is revised to read as follows:

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

S-45.2 The last paragraph in Mn/DOT 2105.3B Preparation of Embankment Foundation, is revised to read as follows:

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

S-45.3 The first and second sentences in the second paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, are revised to read as follows:

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

S-45.4 The fifth paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

Peat, muskeg, and other unstable materials that are not to be used in the roadbed embankments shall be deposited in the areas indicated in the Plans or elsewhere as approved by the Engineer. All other material that is considered unsuitable for use in the upper portion of the roadbed shall be placed outside of a 1:1 slope down and outward from the shoulder lines on fills under 10 m (**30 feet**) in height or outside of a 1 vertical to 1.5 horizontal slope down and outward from shoulder lines on fills over 10 m (**30 feet**) in height, or used to flatten the embankment slopes, or disposed of elsewhere as approved by the Engineer.

S-45.5 The second sentence in the eighth paragraph of Mn/DOT 2105.3D Disposition of Excavated Material, is revised to read as follows:

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

S-45.6 The fourth to last paragraph in Mn/DOT 2105.3D Disposition of Excavated Material, which begins with "All combustible debris materials (stumps, roots, logs, brush, etc.) together with all..." is hereby deleted and replaced with the following:

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

S-45.7 The following is hereby added to Mn/DOT 2105.3:

F3 Modified Penetration Index Method

The full thickness of each layer of Select and Granular Borrow subgrade materials shall be compacted to achieve a penetration index value as described in the modified dynamic cone penetrometer (DCP) test procedure, as determined by an Mn/DOT standard dynamic cone penetrometer (DCP) device. For test purposes, a layer will be considered 300 mm (**1 foot**) in compacted thickness. This would include any areas where crushed concrete or salvaged asphalt may be used for Aggregate Base. Two (2) DCP tests shall be conducted at selected sites within each 3,000 m^3 (**4,000 cubic yards**) (CV) of constructed subgrade. If either of the tests fails to meet the specified requirements, the material represented by the test shall be recompacted and retested for penetration index compliance.

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

S-45.8 Bituminous and concrete items disturbed by construction shall become the property of the Contractor and shall be recycled to the extent allowed in base and surfacing items or disposed off of the Project limits in accordance with Mn/DOT 2104.3C3.

S-45.9 No compensation will be made for the construction of the impervious soil seals.

S-45.10 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-46 (2105) CONTAMINATED GROUNDWATER

Contaminated groundwater will be encountered during reconstruction of the drain tile system in the water seepage areas described below. All contaminated groundwater to be dewatered for the Project shall be handled according to the following provision unless otherwise directed by the Engineer. The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR PART 1910 and all subsequent revisions thereof. The Contractor shall file a site **Health and Safety Plan** with the Engineer at the preconstruction meeting for the Project.

S-46.1 CONTAMINATED SITES

(A) During an investigation of the Project area for contamination, samples of shallow groundwater were obtained from several soil borings placed within the two seepage areas (Water Seepage Area #1 and Water Seepage Area #2) depicted on Sheet No. 61 of the Plan. Analytical data from each of the borings indicated the presence of low levels of chlorinated solvent compounds in groundwater samples. Detected compounds consisted of 1,1-dichloroethane, chloromethane, cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride. All detected concentrations were below their respective drinking water limits, except for one detection of vinyl chloride, which was detected at a concentration slightly above the drinking water limit in one sample. **Contractor will encounter contaminated groundwater in these areas.**

(B) Reports providing additional information about environmental testing that has been completed in the Project area are available for review by potential bidders. The reports can be reviewed at the Mn/DOT Central Office located at 395 John Ireland Boulevard, St. Paul, Minnesota 55155. Please contact Karlene French at 651/366-3609 to arrange an appointment to review the reports.

S-46.2 CONTAMINATED GROUNDWATER DEWATERING

(A) No contaminated groundwater shall be dewatered unless the State's Environmental Consultant is present. The Contractor shall allow and be prepared for the State's Environmental Consultant to screen and sample all water being discharged from the contaminated area.

(B) All groundwater removed for Project work to be completed between Stations 123+00 and 132+00 (in the vicinity of Water Seepage Areas #1 and #2) shall be discharged to the existing highway drain tile system via one discharge location unless otherwise directed by the Engineer. Groundwater containing free (undissolved) petroleum products shall not be discharged to the drain tile system.

(C) The Contractor shall be responsible for obtaining any and all permits from the Minnesota Department of Natural Resources for the construction dewatering, including, but not limited to, a temporary Appropriation of Waters of the State Non-Irrigation Permit. See Section S-19 (PERMITS, LICENSES, AND TAXES) of these Special Provisions.

(D) The Engineer will be responsible for obtaining a National Pollutant Discharge Elimination System (NPDES) permit for discharge of groundwater containing contaminants to surface water.

(E) The Contractor shall measure the rate of groundwater discharge during dewatering using an inline flow device capable of measuring flow rates with an accuracy of plus or minus 50 gallons per minute. The Contractor shall record the rate of discharge daily and shall submit a discharge report to the Engineer weekly, or as approved by the Engineer.

(F) The Engineer will complete all necessary sampling and testing of the dewatered groundwater required by all permitting authorities. The Contractor shall allow the State's Environmental Consultant to periodically collect and analyze samples of dewatered groundwater until all dewatering for the Project is completed.

(G) Payment for the requirements of this Section S-46.2 shall be considered incidental to payment for construction dewatering under Item 2105.601 (Dewatering). See Section S-47 (DEWATERING) of these Special Provisions.

S-46.3 **CONTAMINATED GROUNDWATER CONTINGENCY PLAN**

(A) In the event groundwater contains free (undissolved) petroleum products or excess contaminant concentrations are encountered (as evidenced by the presence of an oily sheen, a strong chemical odor, or discoloration), the groundwater may require treatment prior to discharge, as determined by the Engineer and/or State's Environmental Consultant. The Contractor shall be prepared to stop work and supply a portable groundwater treatment system to the Project within 48 hours of being notified by the Engineer that treatment is required. The treatment system shall include but not be limited to the following components: flow equalizer; suspended solids removal; oil/water separator; activated carbon filtration; and/or aerator; or as approved by the Engineer. The portable groundwater treatment system shall have a treatment capacity equal to or greater than the rate of temporary construction dewatering. The portable groundwater treatment system design shall be approved by the Engineer prior to mobilization of any groundwater treatment system components to the Project site.

(B) The discharge of contaminated groundwater to the existing drain tile system and all associated costs are considered incidental to the Project work. If the Engineer determines that contaminated groundwater must be treated prior to discharge, the treatment of the contaminated groundwater and all relative costs thereto, including proper disposal of treatment system components, shall be considered Extra Work and will be paid for in accordance with Mn/DOT 1403.

S-47 (2105) DEWATERING

This work shall consist of controlling ground water to allow for construction of subsurface drainage. The subsurface drainage is to be installed 3 feet to 4 feet below grade, at or near the same elevation where recent boring indicate bedrock. This work shall be done in accordance with the applicable Mn/DOT Standard Specifications, the Plans, and the following:

S-47.1 GENERAL

(A) Permits

1. Obtain permits required by Minnesota Department of Natural Resources (Mn/DNR) if total discharge from dewatering wells is anticipated to exceed, or actually exceeds 10,000 gallons per day, or 1,000,000 gallons per year.
2. Comply with requirements of all permits.
3. Comply with local and State installation requirements and sediment control regulations.

(B) Requirements

1. Maintain site, excavations, and construction free of water.
2. Dispose of treated water in a lawful manner that will not result in flooding the Project area or adjoining property, nor endanger either permanent work or temporary facilities nor rendering storm water best management practices ineffective.

(C) Methods

1. Have all dewatering methods reviewed and approved by the Project Engineer prior to starting work on site, or submitting Mn/DNR permit, whichever occurs first.

(D) Submittals

1. At least seven (7) calendar days prior to submitting Mn/DNR permit or initiating dewatering procedures, the Contractor shall submit a dewatering plan to the Engineer for approval. The Contractor's dewatering plan shall be in writing and shall contain sufficient drawings to fully illustrate staging concepts involved and ultimate discharge locations. The plans shall describe all facilities and procedures required to dewater the work area as necessary. In addition, work on this Project shall not start until the dewatering plan has been approved by the Minnesota Department of Natural Resources if required. Contractor may incorporate permanent Project features into the dewatering.
2. Submit a work and erosion control schedule, with the plan, which indicates timing of dewatering stages.

S-47.2 PRODUCTS

(A) Materials

1. Materials, whether new or used, shall be adequate in capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

S-47.3 EXECUTION

(A) Protection

1. Protect trees, shrubs, lawns and construction area from damage due to installation and operation of dewatering devices.
2. Minimize the amount of turbidity or silty water entering surface water. Minimized turbidity shall be construed to mean 50 ntu above the receiving water or conveyance system or less, as measured by a NTU portable meter. Chemical flocculation of natural origin materials and treatment train and containment systems will be required. The Office of Environmental Services will provide technical support for the Project Engineer.
3. Suggested methods to minimize sediment from entering a surface water are:

   (a) Construction of a detention basin with controlled rock weeper outlets.
   (b) Use of a portable detention basin (eg. plastic lined dumpster) or upland sump, and active staged pumping.
   (c) Utilization of floc logs and liquid floc injection.
   (d) Pump turbid water away form surface waters and into vegetation buffers, rock weepers or other approved energy dissipation measures.

4. Do not allow water discharge to run over roads, parking areas, or work areas where water or ice could cause a hazardous condition.
5. Do not allow water to pond in the construction area.
6. Protect existing or completed work and installed storm water best management practices from excessive water or sedimentation damage.
7. Protect workers and public from temporary structures or basins.
8. Do not allow water to run over work in progress.

(B) Installation

1. Install dewatering devices adequate to keep the work dry and free of ground water to an elevation at least 1 foot below elevation work is being done.
2. Install sedimentation basins and items shown in the Site Plan as necessary to prevent turbid runoff or discharge.

3. Install dikes, riprap, culverts, and piping as necessary to prevent erosion of site or siltation of surface waters.
4. Dewatering must be maintained until utilities or structures are backfilled.
5. Remove unneeded materials, equipment, and pipe upon completion to the satisfaction of the Project Engineer. Seal wells as required by Minnesota Well Code.
6. Install temporary or permanent erosion control measures to restore or stabilize the area as necessary and as per construction staging and sequencing.

(C) Removal of Sediment and Restoration of Property

If sediments and debris leave the area disturbed by the Contractor's construction activities, it shall be the sole responsibility of the Contractor to notify the affected parties, acquire necessary permits, remove the sediments, deltas and debris, and restore the affected area to the pre-damaged condition. The Contractor's work to restore property outside the Right of Way shall be at no expense to the Department.

(D) Failure to Perform

If turbidity due to dewatering cannot be acceptably controlled during construction, the Contractor shall change construction operations until satisfactory results of visibly clean of 50 ntu above the background receiving waters or conveyance system water are obtained. The Contractor shall suspend operations, if ordered by the Engineer, until the issue is resolved. Any turbid or sediment laden effluent resulting from dewatering footing or other enclosures off Right of Way shall be removed at no expense to the Department. Failure to adequately control turbid water discharge as indicated in the Site Plan and ordered by the Project Engineer, or cease operations if ordered by the Project Engineer **will result in a $1000 per calendar day deduct** until corrective actions are successful.

S-47.4 MEASUREMENT AND PAYMENT

Measurement will be made by Lump Sum. Payment will be made under Item 2105.601 (Dewatering) at the Contract bid price per lump sum, which shall be compensation in full for all costs incidental thereto, including labor, equipment, and materials for performing all dewatering operations as specified.

S-48 (2105) MINOR GRADING

This work shall consist of minor grading to remove accumulated excess soils from underneath plate beam guardrail in accordance with the applicable Mn/DOT Standard Specifications, as directed by the Engineer, and the following:

S-48.1 This work shall restore the proper clearance ensuring the center of guardrail is approximately 21 inches above the gutter line or surrounding ground as necessary. This work shall also include minor grading to remove excess soil behind curb sections milled to 3 inches in height for Guardrail End Treatments. Any required embankment is incidental to the minor grading.

S-48.2 Excavated material removed from designated areas under the plate beam guardrail on the Project shall be handled according to the following provisions unless otherwise directed by the Engineer. The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR Part 1910 and all subsequent revisions thereof. **This material shall be kept separated from any other materials in a location selected by the Engineer until all similar type material on the Project is ready to be hauled off site.** Removal of this material from the Project Site will be paid for under Item 2105.607 (Excavation Special). See Section S-49 (EXCAVATION SPECIAL) of these Special Provisions.

