MINNESOTA DEPARTMENT OF TRANSPORTATION

395 JOHN IRELAND BOULEVARD MS 650 ST. PAUL, MINNESOTA 55155

********** PROPOSAL **********

FOR HIGHWAY CONSTRUCTION AND MAINTENANCE PROJECTS WITH
BIDS RECEIVED UNTIL 9:30 O'CLOCK A.M. ON

MAY 16, 2003

Proposal of_____ PROGRESSIVE CONTRACTORS, INC.
14123 42ND STREET NE
ST. MICHAEL, MN 55376-0416
(763)497-6100

(AREA CODE-TELEPHONE)

TO FURNISH AND DELIVER ALL MATERIALS AND TO PERFORM ALL WORK IN ACCORDANCE WITH THE CONTRACT, THE PLANS AND THE APPROVED DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION, **2000 EDITION"(USING English UNITS)**, ON FILE IN THE OFFICE OF THE COMMISSIONER OF TRANSPORTATION EXCEPT AS STATED OTHERWISE IN THE SPECIAL PROVISIONS, WHICH ARE PART OF THIS PROPOSAL, FOR:

STATE PROJECT NO. 2710-33 (T.H. 65=105)

S03087

STATE FUNDS

LOCATION: In Hennepin County on T.H. 65 from Washington Ave. S. to 2nd Street SE & from Spring Street NE to 14th Ave. NE

TYPE OF WORK: Minor Approach Work & Traffic Control for Bridges 2440 & 27164

LENGTH: 0.39 miles

STARTING DATE: July 7, 2003 COMPLETION DATE: October 31, 2003

NOTICE TO BIDDERS: If you are submitting a bid via "Two Way Electronic" bidding, you need not return the hard copy proposal **(all other requirements shall remain in effect).** If you are utilizing **ANY OTHER ACCEPTED METHOD OF BID SUBMITTAL, YOU MUST RETURN THIS COMPLETE PROPOSAL.** You must initial changes made in the "Schedule of Prices" and acknowledge addenda on Form 21126D, which is attached to the back of this proposal.

I certify that this Proposal was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Elizabeth A Buckley

Elizabeth A. Buckley, Special Provisions Engineer JMS
Lic. No. 15494 Date: April 11, 2003

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

This document is available in alternative formats to individuals with disabilities by calling 1-800-818-6869 or through the Minnesota Relay Service at 1-800-627-3529.vice at 1-800-627-3529.

To the Commissioner of Transportation of the State of Minnesota:

Sir: According to the advertisement of the Commissioner of Transportation inviting proposals for the improvement of the section of highway hereinbefore named, and in conformity with the Contract, Plans, Specifications and Special Provisions pertaining thereto, all on file in the office of the Commissioner of Transportation:

(I)(We) hereby certify that (I am)(we are) the only person(s) interested in this proposal as principal(s); that this proposal is made and submitted without fraud or collusion with any other person, firm or corporation at all; that an examination has been made of the site of the work and the Contract form, with the Plans, Specifications and Special Provisions for the improvement.

(I)(We) understand that the quantities of work shown herein are approximate only and are subject to increase or decrease; that all quantities of work, whether increased or decreased within the limits specified in Mn/DOT 1903, are to be done at the unit prices shown on the attached schedule; that, at the time of opening bids, totals only will be read, but that comparison of bids will be based on the correct summation of item totals obtained from the unit prices bid, as provided in Mn/DOT 1301.

(I)(We) propose to furnish all necessary machinery, equipment, tools, labor and other means of construction and to furnish all materials specified, in the manner and at the time prescribed, all according to the terms of the Contract and Plans, Specifications, and the Special Provisions forming a part of this.

(I)(We) further propose to do all Extra Work that may be required to complete the contemplated improvement, at unit prices or lump sums to be agreed upon in writing before starting such work, or if such prices or sums cannot be agreed upon, to do such work on a Force Account basis, as provided in Mn/DOT 1904.

(I)(We) further propose to execute the form of Contract within 10 days after receiving written notice of award, as provided in Mn/DOT 1306.

(I)(We) further propose to furnish a payment bond equal to the Contract amount, and a performance bond equal to the Contract amount, with the aggregate liability of the bond(s) equal to twice the full amount of the Contract, as security for the construction and completion of the improvement according to the Plans, Specifications and Special Provisions as provided in Mn/DOT 1305.

(I)(We) further propose to do all work according to the Plans, Specifications and Special Provisions, and to renew or repair any work that may be rejected due to defective materials or workmanship, before completion and acceptance of the Project by the Commissioner of Transportation.

(I)(We) agree to all provisions of Minnesota Statutes, Section 181.59.

(I)(We) further propose to begin work and to prosecute and complete the same according to the time schedule set forth in the Special Provisions for the improvement.

(I)(We) assign to the State of Minnesota all claims for overcharges as to goods and materials purchased in connection with this Project resulting from antitrust violations that arise under the antitrust laws of the United States and the antitrust laws of the State of Minnesota. This clause also applies to subcontractors and first tier suppliers under this Contract.

The Special Provisions for Bridge Construction (Division SB) and the tabulation of the bridge plans follows Division S in this Proposal.

Attached:

Attached "Drop Off Guidelines"
Specification for "Temporary Raised Pavement Markers (TRPMs)"
Attachment "Specification for Epoxy Resin Pavement Markings"
Specification for "Three Minute Dry Alkyd Traffic Paints"
Specification for "High Solids Water Based Traffic Paint"
Attachment "Application Specification for Conventional Traffic Marking Paint"
Specification for Glass Beads, Drop-on Type for Reflectorizing Traffic Paint
Fuel Escalation Clause
Guidelines for Approval of Computer Generated Schedule of Prices
Attachment "Schedule of Materials Control"
Attachment "Combined 2360/2350 (Gyratory/Marshall Design) Specification"
Equal Opportunity Employee Provisions
Bid Bond Form No. 21816

PROJECT PLANS

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

PROJECT NO.	TYPE OF WORK	TOTAL SHEETS	SHEET NO.	DATE OF APPROVAL
2710-33	Minor Approach Work and Traffic Control for Bridges 2440 & 27164	44	1-7 13-49	April 9, 2003

New or revised sheets were approved as listed below:

PROJECT NO.	SHEET NO.	DATE OF APPROVAL

INDEX TO DIVISION SB

DIVISION SB

BRIDGE PLANS

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

BRIDGE NO.	TOTAL SHEETS	SHEET NO.	DATE OF APPROVAL
2440	15	1-15	3-6-03
27164	4	1-4	3-7-03

S.P. 2710-2440
S.P. 2710-27164
March 12, 2003

New or revised sheets were approved as listed below:

BRIDGE NO.	SHEET NO.	DATE OF APPROVAL

I hereby certify that the Special Provisions for bridge construction (Division SB) contained in this Proposal were prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

(David J. Dahlberg)

Date: 3/12/03 Lic. No. 20646

MN/DOT STATE FUNDED CONTRACT

SPECIAL PROVISIONS DIVISION A
July 1, 1999

A-1 PREAMBLE

It is in the public interest that public works projects be constructed and maintained by the best means and the highest quality of labor reasonably available and that persons working on public works be compensated according to the real value of the services they perform. Therefore, the Minnesota Department of Transportation (Mn/DOT) will administer this Contract according to the provisions set forth in Minn. Stat. §§ 177.41 – 177.44 and 6 MCAR 5200.1120.

A-2 MINIMUM WAGE RATES

1. The minimum hourly rates of wages required to be paid for all hours worked to the various laborers and mechanics employed by the Contractor and subcontractors under the Contract shall be an amount equal to the sum of the basic hourly rate plus applicable fringe benefits as certified by the Minnesota Department of Labor and Industry for State Funded Construction projects.

2. "Prevailing wage rate" means the hourly basic rate of pay plus the contribution for health and welfare benefits, vacation benefit, pension benefits, and any other economic benefit. Minn. Stat. § 177.42, Subd. 6.

3. The laborer or mechanic must be paid at least the prevailing wage rate in the same or most similar trade or occupation in the area as provided by the Commissioner of Labor and Industry Master Job Classification. Minn. Stat. § 177.44, Subd. 3 and 4.

4. If a construction project extends into more than one area, there shall be only one standard of hours of labor and wage rates for the entire project. Minn. Stat. § 177.44, Subds.4.

5. Mn/DOT shall apply classifications of labor, as listed under 6 MCAR 5200.1100 – Master Job Classifications. Under Standard Specifications for Construction 1906, Mn/DOT shall withhold such amounts as may be needed to protect the Department's interest in consideration of charges or assessments against the Contractor, whether arising from this Contract or any other Contract with the Department.

A-2 MINIMUM WAGE RATES (CONT.)

6. The wage determination(s) contained in the Contract and Mn/DOT's poster titled "Notice to Workers" (Tp-02126-03) must be kept posted on the project work site by the Contractor in at least one conspicuous place for the information of all the employees working on the project. Minn. Stat. § 177.44, Subd. 5.

7. APPRENTICE

   A. Establishment of wage rates. Apprentices working on state projects are not subject to the prevailing wage rate determination, except as they may be affected by registered apprenticeship agreements. The hourly rates of pay for such workers are established by the particular program to which the apprentice or trainee is subject. 6 MCAR 5200.1070, Subp.1.

   B. The term "apprentice" means:

      i. A person employed and registered in a bona fide apprenticeship program registered with the U. S. Department of Labor or with the state apprentice agency, and

      ii. A person in the first 90 days of probationary employment as an apprentice who is not registered in the program but who has been certified by the U. S. Bureau of Apprenticeship and Training or state apprenticeship agency or council to be eligible for a probationary employment as an apprentice. 6 MCAR 5200.1070, Subp. 2.

   C. Any employee listed on a payroll for a state project that does not fall within the term "apprentice" defined above shall be paid the prevailing wage rate for the classification of work performed.

MN/DOT STATE FUNDED CONTRACT

SPECIAL PROVISIONS DIVISION A
July 1, 1999

A-3 PREVAILING HOURS OF LABOR

1. The prevailing hours of labor may not be more than eight hours per day or more than 40 hours per week. Minn. Stat. § 177.42, Subd. 4.

2. "Hourly basic rate" means the hourly wage paid to any employee. Minn. Stat. § 177.42, Subd. 5.

3. Employees may not be allowed or required to work longer than the prevailing hours of labor unless the employee is paid for all hours more than the prevailing hours at a rate of at least 1 ½ times the hourly basic rate of pay. Minn. Stat. § 177.44, Subd.1.

A-4 STATEMENTS AND PAYROLLS

1. The Contractor and all subcontractors shall provide information, based on the Contractor's employee payment schedule, to the Project Engineer. Minn. Stat. § 177.44, Subd.1.

2. The Contractor and all subcontractors may provide the following types of payroll information to Mn/DOT to satisfy this requirement. Payroll information need not include all the listed information below, but failure to provide the listed information may delay payment of funds or result in additional inquires.

   A. The employee's full name, address, and social security number. The employee's address and social security number need only appear on the first payroll on which their name appears.

   B. The employee's classification as defined under 5200.1100 Master Job Classifications.

A-4 STATEMENTS AND PAYROLLS (CONT.)

C. Entries showing the employee's basic hourly wage rate, including any fringe benefits amounts paid in cash. The payroll should show separately the amounts contributed on behalf of the employee to "bona fide" fringe benefit funds and/or programs.

D. The employee's daily and weekly hours worked in each classification, including overtime hours worked.

E. The itemized deductions made; and

F. The net wages paid.

3. The Contractor and subcontractor shall submit, along with the payroll information, a statement specifying that the individual signing the statement attests that the information on the payrolls is true and correct. The statement shall specify that the willful falsification of any information on the payroll may result in civil or criminal prosecution. Contractors must attach to the payroll Mn/DOT's form 21658A.

4. Mn/DOT or the Minnesota Department of Labor and Industry may examine all Contractor and subcontractor records related to hours of work and the wages paid to laborers and mechanics working on the project. Minn. Stat. § 177.44, Subd.7. Mn/DOT or the Minnesota Department of Labor and Industry may interview Contractor and subcontractor employees during work hours on the project.

5. Mn/DOT will administer the submission of payroll records according to Mn/DOT's Prime Contractor Payroll Maintenance Program. Accordingly, the Contractor must collect, maintain, and store certified payroll records for each week work is performed on the Contract by all subcontractors and their own work force.

A-4 STATEMENTS AND PAYROLLS (CONT.)

A. Contractors that have corporate offices outside the State of Minnesota must preserve the records within the State until the final voucher has been issued for final acceptance, unless the project engineer and the labor compliance office has approved a location outside of the State. Upon completion of the Contract, the Contractor may send the payroll records to an out-of-state location. If the Contractor does not have a suitable location within the State to store records, the payrolls may be submitted to the project engineer.

B. The Contractor and all subcontractors must complete a Mn/DOT 21658A form for each payroll record produced. Upon receipt of payroll records from subcontractors, the Contractor must review the record to determine if all required information is contained, and sign the attached 21658A form. The Contractor must send a copy of both the Contractor and subcontractor's 21658A forms to the project engineer attesting that the payrolls have been received and are available for review.

C. The project engineer may request that the Contractor send copies of certified payroll records for examination. The payroll records must be submitted to the project engineer within three days.

D. Upon completion of the Contract, the Contractor must preserve all payroll records for three years from the fiscal year ending date (July 1) after the final payment voucher has been issued.

6. Mn/DOT shall require adherence to the state prevailing wage law. As such, the Department will withhold funds sufficient to protect its interest in the implementation of these Special Provisions against the Contractors as provided for under Section 1906, Standard Specification for Construction. Minn. Stat. § 177.44, Subd. 7.

COVERAGE OF PREVAILING WAGE LAW UNDER MINNESOTA STATUTES, SECTIONS 177.41 TO 177.44.

Subpart 1. **In general.** For purposes of parts 5200.1105 and 5200.1106 and Minnesota Statutes, sections 177.41 to 177.44,the prevailing wage rate which, for the purpose of all public works highway projects funded in whole or in part by state funds only, includes truck rental rates, must be paid for work under the contract.

Subp. 2. **Work under the contract.**

A. Except as provided in subpart 4, work under the contract means all construction activities associated with the public works project, including any required hauling activities on the site of or to or from a public works project and work conducted pursuant to a contract as defined by item B, regardless of whether the construction activity or work is performed by the prime contractor, subcontractor, trucking broker, trucking firms, independent contractor, or employee or agent of any of the foregoing entities, and regardless of which entity or person hires or contracts with another. The term "work under a contract" has the same meaning.