S-48.3 MEASUREMENT AND PAYMENT

Measurement and payment will be made in two parts as follows:

(A) Measurement will be made by the length of minor grading work performed along the guardrail as specified. Payment will be made under Item 2105.603 (Minor Grading) at the Contract bid price per linear foot, which shall be payment in full for all costs involved to remove and stockpile on site as directed by the Engineer.

(B) Measurement of loads removed from the construction Project will be made separately under Item 2105.607 (Excavation Special) by the Cubic Yard. See Section S-49 (EXCAVATION SPECIAL) of these Special Provisions.

S-49 (2105) EXCAVATION SPECIAL

The street sweepings removed the Project shall be handled according to the following Provisions unless otherwise directed by the Engineer. This work shall be performed in accordance with the applicable Mn/DOT Standard Specifications and the following:

S-49.1 The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR Part 1910 and all subsequent revisions thereof. **The Contractor will be required to give two days advance notice to Jeff Cassidy, Mn/DOT Supervisor at (952) 496-4191, to make arrangements for delivery.** All contaminated sweeping sand removed from under the plate beam guardrail and stockpiled on site shall be delivered to:

Mn/DOT Shakopee Truck Station
12550 Chestnut Boulevard
Shakopee, MN 55378
Contact: Jeff Cassidy, Supervisor
Phone: 952/496-4191

All loads removed from the construction Project will be logged by the Mn/DOT Inspector in his daily record as to date, time and quantity transported. All delivered loads to the Mn/DOT Shakopee Truck Station will be logged in by Mn/DOT personnel on site as to date, time and quantity received.

S-49.2 MEASUREMENT AND PAYMENT

Measurement of loads removed from the construction Project will be made by loose volume in cubic yards of the material delivered and properly logged into the Shakopee Truck Station. Failure of the Contractor to properly log in loads at the Mn/DOT Shakopee yard will result in Non-Payment under this pay item for the undocumented loads. Payment will be made under Item 2105.607 (Excavation Special) at the Contract bid price per cubic yard, which shall be payment in full for handling, hauling and all costs relative thereto. Delivery of this material to Mn/DOT will relieve the Contractor from further responsibility to screen and properly dispose of such debris.

S-50 (2123) EQUIPMENT RENTAL

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

S-50.1 The following is added to Mn/DOT 2123.3 SPECIFIC REQUIREMENTS:

N Disk Harrow

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

S-50.2 The following is added to Mn/DOT 2123.5 BASIS OF PAYMENT:

2123.610 Disk Harrow ..... hour

S-51 (2130) APPLICATION OF WATER

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

S-51.1 The third paragraph of Mn/DOT 2130.5 is hereby deleted and the following substituted therefore:

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

S-52 (2211) AGGREGATE BASE

This work consists of the placement, grading, and compaction of Class 5 Aggregate in accordance with Mn/DOT 2211 and 3138, as directed by the Engineer, and the following:

S-52.1 This material shall be used as base for the construction of Concrete Median Barrier, Shoulder Pavement Replacement and Drainage Structures on I 35W as shown on the Plans.

S-52.2 Compaction shall be achieved by the "Modified Penetration Index Method". See Section S-52.5 and the attached "MODIFIED DYNAMIC CONE PENETROMETER (DCP) 5-692.255 modified" for information about this compaction method.

S-52.3 The second sentence in Mn/DOT 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 Mn/DOT Grading and Base Manual.

S-52.4 The last paragraph in Mn/DOT 2211. 3C2 Quality Compaction Method, is revised to read as follows:

The Engineer may elect to perform density tests as shown in the Mn/DOT 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-52.5 Mn/DOT 2211.3C3 Penetration Index Method is hereby deleted and replaced with the following:

C3 Modified Penetration Index Method

The full thickness of each layer of Class 3, 5, 6, or 7 shall be compacted to achieve a penetration index value as described in the modified dynamic cone penetrometer (DCP) test procedure, as determined by an Mn/DOT standard dynamic cone penetrometer (DCP) device. For test purposes, a test layer will be described in the modified dynamic cone penetrometer (DCP) test procedure. Two (2) DCP tests shall be conducted at selected sites within each 800 m^3 (**1000 cubic yards**) (CV) of constructed base course. If either of the tests fails to meet the specified requirements, the material represented by the test shall be recompacted and retested for penetration index compliance.

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

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

S-52.6 The first sentence in Mn/DOT 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 Mn/DOT Grading and Base Manual.

S-52.7 The first sentence in Mn/DOT 2211.3F2(d) under Acceptance Testing, is revised to read as follows:

(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-52.8 Mn/DOT 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-52.9 The third paragraph after Mn/DOT 2211.3F2(k) under Acceptance Testing, is revised to read as follows:

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

S-52.10 Table 2211-B in Mn/DOT 2211.3F2 Acceptance Testing, is hereby deleted and replaced with the following:

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

% Passing Outside Specified Limits*		
4.75 mm (**#4**), 2.00 mm (**#10**), and 425 *u*m (**# 40**) Sieves	75 *u*m (**#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-52.11 The following is added to Table 2211-C in Mn/DOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Additional failing test results shall be subject to the next higher price reduction.

S-52.12 The following is added to Table 2211-D in Mn/DOT 2211.3F2 Acceptance Testing:

Substantial compliance will be applied to no more than one test failure. Additional failing test results shall be subject to the next higher price reduction.

S-53 (2231) BITUMINOUS PATCHING MIXTURE

The provisions of Mn/DOT 2231 are supplemented with the following:

S-53.1 The bid price for this item shall be compensation in full for all costs of routing, cleaning, and tack coating severely deteriorated transverse and longitudinal cracks prior to placing any overlays. The work shall be done in accordance with the Plan to the satisfaction of the Engineer.

S-54 (2232) MILL PAVEMENT SURFACE

The provisions of Mn/DOT 2232 are modified and/or supplemented with the following:

S-54.1 The following is added to Mn/DOT 2232.3B:

The Contractor shall be responsible for the riding surface quality of any milled surface on this Project, to keep it in good riding condition whenever a milled surface is opened to traffic. Any work necessary by the Contractor to maintain the milled surface in riding condition shall be incidental.

S-55 (2232) MILL BITUMINOUS PAVEMENT FOR CRACK REPAIR

The provisions of Mn/DOT 2232 are modified and/or supplemented with the following:

S-55.1 After milling to the required depth and prior to overlaying, air blast any deteriorated cracks and joints to remove loose or deteriorated bituminous surfacing. The air blasting shall be done with high-pressure (100 psi) equipment.

S-55.2 Depressions resulting after air blasting, sweeping or milling operations, which are greater than 1 inch in depth and 2 inches in width, shall be filled with Bituminous Patching Mixture and compacted with a small vibratory or pneumatic roller. Depressions of lesser dimensions shall be filled with the Wear Course Mixture.

S-55.3 Use tack coat between all bituminous mixtures. The bituminous tack coat material shall be applied at a uniform rate of 0.03 to 0.05 gallons per square yard between bituminous layers and 0.07 to 0.10 gallons per square yard on bituminous surfaces prior to being overlaid. The application rates are for undiluted emulsions (as supplied from the refinery) or MC and RC liquid asphalts. The asphalt emulsion may be further diluted in the field in accordance with Mn/DOT 2357.

S-55.4 Compaction of all permanent bituminous mixtures shall be by the "Maximum Density Method."

S-56 (2232) MILL CONCRETE CURB

This work shall consist of milling curb to a height of 3inches above the gutter line in accordance with the applicable Mn/DOT Standard Specifications, as detailed on Standard Plan Sheet 5-297.601 (Guardrail Installation At Medians And End Treatments), and the following:

S-56.1 In place concrete curb shall be modified at all plate beam end treatment locations as shown on the Plan or as directed by Engineer. In some locations curb milling has already been partially performed, additional milling may be needed to bring the curb relief in compliance with Mn/DOT Standard Specifications.

S-56.2 MEASUREMENT AND PAYMENT

Measurement will be made by the length of curb milled as specified. Payment will be made under Item 2232.603 (Mill Concrete Curb) at the Contract bid price per linear foot, which shall be compensation in full for all costs incidental thereto.

S-57 CERTIFIED READY-MIX CONCRETE PLANTS

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

D7 Certified Ready-Mix Plant Program

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

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

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

D7a Certification Documents

The Contractor shall obtain all of the ready-mix concrete used on this Contract from a Certified Concrete Plant meeting all of the pertinent requirements of 1604 and 2461 and the following.

It is the Prime Contractor's responsibility to ensure that the Ready-Mix Concrete Producer adheres to all of the requirements. At the time of delivery, a Certificate of Compliance shall accompany each truckload of ready-mixed concrete used by the Contractor or any sub-contractor on this Contract. **A computerized Certificate of Compliance is required when supplying any concrete [including small quantities < 20 cubic meters (yards)] for an Agency Contract.** Computerized means that the concrete mix design quantities batched are recorded from load cells and meters.

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

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

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

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

Metric Certificate of Compliance

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

English Certificate of Compliance

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

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

Definitions

Mix Design Water – The recommended water content for one cubic meter (yard) of concrete as noted on Mn/DOT Estimated Composition of Concrete Mixes Form TP-02406.

Total Moisture Factor - See 5-694.311 of Concrete Manual

Absorption Factor - See 5-694.311 of Concrete Manual

Free Moisture – The water that is carried on the surface of the aggregate that becomes part of the total water.

Batch Water – Water actually batched into the truck by the batcher.

Total Water = Batch Water + Free Moisture

Temper Water – Water added in mixer to adjust slump.

Trim Water – Water added to the truck after batch was discharged from plant.

Total Actual Water - The water in the concrete mixture at the time of placement from any source other than the amount absorbed by the aggregate. It includes all batch water placed in the mixer, free moisture on the aggregate and any water added to the ready mix truck prior to placement.

Ready-Mix Producer or "Producer" – Party that is producing the concrete for the Contract. It is understood that the Ready Mix Producer is the agent of the Prime Contractor in this Special Provision.

16) Total Water **(Batch Water + Free Moisture)** (kg/lbs)

17) The Certificate of Compliance shall compute the water available to add in gallons [(Mix Design Water) (*Target CM (CY's)*) – Total water] (liters/gallons)

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

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

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

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

19) Location for Producer's Representative signature.

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

D7b Quality Control Testing and Sampling

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

The testing rates stated in the Schedule of Materials Control are minimums only. Changes in the material require taking additional tests. Changes include but are not limited to: variable gradation results, new aggregates arriving on site, moisture conditions changing due to weather, or any other changing condition that warrants additional testing in the opinion of the Engineer. **The Agency may determine when additional testing is necessary.**

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

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

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

Only certified cementitious sources are allowed. The Agency Plant Monitor shall watch the material sampling process whenever possible.

D7c Moisture Content

All moisture tests are run by a Plant Level I Technician certified by Mn/DOT.

The Ready-Mix Producer shall determine the moisture content in all fractions of the aggregate according to the Schedule of Materials Control. Changes in the material may require additional testing. The Producer is responsible for all costs associated with determining the moisture content, including equipment, labor, and materials.

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

To obtain approval for the use of a moisture probe, the Producer must calibrate the moisture probe using the method described in 5-694.128 of the Mn/DOT Concrete Manual.

After approval, the Producer is required to verify and chart both the probe moisture content and the oven-dry verification moisture test at a minimum rate of once per week. The Engineer may reduce this rate of verification if the comparisons justify it. The written permission of the Engineer is required to use other methods.

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

D7d Gradations

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

The Ready-Mix Producer shall determine the gradation of the fine aggregate to insure conformity to 3126 and the coarse aggregates to insure conformity to 3137. The Producer is responsible for all costs associated with running gradations including equipment, labor and materials. The Producer shall perform all testing at the plant site to assure immediate resampling and testing of failing material.

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

The Ready-Mix Producer shall document the results of all gradations on the Weekly Concrete Aggregate Report (Mn/DOT Form 2449) utilizing every other column to provide room for Agency companion results. Supporting documentation for all gradations is kept on file at the plant site. The Ready-Mix Producer shall chart all sieves of the coarse aggregate and the 2.36 mm (**#8**), 600 µm (**#30**), and 300 µm (**#50**) sieves of the fine aggregate with procedures outlined in the Concrete Plant I Certification Course. In addition, the Producer shall plot the results of the Agency verification (audit) samples on the chart having the process control tests. The gradation charts are available at the plant site.

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

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

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

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

Allowable variations on percent passing any sieve:

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

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

D7e Concrete Plant Contact Report

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

D7f Non-Compliance

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

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

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

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

S-58 CONCRETE CURING

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

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

S-59 (2301) EXPANSION JOINTS DESIGN E8S

This work consists of furnishing and installing E8 expansion joints in accordance with the applicable Mn/DOT Standard Specifications and the following:

S-59.1 The preformed material utilized for sealing the E8 expansion joints shall be one of the following or an approved equal:

(A) "Pressure-Relief® (Ceramar®)" as marketed by the W.R. Meadows, Inc., P.O. Box 338, Hampshire, IL 60140. www.wrmeadows.com

(B) "EVA-SEAL®" manufactured by E-Poxy Engineered Materials, LLC, 10 Broadway, Albany, NY 12202. www.e-poxy.com

S-59.2 E-8 Pressure relief joint material shall be installed in accordance with the manufacturer's recommendations and as follows:

(A) Expansion joint filler material used for a 100 mm [**4 inch**] pressure relief joint consists of a preformed foam product having minimum dimensions of 115 mm [**4.5 inches**] in width (may be laminated) and 200 mm [**8 inches**] in depth. Each section shall have a minimum length of 3 meters [**10 feet**]. When the concrete depth is greater than the depth of the pressure relief material, fill the void below the material with polystyrene. The material shall be installed under compression with a lubricant adhesive applied to the concrete contact surfaces.

(B) Saw or form the joints 100 mm [**4 inches**] wide by the full-depth of the slab. Inspect to assure that the inside walls of the joint have been sandblasted, are dry, smooth and free of debris and loose particles. Apply tape to the top 25 mm [**1 inch**] of the inside walls to prevent the lubricant adhesive from contaminating the concrete bonding surfaces of the subsequently placed hot pour joint sealer.

(C) Paint the inside walls of the joint with lubricant adhesive at the rate of approximately 1 liter per 4 meters [**1 gallon per 50 lineal feet**] of joint.

(D) Pinch the bottom of the material together and push down into the joint. Walk the material down into the joint; use a sledgehammer and a 2X4 if necessary. When butting two pieces together, paint the ends with lubricant adhesive.

(E) Install the foam relief joint material so that the top surface is depressed to a depth of approximately 22 mm [**7/8 inch**] below the concrete surface. After proper installation, remove the tape and fill the void on top of the foam material with approximately 13 mm [**1/2 inch**] of Mn/DOT 3723 or 3725 hot pour joint sealer to a level of 9.5 mm ± 6.3 mm [**3/8 inch ± 1/4 inch**] below the surface. The hot joint sealer should only slightly melt into the foam pressure relief joint material. To prevent excessive melting of the joint material, place the hot-pour sealer at the lower end of the temperature specification. Check for correct temperature by placing hot pour sealer on a sample of waste foam material.

S-60 (2301) CONCRETE PAVEMENT REHABILITATION (CPR)

This work shall consist of performing concrete pavement repairs and joint/crack sealing in accordance with the applicable provisions of Mn/DOT 2301, the Plan, Concrete Pavement Rehabilitation (CPR) Standard Details, and the following:

S-60.1 GENERAL REQUIREMENTS

The Contractor shall:

(A) Establish traffic control 1-day in advance of the beginning of the rehab operation for rehab surveys and locations.

(B) Replace bituminous shoulder pavement, as directed by the Engineer, as an incidental cost to performing adjacent concrete repairs.

(C) As directed by the Engineer, repair any damage to any in-place pavement, roadway structure, or appurtenance caused by the Contractor's operations prior to final acceptance at no cost to the Agency.

(D) Saw full-depth relief cuts and remove a transverse section 100 mm [**4 inches**] wide by full-width of the slab as the Contractor determines necessary to protect the existing concrete pavement. If the Contractor chooses not to saw a relief cut and damage is caused to the existing concrete pavement, the Contractor shall make repairs as directed by the Engineer, at no cost to the Agency. Prior to opening to traffic, the Contractor shall backfill the void formed after concrete removal with Class 5 or other material as approved by the Engineer. The Contractor shall maintain the backfill material flush (+/-13 mm [+/- **1/2 inch**]) with adjacent concrete.

(E) Use concrete placing and finishing procedures that do not result in rounding of the surface at any joints or headers.

(F) Not place any concrete mixture after October 15th.

(G) Provide a repaired surface tolerance that does not vary by more than 3 mm [**1/8 inch**] from the existing pavement surface as measured with a straight edge placed over the joint. The Contractor shall replace or grind the repair as necessary to correct deficiencies.

(H) Provide a power pick-up broom to sweep the portion of the closed traffic lane prior to opening.

(I) Equip milling machines used for concrete removal with a device for stopping at preset depths to prevent damage to the dowel bars.

(J) Re-establish longitudinal and transverse cracks and joints according to the appropriate repair detail for the situation encountered.

(K) Restore contraction and longitudinal joints by green sawing Type C and D repairs to a depth of 1/3 of the pavement thickness.

(L) Edge adjacent to all inserts in fresh concrete.

(M) Fill overlaps in saw cuts from removal operations with an approved silicone or hot pour joint sealant.

(N) Assure that concrete repairs do not protrude beyond the original cross-section of the pavement by more than 10 mm [**3/8 inch**] by forming or sawing the edges.

(O) Provide surface texturing for all repairs consisting of brooming in the long dimension of the repair in lieu of the requirements of Mn/DOT 2301.3L Surface Finishing, except the Contractor shall tine Type D repairs that abut concrete surfacing that were tined during the original construction.

(P) Insulate patches in cool weather, (below 15°C [**60°F**]) or when in-place pavement temperatures are below 10°C [**50°F**]. When texture planing is required and the temperatures are below 15°C [**60°F**] (night or day), the Contractor shall apply a blanket cure for a minimum of 48 hours after placement and prior to texture planing. The Contractor shall cast beams or cylinders (cured and tested by the Agency) if earlier opening times are required.

(Q) Repair any areas of failure that appear within one (1) month of the original construction or subsequent repair at no cost to the Agency. Failures include (but are not limited to) the loss of bonding to the inplace concrete or crack apparent in the repair other than the desired crack in the newly constructed joint or re-established crack.

S-60.2 TYPE A REPAIRS

This work shall consist of cleaning and sawing transverse joints, longitudinal joints or cracks to the specified width, as detailed in the Plan, in preparations for resealing. The Contractor shall use the type of joint sealant and method of construction shown in the Mn/DOT CPR Standard Detail. The Contractor shall use only approved silicone and hot pour sealants as listed on the Concrete Engineering Unit Website.

The Contractor shall:

(A) Clean, saw, and reseal joints and cracks in texture planed areas only after the concrete texture planning operations are completed.

(B) As approved by the Engineer, clean and remove waste material produced from cleaning, sawing, routing, planing or other operations from the adjacent pavement and remove from the Agency Right-of-Way to avoid unsightly buildup of waste or future maintenance problems such as but not limited to waste impairing drainage systems.

(C) Remove all of the existing joint seal material from the joints insofar as it is possible with ripping teeth, wire brush, sawing or other reasonable equipment to the satisfaction of the Engineer. However, the Contractor shall not use equipment that will cause spalling of the pavement surface beyond the limits of the proposed sawed section.

(D) Widen the existing joint or crack by sawing to a width ±1.6 mm [**±1/16 inch**] of that shown in the Plan and to a depth of ±3 mm [**±1/8 inch**] of that shown in the Plan. The Engineer will designate the widening dimensions.

(E) Thoroughly clean all joints and cracks by water flushing immediately after sawing.

(F) Not place joint sealant when the air temperature is below 5°C [**40°F**], nor when the joint faces show signs of frost.

(G) Assure that the joints or cracks are clean, dry, and free of all incompressible material before sealant is applied. The Contractor shall apply joint sealants in accordance with the Manufacturer's recommendations. The Contractor shall use talc as necessary. The Engineer may direct the Contractor to use a heat lance to dry joints and cracks prior to placing the joint sealant. The Contractor shall sandblast the joint faces after using the heat lance.

(H) Shall place approved closed cell backer rod when necessary.

(I) Use hot pour concrete joint and crack sealer for sealing longitudinal joints

(J) Fill joints or cracks to 3 mm [**1/8 inches**] below the pavement surface plus or minus 1.6 mm [**1/16 inch**]. Any overfilling will require removal and replacement by the Contractor at no cost to the Agency.

SILICONE SEAL CHART - Metric
(Other Polymeric Sealers will have similar quantities)

Joint Width (mm)	Sealant Bead Thickness (mm)	Backer Rod Diameter * (mm)	Minimum Joint Depth (mm)	Backer Rod Placement Depth (mm)	Estimated Quantity (m/L) **	Estimated Quantity (L/m) **
a	b	c	d	e		
6	6	10	25	13	20	0.050
10	6	13	32	13	12	0.083
13	6	16	32	13	8	0.125
16	8	19	38	14	5	0.200
19	10	25	38	16	3.7	0.270
22	11	29	44	17	2.7	0.370
25	13	32	50	19	2.1	0.476
>25	13	35	50+	19	—	—

* Minimum backer rod diameter.
* * Volumes will vary depending on joint design and joint irregularities.
Sealing of joints wider than 32 mm is not recommended. The appropriate Type "B" or "C" repair should be performed.

HOT POUR SEAL CHART - Metric

Joint Width (mm)	Sealant Bead Thickness (mm)	Backer Rod Diameter * (mm)	Minimum Joint Depth (mm)	Estimated Quantity (m/L) **	Estimated Quantity (kg/m) **	Estimated Quantity (m/kg) **
a	b	c	d			
6	6	10	17	22	0.053	18.87
10	10	13	24	10	0.119	8.403
13	13	16	30	5	0.210	4.762
16	16	19	37	3.5	0.329	3.040
19	19	22	43	2.4	0.474	2.110
22	22	25	49	1.8	0.645	1.550
25	25	29	56	1.4	0.843	1.186
29	29	32	62	1.0	1.067	0.937
32	32	35	68	0.9	1.316	0.760
35	35	38	75	0.7	1.593	0.628
38	38	41	81	0.6	1.896	0.527
41	41	44	87	0.5	2.225	0.449
44	44	48	94	0.4	2.580	0.388
48	48	50	100	0.4	2.961	0.338

* Minimum backer rod diameter.

* * Volumes will vary depending on joint design and joint irregularities.

Sealing of joints wider than 32 mm is not recommended. The appropriate Type "B" or "C" repair should be performed.

SILICONE SEAL CHART - English

(Other Polymeric Sealers will have similar quantities)

Joint Width (inches)	Sealant Bead Thickness (inches)	Backer Rod Diameter * (inches)	Minimum Joint Depth (inches)	Backer Rod Placement Depth (inches)	Estimated Quantity (ft/gal) **	Estimated Quantity (lb/lf) **
a	b	c	d	e		
1/4	1/4	3/8	1	1/2	246	0.050
3/8	1/4	2	1-1/4	1/2	149	0.083
1/2	1/4	5/8	1-1/4	1/2	103	0.120
5/8	5/16	3/4	1-1/2	9/16	66	0.188
3/4	3/8	1	1-1/2	5/8	46	0.270
7/8	7/16	1-1/8	1-3/4	11/16	33	0.376
1	1/2	1-1/4	2	3/4	26	0.477
>1	1/2	1-3/8	2+	3/4	--	--

* Minimum backer rod diameter.

* * Volumes will vary depending on joint design and joint irregularities.

Sealing of joints wider than 1-1/4" is not recommended. The appropriate Type "B" or "C" repair should be performed.

HOT POUR SEAL CHART - English

Joint Width (inches)	Sealant Bead Thickness (inches)	Backer Rod Diameter * (inches)	Minimum Joint Depth (inches)	Estimated Quantity (ft/gal) **	Estimated Quantity (lb/lf) **
a	b	c	d		
1/4	1/4	3/8	11/16	268	0.035
3/8	3/8	1/2	15/16	119	0.079
1/2	1/2	5/8	1-3/16	67	0.140
5/8	5/8	3/4	1-7/16	43	0.219
3/4	3/4	7/8	1-11/16	30	0.316
7/8	7/8	1	1-15/16	22	0.430
1	1	1-1/8	2-3/16	17	0.562
1-1/8	1-1/8	1-1/4	2-7/16	13	0.711
1-1/4	1-1/4	1-3/8	2-11/16	11	0.877
1-3/8	1-3/8	1-1/2	2-15/16	9	1.062
1-1/2	1-1/2	1-5/8	3-3/16	7	1.264
1-5/8	1-5/8	1-3/4	3-7/16	6	1.483
1-3/4	1-3/4	1-7/8	3-11/16	5	1.720
1-7/8	1-7/8	2	3-15/16	5	1.974

* Minimum backer rod diameter.

* * Volumes will vary depending on joint design and joint irregularities.

Sealing of joints wider than 1-1/4" is not recommended. The appropriate Type "B" or "C" repair should be performed.

S-60.3 TYPE B REPAIRS

This work shall consist of removing deteriorated concrete at designated Type B repair areas, furnishing, placing, and curing 3U18 concrete to the original slope and grade and reestablishing joints or cracks.