B. "Contract" means the written instrument containing the consideration and the terms of agreement between the prime contractor and the contracting agency for the construction of all or a part of:

(1) a highway pursuant to Minnesota Statutes, sections 161.32 and 177.44;

(2) a public works project pursuant to Minnesota Statutes, section 177.43 and chapter 16B; or

(3) any public building or public works financed in whole or in part with state funds pursuant to Minnesota Statutes, sections 177.41 to 177.44.

Contract includes project proposals, plans, and specifications, and all requirements for labor, equipment, and materials found in such proposals, plans, and specifications.

C. "Prime contractor" means an individual or business entity that enters into a contract as defined in item B with the contracting agency.

D. "Contractor" means an individual or business entity that is engaged in construction or construction service-related activities including trucking activities either directly or indirectly through a contract as defined by item B, or by subcontract with the prime contractor, or by a further subcontract with any other person or business entity performing work under the contract.

Subp. 3. **Work considered to be under a contract.** Without limiting the application of parts 5200.1105 and 5200.1106 to other situations, the following are considered to be work under the contract.

A. Work performed by employees of a contractor or subcontractor that operates an asphalt or concrete plant, that was moved into a gravel pit, borrow pit, or other location not on the project, primarily to serve public works projects is considered work under the contract including the contractor's employees loading the equipment hoppers with materials obtained from the pit regardless of whether the pit meets the definition of commercial establishment.

B. The following hauling activities are included in hours worked and considered work under the contract for purposes of payment of prevailing wages and payment of the truck rental rate:

(1) the hauling of any or all stockpiled or excavated materials on the project work site to other locations on the same project even if the trucks leave the work site at some point;

(2) the delivery of materials from any facility that does not meet the requirements of a commercial establishment to the project and the return haul to the starting location either empty or loaded;

(3) the delivery of materials from another construction project site to the public works project and the return haul empty or loaded is considered work under the contract. Construction projects are not considered a commercial establishment;

(4) the hauling required to remove any materials from the public works project to a location off the project site and the return haul if empty or if loaded from other than a commercial establishment;

(5) the delivery of materials or products by trucks hired by a contractor, subcontractor, or agent thereof, from a commercial establishment; and

(6) delivery of sand, gravel, or rock, by or for a commercial establishment, which is deposited "substantially in place," either directly or through spreaders from the transporting vehicles is work under the contract. In addition, the return haul to the off-site facility empty or loaded is also considered work under the contract.

Subp. 4. **Work not considered to be under a contract.** Without limiting the application of parts 5200.1105 and 5200.1106 to other situations, the following work is not considered to be work under a contract:

A. the processing or manufacturing of materials or products by or for a commercial establishment;

B. the work performed by employees of the owner or lessee of a gravel pit or borrow pit that is a commercial establishment and that performs work in conjunction with a public works project by adding value to the sand, gravel, or rock contained in or delivered to the pit through the use of screening, washing, or crushing machines. This applies even if the machines are portable. This does not include the employees described in subpart 3, item A;

C. the delivery of processed or manufactured goods to a public works project by the employees of a commercial establishment including truck owner-operators hired by and paid by the commercial establishment, unless it is the delivery of mineral aggregate that is incorporated into the work under the contract by depositing the material substantially in place; or

D. multiple site hauling operations include secondary hauling activities in addition to the hauling of materials on and off the public works project in order to complete the truck's round trip haul. The hauling of materials or products between these secondary off-site facilities as part of a multiple site hauling operation is not considered work under the contract as long as the time spent hauling between the secondary sites is properly documented in the trucking records and the time spent hauling on and off the project is properly compensated as required in subpart 3.

Subp. 5. **Commercial establishment, exceptions, definitions.** For purposes of parts 5200.1105 and 5200.1106 and Minnesota Statutes, sections 177.41 to 177.44, the following terms have the meanings listed.

A. "Laborer or mechanic" means a worker in a construction industry labor class identified in or pursuant to part 5200.1100.

B. "Mineral aggregate" is sand, gravel, or crushed stone or rock, or earthen material suitable for roadway development, or mixtures of these naturally occurring substances with recycled materials, suitable for the base or shoulder of a highway or heavy project used to compose the shoulder, or support bituminous or concrete pavement, or used as a final gravel road surface. Mineral aggregate specifically does not include screenings, slag, riprap, recycled concrete and bituminous materials, ready-mix concrete, bituminous concrete, asphalt, mastic, mortar, plaster, macadam, and other similar processed or manufactured materials or

products. Additionally, mineral aggregate does not include materials such as clay, topsoil, fill, dirt, silt, boulders, wall stone, loam, gumbo, loess, peat, muck, hardpan, or other similar soils or mixed earth.

C. "Incorporated into the work under the contract by depositing the material substantially in place" means the mineral aggregate is deposited on the project site directly or through spreaders where it can be spread from or compacted at the location where it was deposited. As used in this part, "depositing substantially in place" has the same meaning.

D. To be a "fixed place of business," a commercial establishment must serve the government project from a location from which it served the public prior to and at the time of advertisement of the public works contract and that has sufficient utilities and equipment to serve the public upon demand.

E. "Regularly supply" includes supply by a commercial establishment that is closed on a seasonal basis.

F. The determination of whether a facility is a "commercial establishment" is made on a location-by-location basis and on a product-by-product basis, not on a business wide basis. For purposes of parts 5200.1000 to 5200.1120 and Minnesota Statutes, sections 177.41 to 177.44, production of mineral aggregate is considered production of one product. Construction projects are not considered commercial establishments. A "commercial establishment" is a business entity that has not set up at the location from which deliveries are made primarily to serve public works projects and, prior to and at the time of advertisement of the public works contract, it:

(1) owned or leased the land on which it operates;

(2) possessed business records indicating that sales from the location from which deliveries are made are for other than the contracting agency's public works contracts;

(3) advertised the availability of material for sale to the general public from the location and had facilities available for effecting sales at the location; and

(4) has acquired all necessary permits to operate from the location, and met all legal obligations of state and local regulations to excavate soils, sand, gravel, or rock for the purpose of receiving something of value for the product.

Subp. 6. **Prohibited payment practices.** The contractor, subcontractor, trucking broker, or other person making payment to an employee laborer, mechanic, worker, or truck owner-operator may not accept a rebate for the purpose of reducing or otherwise decreasing the value of the compensation paid.

Subp. 7. **Trucking definitions.** The following terms have the meanings given them for the purpose of parts 5200.1105 and 5200.1106 and Minnesota Statutes, sections 177.41 to 177.44.

A. "Independent truck owner-operator" is an individual, partnership, or principal stockholder of a corporation who owns or holds a vehicle under lease and who contracts that vehicle and the owner's services to an entity which provides construction services to a public works project. In addition, an owner and operator of a vehicle that is licensed and registered as a truck, tractor, or truck-tractor by a governmental motor vehicle regulatory agency is an independent contractor, not an employee, only if each of the following factors are significantly present:

(1) the individual, partnership, or corporation owns the equipment or holds it under a lease arrangement;

(2) the individual, partnership, or corporation is responsible for the maintenance of the equipment;

(3) the individual, partnership, or corporation bears the principal burden of the operating costs, including fuel, repairs, supplies, vehicle insurance, and personal expenses while on the road, but not including brokerage fees;

(4) the owner drives the equipment;

(5) the owner determines the details and means of performing the services in conformance with regulatory requirements, operating procedures, and specifications of the entity with which the individual or corporation contracts; and

(6) the individual or corporation enters into a legally binding agreement that specifies the relationship to be that of an independent contractor and not that of an employee.

B. "Trucking firm" is any legal business entity that owns more than one vehicle and hires the vehicles out for services to brokers or contractors on public works projects.

C. "Trucking broker" is an individual or business entity, the activities of which include, but are not limited to:

(1) contracting to provide trucking services in the construction industry to users of such services;

(2) contracting to obtain such services from providers of trucking services;

(3) dispatching the providers of the services to do work as required by the users of the services;

(4) receiving payment from the users in consideration of the trucking services provided; and

(5) making payment to the providers for the services.

D. "Own" and "operate" have the following meanings and apply to independent truck owner-operators and trucking firms. The notation "truck owner-operator" for the purposes of this part will apply to both the independent owner-operator and trucking firms unless otherwise defined:

(1) "Own" means to have a legal and rightful title to the vehicle or to have an approved lease on the vehicle.

(2) "Operate" means the owner either physically drives the vehicle or hires another to physically drive the vehicle but maintains the right to direct the day-to-day operations of the vehicle.

Subp. 8. **Trucking provisions.**

A. Independent truck owner-operators or the owner-driver of a trucking firm are not required to be paid the truck rental rate for:

(1) time spent repairing or maintaining, or waiting to repair or maintain, the truck owner-operator's equipment, except that repair, maintenance, or time spent waiting to load or unload which is attributable to the fault of the broker, contractor, agent thereof, or an employee of such entities, must be included in the hours worked and paid the hourly truck rental rate; and

(2) time spent correcting work that was not performed according to the prime contract that can be directly attributed to the negligence of the truck owner-operator.

B. Employees of a trucking firm must always receive the appropriate prevailing wage rate for any work performed under the contract.

C. The owner of a trucking firm may either drive the vehicles or hire employees to drive the vehicles. If the owner drives the vehicle, then the truck hire is subject to the truck rental rates. If the owner hires an employee to drive the vehicle, the truck hire is subject to the truck rental rates and the employee driver is subject to the appropriate prevailing wage rate. These provisions apply regardless of who owns any trailer being pulled by the truck.

Subp. 9. **Required records.**

A. Upon agreement of a contractor or trucking broker with an independent truck owner-operator to perform work under the contract, the contractor or broker must keep the following records for a period of at least six years following the payment for services:

(1) name, address, and social security number of the truck owner-operator;

(2) name, address, and phone number of the truck owner-operator's business and federal tax identification number;

(3) time period covered by the agreement between the truck owner-operator and the broker or contractor;

(4) date and amount of each payment to the truck owner-operator, and for each payment:

(a) number of hours the truck owner-operator performed work under the contract, not including hours excluded under subpart 7;

(b) type of trucking equipment used for each job by the truck owner-operator and if leased, the name and address of the individual or business entity which owns the equipment;

(c) type of services performed;

(d) hourly truck rental rate used to calculate the minimum payment due; and

(e) an itemization of any deductions from the gross amount payable to the truck owner-operator;

(5) a copy of the owner's certificate of insurance; and

(6) a copy of the vehicle/truck registration.

The contractor or broker must also keep the same records for owner-drivers of trucking firms working on the public works project unless the owner-drivers' information is submitted along with the employee information to a contracting agency as listed under subpart 10.

B. Records required to be kept by item A and other similar records necessary to determine compliance with Minnesota Statutes, sections 177.41 to 177.44, as determined by the commissioner of the department of transportation or the department of labor and industry, must be provided upon request accompanied by a certification form approved by the requesting department.

Subp. 10. **Required employee records.** Records pertaining to the proper payment of employees including, but not limited to, fringe benefit documentation, time cards, payroll ledgers, check registers, and canceled checks will be made available on request from the department for further review to determine if the employee was paid according to this part and Minnesota Statutes, sections 177.41 to 177.44. If the commissioner of the department of transportation or the department of labor and industry requests any or all of the following information, the contractor, subcontractor, or trucking firm shall submit the following information to the department together with any certification forms approved by the requesting department:

A. name, address, and social security number of the employee;

B. the classification of work performed defined by part 5200.1100, master job classification;

C. the hours worked per day and per week;

D. legal deductions made from the employee's check;

E. contract information regarding the public works projects worked on by the employee;

F. hourly rate of pay, including any fringe benefit information deemed necessary to determine if the proper prevailing wage rate was paid;

G. project gross amount earned;

H. weekly gross and net amount of payroll check; or

I. in the case of the owner-driver, information described in items A to E shall be submitted along with the hourly truck rental rate paid to the owner-driver.

Subp. 11. **Effective Date.** Parts 5200.1105 and 5200.1106 are effective June 25, 2001. Part 5200.1106 is effective for all projects as described in part 5200.1106, subpart 2, item B, that are advertised for bid on and after June 25, 2001. The new truck rental rates to be issued under part 5200.1105 are effective for all projects as described in part 5200.1106, subpart 2, item B, that are advertised on and after the publication in the State Register of the notice of certification of the truck rental rates.

STAT AUTH: MS s 175.171; 177.41 to 177.44

HIST: 25 SR 1942
Current as of 08/17/01

Prompt Payment
December 2002

NOTICE TO BIDDERS

Minnesota Statutes that require prompt payment to subcontractors:

16A.1245 Prompt payment to subcontractors.

Each state agency contract must require the prime contractor to pay any subcontractor within ten days of the prime contractor's receipt of payment from the state for undisputed services provided by the subcontractor. The contract must require the prime contractor to pay interest of 1-1/2 percent per month or any part of a month to the subcontractor on any undisputed amount not paid on time to the subcontractor. The minimum monthly interest penalty payment for an unpaid balance of $100 or more is $10. For an unpaid balance of less than $100, the prime contractor shall pay the actual penalty due to the subcontractor. A subcontractor who prevails in a civil action to collect interest penalties from a prime contractor must be awarded its costs and disbursements, including attorney's fees, incurred in bringing the action.

HIST: 1990 c 541 s 1

337.10 Building and construction contracts; prohibited provisions.

Subd. 3. Prompt payment to subcontractors. A building and construction contract shall be deemed to require the prime contractor and all subcontractors to promptly pay any subcontractor or material supplier contract within ten days of receipt by the party responsible for payment of payment for undisputed services provided by the party requesting payment. The contract shall be deemed to require the party responsible for payment to pay interest of 1-1/2 percent per month to the party requesting payment on any undisputed amount not paid on time. The minimum monthly interest penalty payment for an unpaid balance of $100 or more is $10. For an unpaid balance of less than $100, the party responsible for payment shall pay the actual penalty due to the party requesting payment. A party requesting payment who prevails in a civil action to collect interest penalties from a party responsible for payment must be awarded its costs and disbursements, including attorney fees incurred in bringing the action. This subdivision does not apply to construction of or improvements to residential real estate as defined in section 326.83, subdivision 17, or to construction of or improvements to attached single-family dwellings, if those dwellings are used for residential purposes and have fewer than 13 units per structure.