The Contractor shall:

(A) Not place concrete for Type B partial depth repairs at air temperatures below 5°C **[40°F]**.

(B) Not use "Jackhammers" for partial depth removals. Removal hammers are limited to a maximum rated weight of 15.9 kg **[35 lb.]**.

(C) Remove the concrete surface in the designated repair areas to a minimum depth of 50 mm **[2 inches]** and all deteriorated concrete removed to a maximum depth of one-half the pavement thickness.

(D) Remove the concrete surface in the designated repair area by either milling transversely or longitudinally or by delineating the repair area by saw cuts and chipping back the saw cuts to a 30 - 60° angle. The Contractor shall chip-out secondary spalling resulting from milling at no cost to the Agency, otherwise, chipping of the milled edges is not required. The Contractor shall not damage the dowel bars during the removal process. Any damage is the responsibility of the Contractor.

(E) Address corroded and misaligned dowel bars. If dowel bar cross-section loss due to corrosion is slight, the Contractor shall use MC-250 coating or a bridging material approved by the Engineer. If the dowel bars are misaligned or exhibit corrosion to a greater degree, the Contractor shall cut or burn-off the bar. If this involves more than three adjacent dowels, the Contractor shall remove and replace the dowels using the appropriate repair detail. The placement of compression relief material is required to re-establish the joint.

(F) Provide a compression relief saw cut or install compression relief material at the time of placement of the concrete to re-establish joints and cracks at their original locations.

(G) Provide and place a bonding grout to the prepared concrete repair surface consisting of 2 parts portland cement and 1 part sand, mixed with sufficient water to form a slurry with the consistency of thick cream. The Contractor shall mix the grout by mechanical means and apply by brushing or scrubbing (with a stiff bristle broom) onto the in place concrete surface and then immediately placing concrete after grouting. If the grout whitens, the Contractor shall sand blast and regrout. The life of the grout shall not exceed hour.

(H) Furnish, place, finish and cure Grade 3U18 as replacement concrete for all Type B repairs in accordance with the provisions in this Plan and Proposal.

(I) All Type B-2 repair procedures must conform to the procedures for Type B-1 or Type B-3 repair procedures when appropriate.

(J) Saw and seal joints and cracks involving Type B repairs in accordance with the appropriate Type A repair.

Note to Engineer: The practice of using sand to prevent locking the joints together due to concrete infiltration when placing repairs will likely result in a reduced repair life as compared to repairing a joint where the dowels are not exposed and a tight joint exists. Therefore, an early determination is necessary to quantify the extent of this fix to determine if it is a cost effective alternative as compared to a longer lasting full-depth repair. (Contact the Concrete Engineering Unit for advice).

S-60.4 TYPE C REPAIRS

This work shall consist of full-depth concrete removal, installing reinforcing and/or load transfer, furnishing and placing, finishing and curing concrete.

The Contractor shall:

(A) Drill smooth 460 x 25 mm [**18 x 1 inch**] diameter dowel bars or No. 25 reinforcement bars with an approved drill assembly and grouted 225 mm [**9 inches**] into the face of the inplace concrete slab as shown in the Plans. The Contractor shall install individual dowel bars parallel to the inplace grade and the inplace roadway centerline within a tolerance of 3 mm [**1/8 inch**] and to all other dowel bars in the assembly within a tolerance of 1.5 mm [**1/16 inch**].

(B) Use either non-shrink grout or an epoxy anchorages for bonding reinforcing tie bars and dowel bars to in-place concrete (For an approved products list, see www.mrr.dot.state.mn.us\pavement\concrete\products.asp). The Contractor shall clean and dry the drilled holes and place bonding agent into the drilled hole in a manner that will completely fill the void, then push the bar into the hole. The Contractor shall fill any voids with grout and finish smooth and check to assure that the bars are fully set prior to placement of concrete.

(C) Not remove any inserts used in the reestablishment of joints in Type C repairs before 24 hours, except by sawing or as approved by the Engineer

(D) Saw and seal joints and cracks involving Type C repairs in accordance with the appropriate Type A repair.

S-60.5 TYPE D REPAIRS

This work shall consist of sawing and removing inplace concrete; restoration of subgrade; furnishing and installation of dowel bars and reinforcing tie bars; furnishing, placing, finishing and curing concrete; and restoration of joints.

The Contractor shall:

(A) Construct L2KT longitudinal joints unless otherwise directed by the Engineer.

(B) When placing concrete adjacent to inplace concrete pavement joints, protect all ends of transverse joints to the satisfaction of the Engineer to prevent concrete mortar from infiltrating into the existing joints and causing compression spalls.

(C) Saw and seal joints and cracks involving Type D repairs in accordance with the appropriate Type A repair.

S-60.6 CONCRETE MIXTURE REQUIREMENTS

Incorporate concrete into the work for concrete rehabilitation repair areas as indicated in the Plans and at other locations deemed necessary, all in accordance with the applicable provisions of Mn/DOT 2301, Mn/DOT 2461, and the following.

The Contractor shall:

(A) Provide all grades of concrete with an air content of 6.5% plus or minus 1.5%. The Contractor shall not use accelerators when the ambient air temperature exceeds 27°C [**80°F**] without the approval of the Engineer. (Use accelerators with caution, contact the Concrete Engineering Unit).

(B) Proportion the Grade 3U18 concrete mix by weight and mix at the job site in a paddle type mixer; or proportion and mix at the job site by a continuous batching mixing machine designed for this purpose. The Contractor shall include the required admixtures in the concrete mixtures as noted in the Plan.

(C) Incorporate concrete mix designs 3A32HE, 3U27 or 3U28 into the work as indicated in the Plans for all full depth concrete pavement and at other locations deemed necessary by the Engineer.

(D) When required, provide concrete Mix Grades 3U27 and 3U28 using water-reducing accelerator (Type E) as a slump increaser. The mix design shall include the water reducing accelerator solution as part of the total recommended mixing water.

(E) When no early opening time is required, use standard concrete mixes of 3U18 for Type B repairs, and 3A32 or 3A41 for all Type C repairs and Type D repairs.

(F) When early opening times are required, refer to Table 1. Incorporate concrete mix designs 3A32HE, 3U27 or 3U28 into the work for all full depth concrete pavement and at other locations as indicated in the Plans as deemed necessary by the Engineer.

(G) Note that concrete mixes are considered incidental to the work in which they are incorporated.

(H) Note that the Concrete Engineer may approve substitute mixes to the above concrete mix types.

TABLE 1
Concrete Mixes for Early Opening Times

Repair Type	Concrete Mix Grade	Minimum Time to Opening (hours) [1]	Admixture Dosage [2] & Type/ Curing Requirement
B	3U18	24	Maximum Type A
B	3U18	12	40% of Maximum Type E
C	3A32HE	24	Maximum Type A
C	3U27, 3U28	12	40% of Maximum Type E [3]
C	3A32HE	12	40% of Maximum Type E [3]/ Use curing blankets and insulation [4]
D (Less than 15 m [**50 feet**] long)	3U27, 3U28	24	25% of Maximum Type E [3]
D (Less than 15 m [**50 feet**] long)	3A32HE	72	Maximum Type A [5]
D (From 15 m to 60 m long) [**50 feet to 200 feet long**]	3A32HE	72	Maximum Type A [5]
D (From 15 m to 60 m long) [**50 feet to 200 feet long**]	3A32HE	[6]	[5, 6]
D (More than 60 m [**200 feet**] long)	3A32	[6]	[5, 6]
D (More than 60 m [**200 feet**] long)	3A41	[6]	[5, 6]
D (More than 60 m [**200 feet**] long)	3A32HE	[6]	[5, 6]

[1] Providing that ambient and concrete temperatures exceed 15°C [**60°F**].
[2] Recommended dosage is from the manufacturer of the admixture.
[3] Shall be added as a slump increaser.
[4] Materials must meet Mn/DOT 3756 and 3760.
[5] Contact the Concrete Engineering Unit if an earlier opening time is required.
[6] Per Mn/DOT 2301.

S-60.7 MEMBRANE CURING COMPOUND

The following is hereby added to Mn/DOT 3754:

Immediately after final finishing, all concrete shall be cured in accordance with Mn/DOT 2531.3G2. Either Membrane Curing Compound meeting Mn/DOT 3754 AMS or Extreme Service Membrane Curing Compound meeting Mn/DOT 3755 shall be used. Only one type of curing compound shall be used on the entire Project. Hudson sprayers may be used if the coverage rate is doubled and the curing material is from an agitated source.

S-60.8 MEASUREMENT

Measurement of quantities is made by the Engineer.

The Engineer will:

(A) Measure pavement joint and crack repairs separately by length for each type of repair performed as specified.

(B) Measure pavement surface repairs and spot full depth joint repairs separately by the area of each specific type of repairs performed as specified.

(C) Measure and pay Type B repairs by the 0.1 m^2 [**square foot**] to the nearest 0.01 m^2 [**square foot**].

(D) Reserve the right to direct the Contractor to construct a joint repair Type B-3 centered on the longitudinal or transverse joints or on one or both sides of the longitudinal or transverse joint to provide for the situation where there are many spalled joints where the removal area is greater than 250 mm [**10 inches**] wide. (For instance: If the joints had extensive spalling that was 500 mm [**20 inches**] wide and 3.6 m [**12 feet**] long, payment is for 7.2 m [**24 feet**] of B-3 rather than 3.6 m [**12 feet**] of B-3 and the rest under B-2A Spot Surface Repair).

(E) Provide measurement for payment for overlapping Type B-1, Type B-2C, and Type B-3 repairs for the most expensive repair only. Measure for separate payment any Type B-2A or B-2B repairs (square meter [**square foot**]) adjacent to other Type B repairs (meter [**linear foot**]) outside the limits of those Type B repairs.

(F) Pay the Contractor at a measured quantity of 40% of the Type B item plus the full cost for the Type C repair, if after removal, the Engineer changes a Type B repair to a Type C repair.

(G) Pay Type C full-depth joint repair listed as a linear foot pay item. The Engineer will pay for any repair from 0 m to 3 m [**0 to 9.5 feet**] outside of the 1 m [**3'-6"**] minimum width as Item 2301.501 (Concrete Pavement Repair Type CX) paid by the square meter [**square yard**]. Type CX shall include all costs involving removal and replacement, including the cost of the structural concrete and structural steel. If the total length of the repair, including the 1 m [**3'-6"**] minimum is greater than 4 m [**13 feet**], the first 1 m [**3'-6"**] is paid as Type C meter [**linear foot**] and the remainder as Pavement Replacement Type D.

(H) Measure and pay the restoration of cracks and joints through Type B, C or D repairs under the pay item for the appropriate Type A repair in addition to payment for the Type B, C, or D repair.

S-60.9 PAYMENT

Payment for the various type of pavement crack, joint and surface repairs is made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which is, in each instance, compensation in full for costs of all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

The provisions of Mn/DOT 1907 are hereby modified to the extent that when the actual usage of joint sealer material is less than specified, the surplus material shall remain the property of the Contractor. The Contractor is paid 15% of the material cost in lieu of handling and transportation costs, unless otherwise directed by the Engineer.

Item No.	Description	Unit
2301.529	Reinforcement Bars (Epoxy Coated)	kilogram [**pound**]
2301.531	Expansion Joints Design E8S	meter [**linear foot**]
2301.538	Dowel Bar	each
2301.603	Joint Repair (Type A-1H) 1/2"	meter [**linear foot**]
2301.603	Joint Repair (Type B-3)	meter [**linear foot**]
2301.603	Crack Repair (Type B-1)	meter [**linear foot**]
2301.603	Crack Repair (Type A-4H)	meter [**linear foot**]
2301.603	Mid-Panel Repair (Type C-2)	meter [**linear foot**]
2301.603	Longitudinal Repair Special (Type B-2D)	meter [**linear foot**]
2301.603	Longitudinal Joint Repair (Type A-5H) 1/2"	meter [**linear foot**]
2301.603	Edge Repair (Type B-2C)	meter [**linear foot**]
2301.603	Expansion Joint Special (Type C-3BS)	meter [**linear foot**]
2301.604	Pavement Replacement (Type CX)	square meter [**square yard**]
2301.604	Pavement Replacement Single Lane (Type D-1)	square meter [**square yard**]
2301.604	Pavement Replacement Two Lane (Type D-2)	square meter [**square yard**]
2301.608	Seal Concrete Pavement Joint (3725)	kilogram [**pound**]
2301.618	Spot Surface Repair (Type B-2A)	[**square foot**]
2301.618	Surface Repair (Type B-2B)	[**square foot**]
2301.618	Repair Special (Type B-2E)	[**square foot**]

S-61 (2301) CONTRACTION JOINT REPAIR AND MID-PANEL REPAIR

This work shall consist of performing concrete joint repairs in accordance with the applicable provisions of Mn/DOT 2301, the Plan details, the construction notes set forth in the Plans, and the following:

S-61.1 The Contractor shall remove the unconfined and/or loose deteriorated concrete and bituminous at the pavement joints, cracks and patches by power sweeping and air blowing (including removing loose materials from cracks and cavity areas) with 175 cubic feet per minute air flow and 100 psi nominal air pressure as directed by the Engineer.