HIST: 1997 c 127 s 1; 1998 c 289 s 1,2; 1999 c 116 s 2

MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE FUNDED CONSTRUCTION PROJECTS

THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Highway and Heavy

Region Number: 09

Counties within region:

- ANOKA-02
- CARVER-10
- CHISAGO-13
- DAKOTA-19
- HENNEPIN-27
- RAMSEY-62
- SCOTT-70
- WASHINGTON-82

Effective: 2002-10-14 Revised: 2003-03-18

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Transportation
Office of Construction
Transportation Building
John Ireland Blvd
St. Paul, MN 55155
(651) 297-5716

Refer questions concerning the prevailing wage rates to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

LABOR CODE AND CLASS	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
101 LABORER, COMMON (GEN LABOR WRK)	2002-10-14	21.39	7.66	29.05
	2003-05-01	22.79	7.66	30.45
102 LABORER,SKILLED-ASST CRFT JRNYMN	2002-10-14	21.39	7.66	29.05
	2003-05-01	22.79	7.66	30.45

103 LABORER, LANDSCAPING	2002-10-14	13.83	4.61	18.44
104 FLAGPERSON	2002-10-14	21.39	7.66	29.05
	2003-05-01	22.79	7.66	30.45
105 WATCHPERSON	2002-10-14	17.99	7.11	25.10
	2003-05-01	19.38	7.11	26.49
106 BLASTER	2002-10-14	24.39	7.66	32.05
	2003-05-01	25.79	7.66	33.45
107 PIPELAYER (WATER, SEWER & GAS)	2002-10-14	22.89	7.66	30.55
	2003-05-01	24.29	7.66	31.95
108 TUNNEL MINER	2002-10-14	22.09	7.66	29.75
	2003-05-01	23.48	7.66	31.14
109 UNDRGRND & OPEN DITCH LABOR (8')	2002-10-14	22.09	7.66	29.75
	2003-05-01	23.48	7.66	31.14
GROUP 1	2002-10-14	26.27	8.45	34.72
	2003-05-01	26.97	9.35	36.32
201 HELICOPTER PILOT				
202 CRANE,OVER 135' BOOM,WITHOUT JIB				
203 DRGLN/SMLR,SHVL CNTRLS,3 CU YDS+				
204 PILE DRIVING,WITH 3 DRUMS IN USE				
205 TOWER CRANE				
GROUP 2	2002-10-14	25.72	8.45	34.17
	2003-05-01	26.42	9.35	35.77
206 CABLEWAY				
207 CONCRETE MIXER,STATIONARY PLANT				
208 DERRICK-GUY,STFLEG,PWR,SKD,IMMOV				
209 DRGLN/SMLR/SHVL CNTRLS,TO 3 CYDS				
210 DRDGE OR ENGINEER/POWER&ENGINEER				
211 FRONT END LOADER,5 CU YDS & OVER				
212 GRADER OR MOTOR PATROL				
213 LOCOMOTIVE CRANE OPERATOR				
214 MIXR-PAVING,ROADMOLE,CONWAY/SMLR				
216 TRACTOR - BOOM TYPE				
217 TRACTOR CRANE - CRAWLER CRANE				
218 TUGBOAT, 100 H.P. AND OVER				
GROUP 3	2002-10-14	25.54	8.45	33.99
	2003-05-01	26.24	9.35	35.59
219 DUAL TRACTOR				
220 ELEVATING GRADER				
221 PUMPCRETE				

222 SCRAPER,32 CU YDS AND OVER
223 SELF PROPELLED SOIL STABILIZER

GROUP 4	2002-10-14	25.42	8.45	33.87
	2003-05-01	26.12	9.35	35.47

224 AIR TRACK ROCK DRILL
225 ASPHALT BITUMINOUS STABLZR PLANT
226 AUTOMATIC ROAD MACHINE(CMI/SMLR)
227 BACKFILLER OPERATOR
228 CONCRETE BATCH PLANT
229 BITUMINOUS ROLLER,8 TONS OR MORE
230 BITUMINOUS SPREADER,FINISH (PWR)
231 CAT TRACTORS W/ROCK WAGONS/SMLR
232 CHIP HARVESTER AND TREE CUTTER
233 CONCRETE MIXER ON JOB SITE
234 CONCRETE MOBIL
235 CRUSH,WASH,SCREEN GRAVEL PLANT
236 CURB MACHINE
237 DOPE MACHINE (PIPELINE)
238 DRILL RIGS (ROTARY,CHAIN,CABLE)
239 FORK LIFT OR STRADDLE CARRIER
240 FORK LIFT OR LUMBER STACKER
241 FRONT END LOADER OVER 1 CU YD
242 HOIST ENGINEER (POWER)
243 HYDRAULIC TREE PLANTER
244 LAUNCHER,TANKER PERSON,PILOT LIC
245 LOCOMOTIVE
246 MECHANIC WELDER
247 MILL,GRIND,AND PLANE MACHINE
248 MULTIPLE MACHINES/WELD,GENS,PUMP
249 PAVE BRKR,TAMP (PWR),MIGHTY MITE
250 PICKUP SWEEP W HOPPER OF 1 CUYD+
251 PIPELINE WRAP,CLEAN,BEND MACHINE
252 PWR PLANT ENGINEER,100 KWH +
253 PWR HORIZONTAL BORING MACH 6" +
254 PUGMILL
255 RUBBER TIRE TRACTOR,B/HOE ATTACH
256 SCRAPER UP TO 32 CUBIC YARDS
257 SKID LDR,1CUYD+ & BACKHOE ATTACH
258 SLIP FORM (POWER DRIVEN)(PAVING)
259 TIE TAMPER AND BALLAST MACHINE
260 TRACTOR, BULLDOZER
261 TRENCHING MACH (SEWER,WATER,GAS)
262 WELL POINT INSTALLATION

GROUP 5	2002-10-14	22.38	8.45	30.83
	2003-05-01	23.08	9.35	32.43

263 AIR COMPRESSOR, 600 CFM OR OVER
264 BITUMINOUS ROLLER UNDER 8 TONS
265 CNCRTE DSTRB/SPRD/FNSH,FLOAT,JNT
266 CNCRTE SAW W MULT BLADE,PWR OPER

267 FORM TRENCH DIGGER, POWER OPER
268 FRONT END LOADER UPTO INCL 1CUYD
269 GUNITE GUNALL
270 HYDRAULIC LOG SPLITTER
271 LOADER-BARBER GREENE OR SIMILAR
272 POST HOLE DRIVING MACHINE/AUGER
273 POWER AUGER AND BORING MACHINE
274 POWER ACTUATED JACK
275 PUMP
276 SELF PROP CHIP SPRDR(FLAHERTY)
277 SHEEP FOOT COMPACTR/BLADE,200HP+
278 SHOULDER MACH W SAND/CHIP SPRDR
279 STUMP CHIPPER AND TREE CHIPPER
280 TREE FARMER (MACHINE)
281 BTMNUS SPRDR/FINSH MACH OPR/HLPR

GROUP 6	2002-10-14	21.17	8.45	29.62
	2003-05-01	21.87	9.35	31.22

282 CONVEYOR
283 DREDGE DECK HAND
284 FIRE PERSON OR TANK CAR HEATER
285 GRVL SCRN PLNT-PORT,NOCRUSH/WASH
286 GREASER (TRUCK OR TRACTOR)
287 LEVER PERSON
288 OILR-SHVL,CRANE,DLINE,CRUSH,MILL
289 POWER SWEEPER
290 ROLLER ON GRAVEL COMPACTION
291 SELF PROPELLED VIBRATING PACKER
292 SHEEP FOOT ROLLER
293 TRACTOR, WHEEL TYPE,OVER 50 H.P.
294 TRUCK CRANE OILER

GROUP 1	2002-10-14	21.60	6.50	28.10
	2003-05-01	22.40	7.00	29.40

301 MECHANIC - WELDER
302 TRACTOR TRAILER DRIVER
303 TRUCK DRVR,OPER HAND/PWR WINCH

GROUP 2	2002-10-14	21.05	6.50	27.55
	2003-05-01	21.85	7.00	28.85

304 4 OR MORE AXLE,STRGHT BODY TRUCK

GROUP 3	2002-10-14	20.95	6.50	27.45
	2003-05-01	21.75	7.00	28.75

305 BITUMINOUS DISTRIBUTOR DRIVER
306 BITUMINOUS DISTRIBUTOR-1 PERSON
307 THREE AXLE UNITS

GROUP 4	2002-10-14	12.00	0.00	12.00

308 BITUMINOUS DISTRIBUTOR SPRAY OPR
309 DUMP PERSON

310	GREASER				
311	PILOT CAR DRIVER				
312	RUBBER TIRED SELF PROPELL PACKER				
313	TWO AXLE UNIT				
314	SLURRY OPERATOR				
315	TANK TRUCK HELPER-GAS,OIL,WATER				
316	TRACTOR OPERATOR, UNDER 50 H.P.				
401	HEATING AND FROST INSULATORS	2002-10-14	22.89	16.69	39.58
402	BOILERMAKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
403	BRICKLAYERS	2002-10-14	25.37	10.09	35.46
404	CARPENTERS	2002-10-14	26.52	9.45	35.97
		2003-05-01	28.32	9.45	37.77
405	CARPET LAYERS (LINOLEUM)	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
406	CEMENT MASONS	2002-10-14	26.84	8.61	35.45
		2003-05-01	28.64	8.61	37.25
407	ELECTRICIANS	2002-10-14	29.45	14.17	43.62
408	ELEVATOR CONSTRUCTORS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
409	GLAZIERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
410	LATHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
411	GROUND PERSON	2002-10-14	18.43	7.75	26.18
412	IRONWORKERS	2002-10-14	26.85	14.49	41.34
		2003-05-01	28.95	14.49	43.44
413	LINEMAN	2002-10-14	27.51	10.37	37.88
414	MILLWRIGHT	2002-10-14	27.63	9.87	37.50
		2003-05-01	29.48	9.87	39.35
415	PAINTERS	2002-10-14	26.25	9.54	35.79
416	PILEDRIVER	2002-10-14	26.52	9.45	35.97
		2003-05-01	28.32	9.45	37.77
417	PIPEFITTERS - STEAMFITTERS	2002-10-14	29.00	12.84	41.84
418	PLASTERERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
419	PLUMBERS	2002-10-14	27.09	13.75	40.84
		2003-05-01	29.39	13.75	43.14

420	ROOFER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
421	SHEET METAL WORKERS	2002-10-14	27.50	13.51	41.01
422	SPRINKLER FITTERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
423	TERRAZZO WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
424	TILE SETTERS	2002-10-14	24.85	10.09	34.94
425	DRYWALL TAPER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
430	WIRING SYSTEM TECHNICIAN	2002-10-14	26.46	4.62	31.08
		2003-03-01	27.40	4.62	32.02
431	WIRING SYSTEM INSTALLER	2002-10-14	18.26	3.96	22.22
		2003-03-01	19.14	3.96	23.10
435	ASBESTOS ABATEMENT WORKER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
436	SIGN ERECTOR	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			

March 16, 1998

PREVAILING WAGE STATEMENT

A recent unpublished decision of the Minnesota Court of Appeals, affirms the authority of the Minnesota Commissioner of Transportation to enforce the Minnesota Prevailing Wage Law on State Highway projects on a case-by-case basis. International Union of Operation Engineers, Local 49 vs. Minn. Dept. of Transportation, et. al., Court of Appeals Case No. C6-97-1582, also see, Minn. Stat. §§ 177.43 and 177.44 (1996).

The Department of Transportation will enforce the Minnesota Prevailing Wage Law in a manner consistent with the Court of Appeal's decision notwithstanding any prior notices on this subject. A copy of the Court of Appeal's decision is available to anyone who is interested in reviewing it. Please call Charles Groshens, Labor Compliance Unit at (651) 297-5716 to receive a copy.

June 26, 2001

PREVAILING WAGE STATEMENT II

On June 18, 2001, the Minnesota Department of Labor & Industry (MnL&I) published in the State Register a notice of modification and adoption of the rules as published in State Register, Volume 25, Number 14, Pages 772-778, October 2, 2000, (25 SR 772). The rules were promulgated under the Minnesota Administrative Procedures Act, Minn. Stat. Chap. 14, and affect all projects funded in whole or part with state monies that are advertised for bid 5 working days after the publication date. The rules give guidance on the application of the State Prevailing Wage Statute, Minn. Stat. §177.41 to 177.44, as it applies to contractor's labors and mechanics working at off-site facilities, trucks drivers performing hauling activities for state funded projects, and the calculation and application of truck rental rates. The truck rental rates, when certified by the MnL&I, will take effect on state funded projects advertised after the rates are published in the State Register. MnDOT will incorporate the truck rental rates into the appropriate contracts when published after they have been published in the State Register. Copies of the rules can be received by contacting the MnL&I, Labor Standards, Erik Oelker, at (651) 296-6452 or MnDOT, Labor Compliance Office, Charles Groshens, at (651) 297-5716.

DIVISION S

S-1 CONTACT INFORMATION

Questions regarding this Project, including any questions prior to bidding, shall be directed to Elizabeth Benjamin, Tel: 763-797-3067

S-2 RESIDENT PREFERENCE IN PUBLIC CONTRACTS

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

S-3 DISPUTE RESOLUTION AND ARBITRATION

S-3.1 Notice of Claim:

It is the purpose of this Special Provision that claims for additional compensation and any difference between the parties arising under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time and at the first responsible level to increase the possibility for such matters to be resolved or for appropriate action to be taken promptly. This section shall be construed to apply to all claims including, but not limited to, claims based on Contract clauses as well as claims based on breach of Contract or tort.

In the event any basis for additional compensation or time extension is perceived by the Contractor to have occurred, for informational purposes the Contractor shall give the Engineer immediate written notice of such basis for additional compensation or time extension so that the Engineer may take appropriate action.

Should the Contractor disagree with any decision, order, instruction, notice, act or omission of the Engineer, or otherwise determine that a claim for extra compensation or time is necessary, the Contractor may submit a Notice of Claim to the Engineer. The Notice of Claim shall be submitted in writing before the Contractor begins the work on which he/she bases the claim. The Notice of Claim shall indicate, insofar as possible, the basis and the nature of the claim. If notification is not given, the Contractor hereby agrees to waive any claim for additional compensation.

At the time the Contractor gives written notice of his/her claim the Contractor and the State shall immediately begin to keep and maintain complete and specific records to the extent possible, including but not limited to, cost records concerning the details of the perceived claim.

The Contractor shall give the Engineer access to his/her records and, when so requested, shall furnish the Engineer copies of claim documentation.

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, and the Department will continue to make progress payments to the Contractor in accordance with the Contract documents.

S-3.2 Submission of Claims:

As promptly as possible following the submission of a Notice of Claim in accordance with the requirements contained elsewhere in these Special Provisions but in no event later than 60 Calendar Days after all of the Contractor's costs have been incurred, unless otherwise agreed to by the Engineer, the Contractor shall submit his/her claim to the Engineer concerning the matter so noticed.