S-61.2 Unstable concrete fragments less than 12.0 inches in surface diameter shall be removed as directed by the Engineer and may require some light jack hammering. Removal of concrete fragments less than 12.0 inches in diameter shall be incidental to the Bituminous Patching Mixture (Mn/DOT 2360). After cleaning the surface, the Contractor shall follow up closely with Bituminous Patching. Removal of concrete fragments larger than 12.0 inches in surface diameter will be paid for as pavement removal.

S-61.3 Depressions, after blowing and sweeping operations, that are greater than 1.5 inches deep and 4.0 inches wide, and cracks and joints that are greater than 1.0 inch wide shall be patched with Bituminous Patching Mixture (Mn/DOT 2360) as directed by the Engineer. Patching mixture shall meet the requirements of Wear Course Mixture SPWEB230B (Mn/DOT 2360) and shall be compacted by the "Ordinary Compaction Method" including rolling with a pneumatic tired roller.

S-61.4 Polymeric joint sealants (silicones, etc.) shall be used in all transverse joints and Mn/DOT 3723 - Hot Poured Joint Sealing Material shall be used in all longitudinal joints and in cracks. The type of pavement repair to be used at any location will be as directed by the Engineer.

S-61.5 If the Plans and Specifications require 3725 sealant in transverse joints, 3725 sealant shall also be used in longitudinal and expansion joints to avoid potential confusion caused by different spec hot-pour sealers (3723 & 3725) on the job site.

S-61.6 If the type of sealant for transverse joints is not specified elsewhere in the Contract, the Contractor shall select an approved moisture cured polymeric sealant from the list of approved products on file at Mn/DOT's concrete office.

S-61.7 The Contractor shall adhere to the Construction Notes for Concrete Joint Repair in the Plan.

S-61.8 MEASUREMENT AND PAYMENT

Contraction joint repair will be measured separately by the length of each type of repair performed as specified. Payment for the various types of contraction joint repairs will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for the costs of all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

Item No.	Description	Unit
2301.603	Contraction Joint Repair (Type C-3D)	meter [**linear foot**]

S-62 (2301) CONCRETE TEXTURE-PLANING

This work shall consist of planing and texturing the surface of the existing concrete pavement, as shown in the Plan, in a longitudinal direction as directed by the Engineer. The intent of this specification is to improve skid resistance, correct surface defects and promote drainage. Existing joint seals may be removed prior to or in conjunction with this operation. However, tolerances for joint sealing shall be measured from the resulting planed surface.

S-62.1 The entire surface area of pavement designated shall be planed in a manner that results in uniform texture. The surface shall have a finished texture with grooves between 2.5 mm [**0.097 inch**] and 3.3 mm [**0.130 inch**], and 2.03 mm [**0.080 inch**] and 2.92 mm [**0.115 inch**] apart. The width of kerf shall be adjusted to maximize skid resistance. The grooves shall not be less than 0.787 mm [**0.031 inch**] or more than 2.92 mm [**0.115 inch**] in depth. The actual textured area of any selected 0.6 meter [**2 foot**] by 30 meter [**100 foot**] longitudinal area of pavement shall not be less than 98% of the selected area.

S-62.2 All concrete repairs to the existing concrete pavement must be made before the concrete-texture planing operation is commenced. All repairs, except "TYPE D" repairs in excess of 9 meters [**30 feet**] will have a texture-planed surface. Those "TYPE D" repairs in excess of 9 meters [**30 feet**] shall have a 5 meter [**15 foot**] minimum texture-planed runout at each end to eliminate bumps.

S-62.3 Residue and excess water resulting from this operation shall be removed from the roadway by vacuuming. Residue and water shall not be permitted to either flow across lanes occupied by traffic or to flow into gutters or other drainage facilities. All materials will be disposed of outside of the right of way unless otherwise directed by the Engineer.

S-62.4 Using an approved texture planing grinding device consisting of multiple diamond blades, the Contractor shall remove all areas represented by:

(A) High points having deviations of 7.62 mm [**0.3 inches**] or more,

(B) Lanes with an average International Roughness Index exceeding 1.42 mm/km [**90.00 inches**] per lane mile taken in 0.1609 km [**0.10 mile**] increments, as measured with the Inertial Profiler in the longitudinal direction, or

(C) Lanes with 7.62 mm [**0.3 inches**] in 0.9144 m [**3 feet**] measured with a 3.038 meter [**10 foot**] straight edge in the transverse direction.

After removing all deviations as described, additional corrective work and surface testing shall be performed by the Contractor, if necessary, to achieve the required surface smoothness. All costs relative to the Contractor providing the Inertial Profiler and the appropriate test results are included in the unit bid price for Item 2301.604 (Concrete Planing).

S-62.5 MEASUREMENT

Smoothness will be measured with an Inertial Profiler (IP), which produces both an International Roughness Index (IRI) value and a profilogram (profile trace of the surface tested). The IP shall conform to the Class 1 requirements of ASTM E950-94 and must be certified according to the most recent procedure on file in the Concrete Engineering Unit. For pavement evaluation, one pass shall be made in the each wheel path of each lane of the mainline pavement. The IP shall be run in the direction the traffic will be moving. Each lane shall be tested and evaluated separately. The Engineer shall determine the length in kilometers [**miles**] for each mainline traffic lane. The IP shall be operated at the optimum speed as defined by the manufacturer.

S-62.6 SMOOTHNESS TESTING

The Contractor shall furnish a properly calibrated, documented, and Mn/DOT certified IP. The IP shall be equipped with automatic data reduction capabilities for determining IRI values. Computer programs used to calculate the IRI statistic from a longitudinal roadway profile shall follow the procedure developed by the World Bank for a quarter-car simulation as described in NCHRP Report 228.

Mn/DOT certification documentation shall be provided to the Engineer on the first day the IP is used on the Project. Inertial Profiler settings are on file in the Concrete Engineering Unit. The Contractor shall furnish a competent operator, trained in the operation of the IP and evaluation of both California Test Method 526 and International Roughness Index.

The Contractor shall remove all objects and foreign material on the pavement surface prior to surface evaluation.

Perform each run on a length of pavement as long as practical and measure in the direction the traffic will be moving. Each run shall be made continuously. Bridge approach panels and bridge surfaces are exempt from these requirements; however, paving start-up areas are not exempt.

The measured pavement surface profile will be divided into sections that represent continuous placement. Each run will be separated into sections 0.1609 km [**0.1 mile**] in length. Final sections in a run that are less than 0.1609 km [**0.1 mile**] but that are longer than 7.62 m [**25 feet**] shall be evaluated as an independent section, but incentives will be prorated for length.

Determine the average IRI by averaging the two wheel path IRI results in each lane. An IRI value shall be computed for each segment of 7.62 m [**25 foot**] or more. The IRI value will include the 7.62 m [**25 foot**] at the ends of the section only when the Contractor is responsible for the adjoining surface. The IRI values shall be reported in units of m per km [**inches per mile**]. Both m per km and inches per mile shall be reported with two digits right of the decimal. Follow Mn/DOT rounding procedures per the Concrete Manual section 5-694.002.

The Contractor shall submit the graphical trace, a summary of the bump(s)/dip(s) locations, the magnitude of the bump(s)/dip(s) and each section IRI value with the signature of the Operator to the Engineer on the same day as the profiling was conducted.

S-62.7 RETESTING

The Engineer may require any portion or the total Project to be retested if the results are questioned. The Engineer will decide whether Mn/DOT, an independent testing firm (ITF), or the Contractor will retest the roadway surface.

If the retested IRI values differ by more than 10% from the original IRI values, the retested values will be used as the basis for acceptance and any incentive/disincentive payments.

If the Engineer directs the Contractor or an independent testing firm to perform retesting and the original results are found to be accurate, the Department will pay the Contractor or the independent testing firm $62.14 per lane km [**$100 per lane mile**] that is retested, with a minimum charge of $500.00. The Contractor will be responsible for any costs associated with retesting if the original values differ by more than 10% from the retested values.

S-62.8 The Contractor shall submit a **final** spreadsheet summary of the smoothness data to the Engineer within 5 calendar days after texture planing is completed. The Contractor shall also submit computer files in ERD format that represent the raw data from the each run. The Contractor shall sign the summary report. The spreadsheet summary shall be in tabular form, with each 0.1609 km [**0.1 mile**] section occupying a row.

Each row shall include the following:

1. The beginning and ending station for the section,
2. The length of the section,
3. The final IRI value for the section,

Each continuous run will occupy a separate table and each table will have a header that includes the following:

1. The Project number,
2. The roadway number or designation,
3. A lane designation,
4. The date of the final smoothness runs, and
5. The beginning and ending station of the continuous run.

Software to summarize the data is available from the Mn/DOT Concrete Engineering Unit at www.mrr.dot.state.mn.us/pavement/concrete/concrete.asp.

The Contractor will be responsible for all traffic control associated with the testing and any corrective action (when applicable) that is required of the final pavement surface.

If permanent pavement marking are damaged or destroyed by texture planing, they will be replaced at no cost to the Department.

Joint sealant that has been damaged by texture planing on concrete pavement as determined by the Engineer shall be repaired and replaced at no expense to the Department.

S-62.9 Measurement will be made to the nearest square meter (**square yard**) of concrete area planed and textured based on the lane width times the length planed. Payment will be made under Item 2301.604 (Concrete Planing) at the Contract bid price per square meter (**square yard**), which shall be compensation in full for all costs relative thereto including, but not limited to, the specified texture planing.

S-63 (2301) DRILL AND GROUT REINFORCEMENT BAR (EPOXY COATED)

This work shall consist of drilling and grouting epoxy-coated reinforcement bars into the existing concrete pavement in accordance with the applicable Mn/DOT Standard Specifications, as detailed on Sheet No. 118 of the Plan, and the following:

S-63.1 This work consists of **tying** new concrete pavement to existing concrete pavement.

S-63.2 Items included with this Pay Item include the required epoxy-coated reinforcement bars, bituminous felt, approved non-shrinking grout, and the drilling and grouting operation.

S-63.3 MEASUREMENT AND PAYMENT

Measurement will be made by the number of reinforcement bars drilled and grouted as specified. Payment will be made under Item 2301.608 (Drill and Grout Reinforcement Bars (Epoxy Coated)) at the Contract bid price per kilogram **[pound]**, which shall be compensation in full for all costs relative thereto including, but not limited to, all materials and labor necessary to drill and grout the reinforcement bar as specified.

S-64 (2360) PLANT MIXED ASPHALT PAVEMENT

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

S-64.1 Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

Type SP 12.5 Wearing Course SPWEB340L

S-64.2 Pavement smoothness requirements of 2360.7C **will not** apply on this Project. The requirements of 2360.7B (Straight edge specification) **will** apply.

S-64.3 **2360.4F (2a)1**of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** is hereby modified with the following:

1. Percent passing on sieves listed in Table 2360.2-E and the following sieves: 1.18 mm **(#16)**, 0.600 mm **(#30)**, 0.300 mm **(#50)**, and 0.150 mm **(#100)**. The test results for these additional sieves may be included on the daily Test Summary Sheet or on a separate Summary Sheet. If the test results for the additional sieves are recorded on a separate Summary Sheet, the test results must be identified such that there is a direct and easy correlation with the test results of the sieves listed in Table 2360.2-E and the other mixture property tests for that sample.

S-64.4 The fourth paragraph of **2360.7C5** of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** is hereby deleted and replaced with the following:

When pavement smoothness evaluation by Equation C is specified the Engineer may require that the Contractor, at no expense to the Department, correct segments with an IRI greater than 1.34 m per km **[85 inches/mile] or the** Engineer may assess a $280 per 0.1 km **[$450 per 0.1 mile]** penalty in lieu of requiring corrective work.

S-64.5 **2360.6** of the attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** is hereby deleted and replaced with the following:

2360.6 PAVEMENT DENSITY

A General

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

B Maximum Density Method

All courses or layers of plant mixed asphalt mixtures for which the Maximum Density Method is used shall be compacted to a density not less than the percentage shown in the Table of Required Density, Tables 2360.6-B2 and 2360.6-B2 LJ, for the applicable mixture and course and longitudinal joint type (i.e.

confined or unconfined). Longitudinal joint density will not be evaluated on those lifts, which have a 1% reduced density requirement. If the Contractor elects to waive the 1% reduced density requirement as per 2360.6B4, then the Longitudinal Joint Density will be a requirement.