The claim shall set forth clearly and in detail, for each item of additional compensation or extension of time requested, the reasons for the claim, references to applicable provisions of the Specifications, the nature and the specific cost ascribed to each element of the claim or for each such period of time, and all other pertinent factual data, including percentage of liability if applicable.

The Contractor shall, in so far as it is possible to do so, promptly furnish any clarification and additional information or data deemed necessary and requested in writing by the Engineer.

S-3.3 Decision on Claims:

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 $100,000.00 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 $100,000.00, 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 the time frames prescribed in this subsection, the claim shall be deemed denied and the Contractor may proceed with the legal remedy prescribed herein.

When the Contractor and the Engineer have 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.

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 $100,000.00 but the Contractor's sole legal remedy in relation to claims of $100,000.00 or less shall be arbitration as prescribed hereafter in these Special Provisions.

S-3.4 Arbitration of Claims and Disputes:

(A) All arbitration of claims shall be conducted in Minneapolis, Minnesota, or another mutually agreed upon location, in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect.

(B) If the Contractor elects to invoke his/her right to arbitration the Contractor shall file a Demand for Arbitration in writing with the American Arbitration Association and serve a copy thereof upon the State Engineer. Such Demand for Arbitration shall be made by claimant within 30 Calendar Days measured from actual receipt of the Engineer's decision as provided for above. The scope of the arbitration proceeding shall be restricted and limited to the matters presented to the Engineer upon which the decision or determination was made and shall include no other matters.

When the amount of the claim for arbitration is less than $10,000.00, the Demand for Arbitration shall be given as provided for above, but the date for the hearing may be delayed by mutual consent until a date that is convenient for all parties. In no instances will this delay exceed one year in length from the date of Demand for Arbitration.

(C) Because many issues will combine both a question of responsibility or liability and an issue of compensation amount, when the issue to be arbitrated contains a question of responsibility or liability, as well as an issue of compensation, the arbitration shall be bifurcated (separate rulings). The arbitrator shall rule as to liability prior to receiving evidence or testimony on any damage claim. In the event that the State is found to be liable to any degree, the arbitration proceeding shall continue before the same arbitrator to resolve any and all damage issues.

(D) Each party shall submit to the arbitrator and exchange with each other in advance of the hearing their last best offers. The arbitrator shall be limited to awarding only one of the two figures submitted.

(E) The decision or award of the arbitrator shall be supported by substantial evidence and, in writing, contain the basis for the decision or award and the findings of fact. The decision or award by the arbitrator when made shall be final and binding on both the State and the Contractor. There shall be no right of appeal of the decision and the award shall have the same finality as is accorded awards under the Uniform Arbitration Act, Minnesota Statutes Chapter 572.

(F) 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. That is to say, a claim under this section is defined as the event, transaction, or set of facts that give rise to a claim for compensation costs or expenses or damages which do not exceed $100,000.00 in amount.

(G) Any Contractor having a claim adjustment or dispute for an amount in excess of $100,000.00 may waive or abandon the dollar amount of any such claim in excess of $100,000.00 so as to bring the claim, adjustment or dispute within the scope and coverage of this section provided, however, that the amount allowed to any such Contractor by the arbitration award shall not exceed $100,000.00. Various damages claimed by the Contractor for a single claim may not be divided into separate proceedings to create claims within the $100,000.00 limit.

(H) The claim shall be submitted to a single arbitrator who shall be selected by the parties from a list of arbitrators furnished by the American Arbitration Association. Each party shall alternately strike names from the list until only one name remains. The parties shall advise the American Arbitration Association that the person whose name thus remained on the list of arbitrators is their first choice but that if that person is not able to serve, the two persons whose names were last stricken are acceptable, with the one whose name was last stricken being the first alternate.

Any alternate procedure that is mutually agreed upon by all parties to the dispute for the selection of the arbitrator may be used, but in the absence of mutual agreement the above selection procedures shall be utilized.

(I) Unless mutually agreed to otherwise, the parties shall select the arbitrator within ten Calendar Days after each has received a copy of the list of arbitrators from the American Arbitration Association. If for any reason the parties do not select the arbitrator in the manner and within the time provided herein, the arbitrator shall be selected in accordance with the procedures of the American Arbitration Association.

(J) Each party to the arbitration shall bear its own costs and fees assessed by the American Arbitration Association 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 assessed by the American Arbitration Association for the arbitration and then submit the bill to the Engineer for 50 percent reimbursement.

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

S-4 (1206) PREPARATION OF PROPOSAL

The provisions of Mn/DOT 1206 are hereby deleted and replaced with the following:

1206.1 PREPARATION

The bidder shall submit a Proposal upon the **bid schedule** forms furnished by the Department or in lieu of using the Department's bid schedule, the bidder may use one of the following methods:

(A) The bidder may submit a substitute computer printed bid schedule **WITH THE PROPOSAL.** A substitute bid schedule shall be in a format conforming to the guidelines in the attachment entitled "Guidelines for Approval of Computer Generated Schedule of Prices".

(B) A 3 ½ inch floppy disk containing the bid schedule may be submitted **WITH THE PROPOSAL.** The diskette must be labeled with the company name and the State Project Number. A printed copy of the bid schedule file must also be submitted with the proposal. In the case of a discrepancy, the hard copy will prevail. The EBS files (available at the Mn/DOT Web site:www.dot.state.mn.us) and the AASHTO program "Expedite Bid" **MUST** be used to create the disk.

(C) The bidder may utilize "Two Way Electronic" bidding. The electronic bid must be submitted in accordance with the requirements of AASHTO "Expedite Bid" software and the "Bid Express" Web site (www.bidx.com). A hard copy of the proposal and/or the "Schedule of Prices" is **NOT** required when submitting a bid utilizing "Two Way Electronic" bidding. **If a hard copy of the proposal is submitted with a "Two Way Electronic Bid", the Hard Copy Will Govern.**

The following applies to **all methods** of submitting a bid. The bidder shall:

(a) Specify a unit price in figures for each pay item for which a quantity is given, except as not required in the case of alternative items,
(b) Show the products of the respective unit prices and quantities in figures in the column provided for that purpose, and
(c) Show the total amount of the Proposal obtained by adding the amounts of the several items.

All figures shall be in ink, typed or computer printed. In case of a discrepancy between a unit bid price and the extension, the unit price will govern. The line number, bid item description and quantity shown in the bound proposal (on file with Mn/DOT) will govern over those submitted on a substitute bid schedule and those submitted via "Two Way Electronic" bidding.

When an item in the proposal contains a choice to be made by the bidder, the bidder shall indicate the choice in accordance with the Specifications for that item, and thereafter, no further choice will be permitted.

The bidder's proposal shall be signed with ink by the individual, by one or more members or officers of each firm representing a joint venture, or by one or more officers of a corporation. If the proposal is made by an individual, the name and post office address shall be shown; by a partnership, the name and post office address of each partner shall be shown; as a joint venture, the name and post office address of each member or officer of the firms represented by the joint venture shall be shown; by a corporation, the State in which it is chartered, and the business address of its corporate officials shall be shown.

When the bid is submitted using "Two Way Electronic Bidding", the bidder must sign his bid in conformance with Minnesota Statute Section 161.32, subdivision 1b. The bid must also comply with the requirements of the "Expedite Bid" software and the "Bid Express" Web site (www.bidx.com).