B1 Maximum Density Determination

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

B1a Pavement Density Determination

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

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

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

B2 Required Density

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

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

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

If the Plans or Special Provisions indicate a narrow shoulder is to be compacted by the Maximum Density Method, the minimum required density is listed in Table 2360.6-B2. If the minimum required

density of the shoulder is different than the driving lane, the tonnage placed on the shoulder shall be delineated in separate lots from the driving lane.

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

Table 2360.6-B2
Required Minimum Lot Density (Mat)

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

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

Table 2360.6-B2 LJ
Longitudinal Joint Density Requirement

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

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

B2a Lots & Core Locations

Table 2360.6-B2a
Lot Determination

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

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

Compacted Mat Density

Divide the days production into equal lots as shown in Table 2360.6-B2a. The Engineer may require additional density lots be established to isolate areas affected by equipment malfunction/breakdown, heavy rain, or other factors that may affect the normal compaction operations. Obtain four cores in each lot.

Two cores will be taken from random locations selected by the Engineer. The third and fourth cores (the companion cores) shall be taken within 0.3 meters [**1 foot**] longitudinally from the first two cores. All companion cores shall be given to the Department Street Inspector immediately upon completion of coring and sawing. The random locations will be determined by the Engineer using statistically derived stratified random number tables or other approved methods of random number generation. These will also be used for partial lots. If the random core location falls on a longitudinal joint cut the core with the outer edge of the core barrel 0.3 meters [**1 foot**] away (laterally) from the edge of the top of the mat (joint). Cores for compacted mat density will not be taken within 300 mm [**1 foot**] of any longitudinal joint. The Contractor shall be responsible for maintenance of traffic, coring, patching the core holes, and sawing the cores if necessary to the proper thickness prior to density testing.

Longitudinal Joint Density

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

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

B3 Core Testing

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

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

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

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

Companion Core Testing

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

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

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

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

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

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

B4 Maximum Density Acceptance and Payment Schedule

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

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

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

Table 2360.6-B4 LJ
Payment Schedule for Maximum Mat Density

% Density [2] SP Wear, and SP Shld (4% Void)	% Density [2] SP Non-Wear, SP Shoulders (3% Void)	**Pay Factor A**
93.6 and above	94.6 and above	1.04 [3]
93.1 - 93.5	94.1 - 94.5	1.02 [3]
92.0 - 93.0	93.0 - 94.0	1.00
91.0 - 91.9	92.0- 92.9	0.98
90.5 - 90.9	91.5 - 91.9	0.95
90.0 - 90.4	91.0 - 91.4	0.91
89.5 - 89.9	90.5 - 90.9	0.85
89.0 - 89.4	90.0 - 90.4	0.70
Less than 89.0	Less than 90.0	See 2360.6 B5

Table 2360.6-B4A [1]
1% Reduced Table

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

Table 2360.6-B4a LJ [5]
Payment Schedule for Longitudinal Joint Density
(SP Wear, and SP Shld (4% Void))

% Density [2] Long. Joint (Confined Edge)	**Pay Factor B** (Confined Edge)	% Density [2] Long. Joint (Unsupported Edge)	**Pay Factor C** (Unsupported Edge)
91.6 and above	1.02 [2]	89.6 and above	1.02 [2]
91.1-91.5	1.01 [2]	89.1-89.5	1.01 [2]
89.0-91.0	1.00	86.5-89.0	1.00
88.0-88.9	0.98	85.5-86.4	0.98
87.5-87.9	0.95	85.0-85.4	0.95
87.0-87.4	0.91	84.5-84.9	0.91
86.5-86.9	0.85	84.0-84.4	0.85
86.0-86.4	0.70	83.5-83.9	0.70
Less than 86.0	0.50	Less than 83.5	0.50

Table 2360.6-B4b LJ [5]
Payment Schedule for Longitudinal Joint Density
(SP Non-Wear, and SP Shoulders (3% Void))

% Density [2] Long. Joint (Confined Edge)	**Pay Factor B** (Confined Edge)	% Density [2] Long. Joint (Unsupported Edge)	**Pay Factor C** (Unsupported Edge)
92.6 and above	1.02 [2]	90.6 and above	1.02 [2]
92.1-92.5	1.01 [2]	90.1-90.5	1.01 [2]
90.0-92.0	1.00	87.5-90.0	1.00
89.0-89.9	0.98	86.5-87.4	0.98
88.5-88.9	0.95	86.0-86.4	0.95
88.0-88.4	0.91	85.5-85.9	0.91
87.5-87.9	0.85	85.0-85.4	0.85
87.0-87.4	0.70	84.5-84.9	0.70
Less than 87.0	0.50	Less than 84.5	0.50

(1) Minimum reduced by one 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 6.35 metric ton [**7 ton**] or less spring load restriction (roadway includes shoulders). Minimum reduced by one percent on the first lift constructed on PCC pavements (reduced density cannot be waived).

(2) In calculating the percent of maximum specific gravity, report to the nearest tenth.

(3) The payment in this portion of the specification shall apply only if the day's weighted average individual production air voids are within - 0.5 percent of the target air void value. The weighted average air voids shall be based on all the mixture production tests (2360.4e) for the corresponding day and shall be weighted by the tons the corresponding test represents.

(4) The HMA material represented by the lot shall be paid at a 70% pay factor, unless a single core density is less than 87.0% of the maximum specific gravity (Gmm). If a single core density is less than 87.0% of Gmm, the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. Reduced payment will be 50 percent of the Contract bid price. If the mixture is to be removed and replaced, the Contractor at his expense will remove and replace with mixture that meets the density requirement. The limits of the area to be removed and replaced will be determined by additional core samples. These additional core samples shall be taken at the same offset from centerline as the original core; unless the original low density core was taken within 0.45 m [**1.5 feet**] of an edge of the paver pass. In that case, the additional cores shall be taken 0.45 m [**1.5 feet**] from the edge of the paver pass. The densities shall be determined at 15 m [**50 foot**] intervals, both ahead and back of the point of unacceptable core density (less than 87.0% of Gmm), until a point of acceptable core density (87.0% of Gmm or greater) is found. If the incremental core density testing extends into a previously accepted lot, removal of the unacceptable material will be required; however, the results of these tests shall not be used to recalculate the previously accepted lot density. All costs incurred from additional coring and testing, resulting from unacceptable core density, will be paid by the Contractor. The unacceptable pavement area is to be computed as the product of the longitudinal limits so determined by the 15 m [**50 foot**] cores and the full width of the paver pass, laying in the traffic lane or lanes. Shoulders shall be exempt from this calculation unless density failure occurred in the shoulder area.
After the unacceptable material (core density less than 87.0% of Gmm) has been removed and replaced, the density of the replacement material will be determined by the average of two cores. Payment for the replacement material will be in accordance with Tables 2360.6-B4 or 2360.6-B4A, whichever applies. There will be no payment for the material removed. The remainder of the original lot shall have a 70% pay factor.

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

Pay Factor Determination

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

Case 1) Total Pay Factor = (Pay Factor A) X (Pay Factor B) X (Pay Factor C)
Case 2) Total Pay Factor = (Pay Factor A) X (Pay Factor B) X (Pay Factor B)
Case 3) Total Pay Factor = (Pay Factor A) X (Pay Factor C) X (Pay Factor C)

Where: Pay Factor A is for mat density
Pay Factor B is confined edge density, and
Pay Factor C is for unsupported edge density

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

C Ordinary Compaction Method

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

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

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

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

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

shall be developed to determine the optimum rolling pattern. The Contractor shall furnish documentation of the growth curve to the Engineer.

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

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

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

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

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

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

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

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

C1 Rollers

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

C2 Steel-Wheeled Rollers

Steel-wheeled rollers shall be self-propelled and has a minimum total mass of 7.3 metric tons [**8 tons**], or as otherwise specified in the Contract. When vibratory rollers are used, they shall produce 45 kN per meter [**3,085 lbf per foot**] of width. The frequency should be at least 2400 vpm and amplitude setting low. The roller shall be capable of reversing without backlash and shall be equipped with spray attachments for moistening all rollers on both sets of wheels.

C3 Pneumatic-Tired Rollers

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

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

C3a Vibratory Pneumatic-Tired Rollers

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

C4 Trench Rollers

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

C5 Mixture Temperature Controls

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

Table 2360.6-C5
Mixture Temperature Control

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

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

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

S-64.6 BASIS OF PAYMENT

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

If the production lab density at the design gyrations at the recommended or established asphalt content is in excess of 2565 kg/m^3 [**160 pounds per cubic foot**], payment for mixture will be calculated at the following percent of the Contracted unit price.

% Payment = {100 - [{100 x (production density at design gyrations - 2565)} / 2565]}
% Payment = {100 - [{100 x (production density at design gyrations - 160)} / 160]} ENGLISH

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

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

S-64.7 Payment for the item of asphalt mixture production at the Contract unit price of mixture produced shall be compensation in full for all costs of producing the mixture and loading it on board the Department's trucks at the mixing plant. The provisions of Mn/DOT 1903 are modified to the extent that the Department will not make a price adjustment in the event of increased or decreased quantities of asphalt mixture items.

S-64.8 Payment for plant mixed asphalt surface will be made on the basis of the following schedule:

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

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

S-65 (2411) CONCRETE BARRIER WALL

This work shall consist of constructing a concrete barrier wall between the pier columns underneath the Broadway Street Bridge (Bridge No. 27886) in accordance with the applicable Mn/DOT Standard Specifications, as shown in the Plan, and the following:

S-65.1 The concrete barrier wall shall be constructed as shown on Standard Plan sheet No. 5-297.610 (Sheet No. 45 of the Plan), and Sheets No. 113-114 of the Plan.

S-65.2 Measurement will be made from face of pier to face of pier, by the length of wall constructed, as specified. Payment will be made under Item 2411.603 (Concrete Barrier Wall) at the Contract bid price per meter [**linear foot**], which shall be payment in full for all costs incidental thereto.

S-66 (2411) CONCRETE BARRIER WALL-DESIGN SPECIAL

This work shall consist of constructing four (4) separate concrete barrier walls in front of the pier columns underneath the University Avenue Bridge (No. 27882), and the 4th Street Bridge (No. 27883), in accordance with the applicable Mn/DOT Standard Specifications, as shown in the Plan, and the following:

S-66.1 CONSTRUCTION REQUIREMENTS

The concrete barrier wall shall be constructed as shown on Sheets No. 115-126 of the Plan.

S-66.2 GROUTED ANCHORAGES FOR PIER PROTECTION BARRIERS

Each anchorage shall consist of drilling and grouting a reinforcement bar into the inplace concrete. The holes for the anchorages shall be drilled to the diameter and depth given in the Plans. Grout shall be a type formulated for this usage and approved by the Engineer.

S-66.3 Front anchorages at the *exterior* footings shall be placed 6 inches from the front edge of the footing. Front anchorages at the *interior* footings shall be placed in line with the vertical reinforcement. Concrete cover (for new concrete) for all anchorages shall not be less than 2 inches.

S-66.4 PULLOUT TESTS

The reinforcement bar anchorages shall have an *ultimate* pull out strength of 29,000 pounds, and shall be installed in sound concrete to a minimum depth of 7 inches.

(A) Laboratory tests, that include static load tests for ultimate pullout strengths, shall be performed on anchorage systems that are subject to tensile loads. The tests, in accordance with ASTM E 488, shall be performed and certified by an independent testing laboratory. The Contractor shall furnish the Engineer with the test reports and the specification sheets that are prescribed by ASTM E 488.

(B) The Contractor shall demonstrate the anchorage system for drilled-in anchorage systems at the first site of field installation prior to actual use in the Project. The demonstration shall include installation and a static tension test in the presence of the Engineer, in accordance with test procedures prescribed in ASTM E 488. No portion of the testing device shall bear on the concrete surface within a distance equal to the anchorage embedment depth.

(C) Three (3) anchorages shall be tested to not less than ½ the required minimum ultimate pull out strength. Failure of an anchorage test will require a modification of installation procedures or use of a different anchorage system.

S-66.5 Measurement will be made by the length of concrete barrier wall constructed as specified. Payment will be made under Item 2411.603 (Concrete Barrier Wall – Design Special) at the Contract bid price meter **[linear foot]**, which shall be payment in full for all costs incidental thereto.

S-67 (2433) RESEAL JOINT TYPE E8

This work shall consist of furnishing all materials, labor, and equipment required to reseal the Type E8 joints at the end of each approach panel in seven (7) locations as shown in the Plans and described below. For all other Type E8 Joints in other locations, see the Bridge Plans. This work shall be performed in accordance with Mn/DOT 2301, the Plan, and the following:

S-67.1 The Contractor shall reseal Type E8 Joints at the following locations under this Plan:

1. Center Line MEDIAN35W 77+93 5.5'LT-5.5'RT, Bridge No. 9340
2. Center Line LORSB35W 160+60 24'LT-24'RT, Bridge No. 27887
3. Center Line LORSB35W 165+49 33'LT-24'RT, Bridge No. 27887
4. Center Line LOR2-NB35W 158+97 12'LT-24'RT, Bridge No. 27888
5. Center Line LOR2-NB35W 162+67 12'LT-24'RT, Bridge No. 27888
6. Center Line LORSB35W 176+39 12'LT-24'RT, Bridge No. 27893
7. Center Line LOR2-NB35W 172+57 12'LT-24'RT, Bridge No. 27893

S-67.2 The Contractor shall saw the roadway panel full depth parallel along the in place E8 joint as needed to restore the full joint width to 4 inches. All debris, loose concrete, old preformed filler, and sealant shall be removed from the joint before cleaning. The joint faces shall be cleaned and dried by sandblasting and air blasting. Prior to sealing, the joint shall be filled with a preformed joint material Mn/DOT 3702.

S-67.3 Mn/DOT 3725 hot pour sealant shall be used. Top of sealer shall be installed flush to 1/8 inch below top of pavement surface. See Plan Sheets No. 38 and 39 (Standard Plan Sheet No. 5-297.221 (Pavement Joints)) for full details.

S-67.4 Measurement will be by the length of Type E8 joints resealed as specified. Payment will be made under Item 2433.603 (Reseal Joint Type E8) at the Contract bid price per meter [**linear foot**], which shall be compensation in full for all costs incidental thereto.

S-68 (2461) STRUCTURAL CONCRETE

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

S-68.1 Mn/DOT 2461.4A4a and 2461.3B3 are hereby deleted and the following inserted therefore:

4A4a Water Content

Water content of the concrete shall be the minimum that will produce the desired consistency. The water content shall consist of the free water carried by the aggregate plus the water added at the mixer, and may also include the water used in making extremely dilute admixture solutions.

The Engineer will test the concrete for consistency as often as may be necessary during the progress of the work. The Department reserves the right to reject any concrete batch the consistency of which is outside of the slump range as listed in Table 2461-2. When any test shows the slump to be in excess of the upper limit of the slump range, the concrete represented by that test will be rejected unless adjustments satisfactory to the Engineer are made in the concrete prior to use.

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

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

(2) Concrete with water reducer
When using an approved Type A water reducer at the manufacturer's recommended dosage rates listed on the Mn/DOT Concrete Unit Website, the values for the slump shall meet the range as specified below in Table 2461-2 for a slump range **with** water reducer. **No tolerances shall be applied to the slump range.**

TABLE 2461-2
SLUMP RANGE DESIGNATION

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

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

Concrete Placed by the Slip-Form Method

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

Non Conformance

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

Should any non-conforming material be inadvertently placed in the work, it will not be accepted for payment at Contract prices but will be subject to the following tables governing acceptance and payment provided the material was placed to the satisfaction of the Engineer.

Otherwise the determination will be made according to other procedures addressed in 1503. The price reduction will represent only the quantity of material represented by the sample and actually used.

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

GENERAL CONCRETE*

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

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

BRIDGE DECK CONCRETE

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

LOW SLUMP BRIDGE DECK CONCRETE
12 mm to 25 mm **(1/2 inch to 1 inch)** specified

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

LOW SLUMP CONCRETE - PATCHING
12 mm to 25 mm (**1/2 inch to 1 inch**) specified

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

S-69 (2471) STRUCTURAL METALS

The provisions of Mn/DOT 2471 are modified with the following:

S-69.1 The Contractor is hereby referred to Section SB-14 (STRUCTURAL METALS) in Division SB which is attached to this Proposal. The provisions in SB-14 (STRUCTURAL METALS) shall be applicable to the entire Contract.

S-70 (2502) SUBSURFACE DRAINAGE SYSTEM

This work shall consist of furnishing and installing 8 inch PVC Drain Pipe and 8 inch PVC Perforated Pipe to construct subsurface drains in accordance with Mn/DOT 2502, as shown in the Plans, and the following:

S-70.1 This drain is intended to control high groundwater conditions. Unless otherwise specified by the Engineer, the Contractor shall install the Subsurface Drainage system in locations as shown in the Plans.

S-70.2 There are two areas defined as Water Seepage Area 1 and Water Seepage Area 2 shown in the Plan differing only in the way the trench is finished at grade. See Sheet No. 72 of the Plan for locations. See Sheet No. 154 of the Plan for details.

(A) Water Seepage Area 1: Located NB I-35W in two areas beginning at Centerline LOR2-NB35W 127+56 43' RT to 129+11 52' RT and 130+41 65' RT to 132+69 83' RT. Place bottom of the trench 3 feet to 4 feet below grade where records and recent borings indicate bedrock. Grade the berm between the back curb and the toe of the back slope, to drain to existing drop inlet. All Perforated Pipe installation in this area shall be finished off with a minimum cover of 6 inches of Topsoil and Turf restoration as shown in the Plan details.

(B) Water Seepage Area 2: Located SB I-35W beginning at Centerline LOR3SB35W 123+70 22' LT to 128+52 73' LT. For the subsurface drains located behind the curb, place the bottom of trench 3 feet to 4 feet below grade where records and recent borings indicate bedrock. For the subsurface drains on the slope, place the bottom of trench 5 feet to 8 feet below grade. All Perforated Pipe installation in this area shall be finished off with a minimum cover of 12 inches of Class I Riprap as shown in the Plan details.

S-70.3 MATERIAL REQUIREMENTS

(A) Suitable Grading Material: This Project will have an excess of clean granular material available on site to be used for backfilling of Non-Perforated Pipe as detailed in the Plans.

(B) Coarse Filter Aggregate shall conform to Mn/DOT 3149.2H . Coarse filter aggregate shall be a free draining mineral product, excluding crushed carbonate quarry rock, crushed concrete, and salvaged bituminous mixture, and meeting the following gradation requirements (considered incidental):

Sieve Size	Percent Passing
25.0 mm (**1 inch**)	100
19.0 mm (**¾ inch**)	85-100
9.5 mm (**⅜ inch**)	30-60
4.75 mm (**# 4**)	0-10

(C) 12 inch Class I Riprap shall be placed in the designated areas to the satisfaction of the Engineer in accordance with Mn/DOT 2511 and Mn/DOT 3601 for the type of material Specified.

(D) 8 inch Non Perforated PVC Pipe conforming to Mn/DOT 3245 (unwrapped).

(E) 8 inch Perforated PVC Pipe conforming to Mn/DOT 3245 (unwrapped).

(F) Geotextile Fabric Type I for trench lining shall meet Mn/DOT 3733.

(G) Topsoil shall be stripped and saved for reuse in Water Seepage Area 1 over all trenches.

S-70.4 CONSTRUCTION REQUIREMENTS

(A) All 8 inch Perforated and Non-Perforated PVC Drain Pipe shall be placed in an open trench 24 inches in minimum width at locations shown in the Plan.

(B) Geotextile Fabric Type I will be required to line all open trenches set to receive 8 inch Perforated PVC Drain Pipe detailed in the Plan. Prior to placement of the geotextile, the subgrade shall be made relatively smooth and all stones, roots, or debris that may puncture the geotextile shall be removed. Any damaged or otherwise imperfect fabric shall be replaced to the satisfaction of the Engineer at no cost to the State. Once placed, no construction traffic of any type shall be permitted on top of the geotextile until at least 6 inches of protective cover have been placed. Compaction will not be required for the Coarse Filter Aggregate.

The geotextile may be unrolled and placed in any direction. All seams shall overlap a minimum of 6 inches, be either factory or field sewn to produce total continuity and meet the seam strength specifications. The sewing machine shall sew a seam similar to a Federal Type 401 (2 spool machine). All seams shall be sewn so that the seam extends upwards to provide easy visual inspection of the seam. Broken or flawed seams shall be oversewn and all loose thread ends shall be securely knotted. No backfilling will be allowed until inspection of the placed geotextile fabric is made by Project Engineer. When completed, the geotextile shall completely surround the coarse filter aggregate in the Subsurface Drainage Trench, overlap a minimum 18 inches in both directions at the top as detailed in the Plan to prevent intrusion of fines.

(C) All PVC pipe joints shall be made with the proper type of fittings, gaskets, couplers or hardware installed using the manufacturer's recommended instructions and to the satisfaction of the Engineer.

(D) The 8 inch Perforated PVC Drain Pipe shall be placed in the center of the trench upon a minimum bed of 8 inch coarse Filter Aggregate with the rows of perforations pointed downward. Care should be taken during backfilling to prevent shifting of the pipe, tearing or damage to the geotextile fabric, or collapse of the drainage trench. The Contractor shall repair any item as necessary to the satisfaction of the Engineer. Construction equipment may not operate above the pipe until the upper layer of geotextile and at least 12 inches of Granular Material has been placed.

(E) All connections into existing drainage structures shall be core drilled thru the structure wall to facilitate the installation of 8 inch PVC Drainage Pipe. Contractor shall seal the joint as detailed with concrete grout or at his option Silicone Sealant meeting Mn/DOT 3722 to the satisfaction of the Engineer.

(F) A Mn/DOT buried Fiber Optic and copper cable is located in the vicinity of this work. Contractor shall be responsible to locate and protect the inplace cable before starting and during construction. Approximate cable locations are shown on Sheet No. 61 of the Plan. In-place fiber optic cable shall be encased in concrete as directed by Engineer according to details shown on Sheets No. 376 and 385 of the Plan. Compensation will be made by the linear foot under Item 2550.603 (Fiber Optic Encasement).

(G) Compensation for dewatering is provided under Item 2105.601 (Dewatering) by the lump sum to assist in the construction of the Subsurface Drainage System.

(H) Erosion control and Turf establishment will be compensated for under their respective item numbers at the Contract bid price for each item bid.

S-70.5 MEASUREMENT AND PAYMENT

Measurement for the ***complete installed*** Subsurface Drainage System will be made for each type of installed 8 inch PVC drainage pipe by linear foot placed in locations detailed in the Plan to the satisfaction of the Engineer. No measurement or payment will be made for any other individual items, but not limited to those listed above required to complete the installation of Subsurface Drainage System, all such items are considered incidental. Payment will be made under Items 2502.521 (8" PVC Pipe Drain) and 2502.541 (8"Perforated PVC Pipe Drain) at the Contract bid price per linear foot, which shall be compensation in full for all costs of furnishing and constructing the complete Subsurface Drainage System in place.

S-71 (2503) CONNECT TO EXISTING STORM SEWER

This work consists of extending existing storm sewer pipes by constructing a connection between the existing storm sewer pipe and a new storm sewer pipe. The pipes to be extended are 12 inch and 15 inch reinforced concrete pipes. This work shall be performed in accordance with the applicable Mn/DOT Standard Specifications, the detail in the Plan on Sheet No. 153, and the following:

Measurement will be made by the number of connections constructed as specified. Payment will be made under Item 2503.602 (Connect to Existing Storm Sewer) 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 storm sewer pipe to the existing storm sewer pipe.

S-72 (2503) CONNECT INTO EXISTING DRAINAGE STRUCTURE

This work consists of constructing connections into existing drainage structures in accordance with the applicable Mn/DOT Standard Specifications and the following:

Measurement will be made by the number of connections constructed as specified. Payment will be made under Item 2503.602 (Connect Into Existing Drainage Structure) 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 install proposed concrete pipe into an existing drainage structure. Any damage caused to the existing drainage structure shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

S-73 (2503) LINING SEWER PIPE

This work consists of the reconstruction of storm sewer by the installation of a resin-impregnated flexible tube which is inverted into the original conduit by use of a hydrostatic head or compressed air. The resin is cured by circulating hot water or injecting steam within the tube. When cured, the 'cured-in-place pipe' (CIPP) will be continuous and tight-fitting.

S-73.1 This specification references ASTM F1216 and ASTM D790 which is made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and F1216, this specification will govern.

S-73.2 The process (materials, methods, workmanship) must be proven through previous successful installations in the Department's sewer collection system or other sewer systems to an extent and nature satisfactory to the Owner and commensurate with the size of the Project under the proposed Contract. The Contractor, the proposed method of reconstruction, and the product manufacturer's name shall be submitted to the Engineer for approval prior to commencement of this portion of the work.

S-73.3 Materials shall meet the following requirements:

(A) **Tube Material**

The tube material shall meet the requirements of ASTM F1216, Section 5.1 and shall not contain fiberglass.

The tubes shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

The tube shall be fabricated to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during inversion.

The outside layer of the tube (before wetout) shall be plastic coated with a translucent flexible material that clearly allows inspection of the resin impregnation (wetout) procedure. The plastic coating shall not delaminate after curing of the CIPP.

The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP.

The wall color of the interior pipe surface of the CIPP after installation shall be a light reflective color so that a clear detail examination with closed circuit television inspection equipment may be made.

(B) **Resin Material**

The resin system shall be a corrosion resistant isophthalic polyester and catalyst system that meets the requirements of ASTM F1216.

S-73.4 The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The Long-Term Flexural Modulus to be used in Design shall be verified by independent testing (preferably the Trenchless Technology Center at Louisiana Tech University. Such Long-Term Modulus shall not exceed 50% of the short-term values given 5.3. CIPP thickness shall not be less than that which is computed from the DR's given in Table #1.

The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

The cured pipe material (CIPP) shall conform to the minimum structural standards, as listed below.

RESULT			
	Test Method	Minimum Physicals Resin per ASTM F 1216	Resin With 400,000 psi Properties
Modulus of Elasticity	ASTM D-790	250,000	400,000 psi
Flexural Stress	ASTM D-790	4,500	4,500 psi

Thickness of CIPP liner shall be determined by the manufacturer as required for partially-deteriorated existing pipe condition and 8 feet of saturated soil overburden. The manufacturer of the CIPP liner shall submit a basis for thickness determination before fabrication.

S-73.5 **Chemical Resistance** - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

Hydraulic Capacity - The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.

CIPP Field Samples - When requested by the Engineer, the Contractor shall submit test results from previous field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 5.3 have been achieved in previous field applications. Testing samples for this Project shall be made and tested as described in Section 10.1.

S-73.6 It shall be the responsibility of the Owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. It will be the responsibility of the Contractor to provide water necessary for cleaning, inversion and other work items requiring water.

The Contractor shall clean and remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Contractor shall dispose of all debris removed from the sewers during the cleaning operation off the Right of Way. Any hazardous waste material encountered during this Project will be considered as a changed condition.

The Contractor shall schedule CIPP liner insertion and curing with due regard for the weather. If rainfall occurs before completion of the lining process of any segment, the Contractor shall provide for the flow of stormwater around the section or sections of pipe that are not open. The bypass may be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to preclude backing water onto traveled lanes. The Contractor shall work at night as required to avoid additional impact upon traffic beyond that necessitated by other construction operations.

Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed-circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Engineer.

It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion process, and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Engineer prior to the commencement of the work and shall be considered as extra work.

S-73.7 CIPP installation shall be in accordance with ASTM F1216, Section 7, with the following additional requirements:

The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure a thorough wetout, the point of vacuum shall be no further than 7.5 m [**25 feet**] from the point of initial resin introduction. After vacuum in the tube is established, the vacuum points shall be no further than 25 m [**82 feet**] from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube.

Temperature gauges shall be placed to determine the temperature of the incoming and outgoing water from the heat source. Another such gauge shall be placed inside the tube at the remote end to determine the temperature at that location during the cure cycle.

S-73.8 All heated water that fills and cures the resin in the liner CANNOT be discharged into the storm sewer system, which discharges to the Mississippi River, or discharged into any area of land that is part of any drainage pattern into the Mississippi River. It must be pumped out and truck-hauled to a sanitary sewer system in the area approved by the Engineer.

S-73.9 Measurement will be made by the length in meters [**linear feet**] of sewer lined as specified. A copy of post CIPP installation video inspection of each storm sewer shall be provided to the Engineer.

S-73.10 Payment will be made under Item 2503.603 (Lining Sewer Pipe __") at the Contract bid price per meter [**linear feet**], which shall be compensation in full for all removal, excavation, material and labor costs relative thereto, including restoration of the existing storm sewer system components and disturbed area.

S-74 (2506) MANHOLES AND CATCH BASINS

Mn/DOT 2506 is hereby modified and/or supplemented with the following:

S-74.1 A 100 mm [**4 inch**] thick concrete encasement shall be placed around the outside of the manhole or catch basin as detailed in current Mn/DOT Standard Plate 4026. This encasement shall be placed at the time of final casting placement and shall be incidental for which no payment will be made.

S-74.2 Adjusting Rings manufactured from High Density Polyethylene (H.D.P.E.) are approved as an alternate to concrete adjusting rings. It is important that the H.D.P.E. adjusting ring be sealed with the product recommended by the manufacturer.

S-75 (2506) CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL

This work shall consist of constructing Low Point Drainage Structure No. 5027, located as shown in the Plan on Sheet No. 139. This work shall be performed in accordance with the applicable Mn/DOT Standard Specifications, the details on Sheets No. 149-151 of the Plan, and the following:

S-75.1 MATERIAL AND CONSTRUCTION REQUIREMENTS

The Drainage Structure shall be constructed around the existing 24 inch RCP inlet and outlet pipes as detailed in the Plan. The existing 24 inch RCP concrete pipes will need to be shortened; the pipes are intended to be reused and not removed. The Contractor needs to work with care when removing the existing 6 foot by 6 foot concrete low point structure so that the inplace 24 inch RCP concrete pipes are not damaged. Any damage caused to the existing 24 inch RCP pipe shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

(A) All reinforcement bars shall be epoxy-coated No. 16 & No. 25 in metric size meeting Mn/DOT 3301, Grade 420MPa (60,000 psi).

(B) All epoxy-coated reinforcement shall be tied and secured in place conforming to Mn/DOT 2472 before placement of structural concrete (3Y46).

(C) Concrete for all construction shall meet structural concrete mix design 3Y46.

(D) Inlet grates shall maintain a minimum free open area of 8.1 square feet in area for each inlet on each side of the proposed concrete median barrier. The structure in the Plan is designed to accommodate drainage grate configurations of up to 13 feet long by 2 feet wide on each side of the barrier. The Contractor may use the grate design as shown or substitute another grate that meets AASHTO H-25 minimum loading requirements. Any change in grate size as shown will require a change in rebar spacing to be approved by Project Engineer. Payment for the casting assemblies are included in payment for the drainage structure.

S-75.2 MEASUREMENT AND PAYMENT

Measurement will be made by the number of structures constructed as specified. Payment will be made under Item 2506.502 (Construct Drainage Structure Design Special) at the Contract bid price per each, which shall be compensation in full for all costs, including but not limited to, all materials and labor necessary to construct the drainage structure complete and inplace as specified. The concrete median barrier spanning the drainage structure will be paid for separately. Payment for the dowel bars required to connect the concrete median barrier to the drainage structure are included in payment for the drainage structure.

S-76 (2533) PORTABLE PRECAST CONCRETE BARRIER DESIGN 8337

The Contractor shall furnish and install portable precast concrete median barriers in accordance with current Mn/DOT Standard Plate No. 8337 and the provisions of Mn/DOT 2533 except as modified below:

S-76.1 All portable precast concrete median barrier shall be placed as shown in the Plans and as directed by the Engineer. The barrier shall not be removed until the Engineer approves the removal.

S-76.2 Mn/DOT will designate in the Plan whether the portable precast concrete median barrier shall remain the property of the Contractor or become the property of Mn/DOT upon completion of the Project. If the Plan indicates that the barrier is "Mn/DOT owned", the barrier will be furnished by the Contractor and will become the property of Mn/DOT at the completion of the Project. If the Plan indicates that the barrier is "Contractor owned", the barrier will be furnished and installed by the Contractor and shall become the property of the Contractor at the completion of the Project for disposal outside of the Right of Way.

(A) When portable precast concrete median barrier is to remain the property of the Contractor upon completion of the Project, the Contractor:

(1) May provide used barrier, if it is in a condition acceptable to the Engineer;

(2) May provide barrier which does not have epoxy coated reinforcing steel;

(3) May provide Type J barrier if the following guidelines are followed:

(a) When used between lanes of opposing traffic, only one type of portable barrier shall be used.

(b) When only one way traffic is adjacent to the barrier, both types of portable barrier will be permitted if the Type J barriers are upstream from the Type F barriers. The two types of barriers cannot be inter-mixed.

(c) Barrier was produced prior to October 1, 2003.

(4) Shall, upon completion of the Project, dispose of the barrier outside of the Right of Way.

S-76.3 The Contractor will be subject to a non-compliant charge for failure to properly connect the Portable Concrete Barrier sections. Non-compliance charges, for each incident, will be **assessed at a rate of $250.00 per hour**, for each or any portion thereof, which the Engineer determines that the Contractor has not complied.

S-77 (2533) RELOCATE PORTABLE PRECAST CONCRETE BARRIER DESIGN 8337

This work shall consist of relocating portable concrete median barrier within the Project limits as directed by the Engineer and the following:

S-77.1 When portable median barrier has to be removed from the Project roadways, but will be needed again in a later phase of the work, the Engineer may direct that it be stockpiled on or near the Project site. When this is done, payment will be made under Item 2533.508 (Relocate Portable Precast Concrete Barrier Design 8337). Payment will be made once for removing the barrier from the roadway and placing it in the stockpile; and again for removing it from the stockpile and installing it in the roadway.

S-78 (2533) MEDIAN BARRIER COVER PLATE

This work consists of furnishing and installing a steel cover plate over the 4 inch E8 Joint gap on each side of the median barrier at Station 77+93. The work shall be performed in accordance with Mn/DOT 2533, the Plan details (Sheet No. 132), and the following:

S-78.1 Structural steel shall comply with Mn/DOT 3306. Fasteners shall comply with Mn/DOT 3391. Galvanize the cover plates after fabrication per Mn/DOT 3394.

S-78.2 MEASUREMENT AND PAYMENT

Measurement will be made by the number of median barrier cover plates furnished and installed as specified. Payment will be made under Item 2533.602 (Median Barrier Cover Plate) at the Contract bid price per each, which shall be compensation in full for all costs of furnishing and installing the cover plates complete inplace.

S-79 (2545) 3" NON-METALLIC CONDUIT FOR ANTI-ICING DISTRIBUTION SYSTEM

This work shall consist of installing a 3" NON-METALLIC CONDUIT distribution system to be used for Anti-Icing as detailed in the Plan on Sheets No. 133-138. All conduit shall consist of Schedule 80 Rigid Conduit. **Conduit placement and elevation into the handholds is critical and must follow the Plan details as shown. Any deviation from the Plan must be authorized by Mn/DOT Engineer Chris Beckwith at (651) 582-1431.** This work shall be done in accordance with Mn/DOT 3803, as shown in the Plans, or as directed by the Engineer. Mn/DOT technicians will install the hardware and liquid piping at a future time.

S-79.1 NON-METALLIC CONDUIT

The Contractor shall furnish and install non-metallic rigid conduit (N.M.C.) at the locations indicated in the Plans. The size of the conduit and all fittings shall be 3 inch as indicated in the Plan. All conduit shall be in accordance with Mn/DOT 3803, except as follows:

(A) All conduit and fittings shall be Schedule 80 Rigid conduit.

(B) Shall be capable of being installed by plowing, trenching, or directional boring methods.

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

S-79.2 **The Contractor shall not use HDPE continuous type conduit for any of this installation.**

S-79.3 CONDUIT INSTALLATION

Conduit shall be installed in accordance with Mn/DOT 2565.3D, except as follows:

(A) Rigid Non-Metallic Conduit Joints:

1. The Contractor shall install appropriate sized long line couplings when installed under existing roadway surfaces.

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

S-79.4 After the conduit is installed the concrete pavement will be replaced. A recess shall be constructed in the concrete roadway as detailed in the Plan on Sheet No. 135 for the future anti-icing nozzles. The constructed recess area shall have a 3 inch PVC plug installed and hand tightened. The recesses shall be filled using a temporary MC Bituminous Type Driveway Patch Material that is commercially available in bags, at most Home Supply Stores. These temporary patches will be removed by Mn/DOT technicians at the end of the Project to facilitate the Anti-Ice Hardware installation. The twenty-four (24) locations will require a total of approximately **2.0 cubic feet** of bituminous material. **No bituminous tack coat shall be applied to any patch to ease in future removal.**

S-79.5 Each patch shall be uniformly compacted by tamping and continue until there is no evidence of additional consolidation. Care should be exercised to not damage the PVC structure located within the recess.

S-79.6 All costs incurred by compliance with the above requirements will be considered to be included in the payment for Item 2545.523 (3" Non-Metallic Conduit).

S-79.7 MEASUREMENT AND PAYMENT

Measurement will be made by the meter [**linear foot**] of Non-Metallic Conduit installed. Payment will be made under Item 2545.523 (3" Non-Metallic Conduit) at the Contract bid price per meter [**linear foot**], which shall be compensation in full for all costs incidental thereto.