1206.2 ALTERATIONS

The bidders attention is directed to Minnesota Statute Section 161.32 Subdivision 1c, which provides among other things, that a bid will be rejected if it contains any alterations or erasures that are not corrected as follows:

(a) The alteration or erasure must be crossed out and the correction thereof printed in ink or typewritten adjacent to it, and

(b) The correction must be initialed in ink by the person signing the proposal.

Any alteration or erasure made by the bidder in the Proposal in accordance with a specific instruction contained in an "addendum" will not be considered an "alteration or erasure" within the meaning of the Statute.

S-5 (1207) IRREGULAR PROPOSALS

The provisions of Mn/DOT 1207 are hereby deleted and replaced with the following:

S-5.1 Proposals will be considered irregular and may be rejected for any of the following reasons:

(1) If the Proposal is on a form other than that **allowed in Mn/DOT 1206**, or if the **Proposal** is altered.

(2) If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the Proposal incomplete, indefinite, or ambiguous as to its meaning.

(3) If the bidder adds any unauthorized provisions reserving the right to accept or reject an award, or to enter into a Contract pursuant to an award.

(4) If the Proposal does not contain a unit price for each pay item listed except in the case of authorized alternate pay items.

(5) If any unit prices are obviously unbalanced, either in excess of or below the reasonable cost analysis values.

S-6 (1209) DELIVERY OF PROPOSALS

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

S-6.1 Each "Two Way Electronic" bid submitted shall:

- include a proposal guaranty
- be submitted in accordance with requirements of the AASHTO "Expedite Bid" software and the "Bid Express" Web site (www.bidx.com).
- Must be filed prior to the time specified in the Advertisement for Bids.

S-7 (1210) WITHDRAWAL OR REVISION OF PROPOSALS

The first sentence of Mn/DOT 1210 (1) is hereby deleted and replaced with the following:

(1) Each Addendum will be sent by UPS to each prospective bidder who has received a Proposal form prior to the date of the Addendum.

S-8 (1213) DISQUALIFICATION OF BIDDERS

The provisions of Mn/DOT 1213 are hereby deleted and replaced with the following:

S-8.1 Either of the following reasons may be considered sufficient cause for disqualification of a bidder and the rejection of his Proposals:

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

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

S-9 (1403) EXTRA WORK

The second paragraph of Mn/DOT 1403 is hereby deleted and the following substituted therefore:

Minor Extra Work shall not exceed $25,000 per individual occurrence.

S-10 (1404) MAINTENANCE OF TRAFFIC AND (2563) TRAFFIC CONTROL

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

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

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

S-10.1 TRAFFIC CONTROL

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

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

(C) The Contractor shall notify the Engineer in writing at least 48 hours prior to the start of any construction operation that will necessitate lane closure or internal traffic control signing.

(D) The Contractor shall inspect, on a daily basis, all traffic control devices, which the Contractor has furnished and installed, and verify that the devices are placed in accordance with **the Traffic Control Layouts,** these Special Provisions, and/or the MN MUTCD. Any discrepancy between the placement and the required placement shall be immediately corrected. The person performing this inspection shall be required to make a daily log. This log shall also include the date and time any changes in the stages, phases, or portions thereof go into effect. The log shall identify the location and verify that the devices are placed as directed or corrected in accordance with the Plan. All entries in the log shall include the date and time of the entry and be signed by the person making the inspection. The Engineer reserves the right to request copies of the logs as he deems necessary.

(E) The Contractor shall be required to respond immediately to any call from the Engineer or his designated representative concerning any request for improving or correcting traffic control devices. If the Contractor is negligent in correcting the deficiency within one hour of notification the Contractor shall be subject to the hourly charge as set forth in Section S-20.2 (FAILURE TO COMPLETE THE WORK ON TIME) of these Special Provisions.

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

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

(G) Measurement and Payment:
Traffic Control will be measured and paid for as follows:

Lump Sum Traffic Control under Item(s) 2563.601 (Traffic Control).

The lump sum payment(s) shall be compensation in full for all costs of furnishing, installing, maintaining, relocating, and removing the individual traffic control devices as shown on the Traffic Control Layouts in the Plans and/or as specified in these Special Provisions. The lump sum shall also include any extra signing needed to facilitate traffic switches or for transitioning traffic from one stage to another.

If the Contractor requests changes in traffic control as shown on the Traffic Control Layout(s), and these changes are implemented, there will be no increase or decrease in the lump sum payment(s) for the stage(s) of traffic control.

Partial payments for lump sum Item 2563.601 (Traffic Control) will be made as follows:

1. When all traffic control devices for an individual stage, as shown on the Traffic Control Layouts, have been installed, 75% of the Contract Unit Price for that stage will be paid.

2. When all work in an individual stage and all traffic control devices for that stage are removed, the remaining 25% of the Contract Unit Price for that stage will be paid.

S-10.2 VEHICLE WARNING LIGHT SPECIFICATION

All Contractors', subcontractors' and suppliers' mobile equipment, which are working in the lane closure or within 4.5 m [15 feet] of the lane closure, shall be equipped with operable warning lights which meet the appropriate requirements of the SAE specifications. This would include any vehicle which enters the traveled roadway at any time. The SAE specification requirements are as follows:

360 Degree Rotating Lights - SAE Specification J845

Flashing Lights - SAE Specification J595

Flashing Strobe Lights - SAE Specification J1318

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

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

Vehicle Warning Lights
Office of Construction MS650
Transportation Bldg. OR by calling: (651)296-3126
395 John Ireland Blvd.
St. Paul, MN 55155

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

S-10.3 TEMPORARY LANE CLOSURE REQUIREMENTS:

(A) Unless otherwise authorized by the Engineer, any temporary lane closure extending to or beyond 300 m [**1000 feet**] shall have a minimum of one Type III barricade placed in the closed lane for every 300 m [**1000 feet**] of extension.

(B) All temporary lane closures used at night shall have plastic drum-like channelizers, Type I or Type II barricade or Direction Indicator Barricade in the lane closure taper and also in any shifts in traffic alignment.

(C) Temporary lane closures will not be permitted during inclement weather, nor any other time when, in the opinion of the Engineer, the lane closure will be a greater than normal hazard to traffic.

(D) Temporary lane closures or other restrictions by the Contractor, during work hours and consistent with the time restrictions, will be permitted during those hours and at those locations approved by the Engineer. Requests for temporary lane closures shall be made at least 24 hours prior to such closures. When a temporary lane closure is used by the Contractor, the closure shall be incidental work and no direct compensation will be made therefore.

(E) Temporary lane restrictions will not be permitted between the hours of 6:00 A.M. and 8:00 A.M. and between the hours of 3:00 P.M. and 6:00 P.M. **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 the hourly charge as set forth in Section S-20.3 (FAILURE TO COMPLETE THE WORK ON TIME) of these Special Provisions.

(F) 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.

(G) 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 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 five (5) 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.

(H) 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 under Item 2563.601 (Police Officer).

S-10.4 GENERAL REQUIREMENTS:

(A) 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.

(B) 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.

(C) 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.

(D) 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.

(E) All personnel working on or near the traveled roadway 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. These garments shall be considered an incidental expense for which no direct compensation will be made.

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.**

(F) 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/Division 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.

(G) 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.

S-10.5 MAINTENANCE AND STAGING OF TRAFFIC CONTROL

(A) **NOTE: The staging for Bridge 2710-2440 shall consist of constructing Stage 7 first, followed by the construction of Stage 6 second.**

(B) No work, on Bridge 2710-2440, shall be performed on the day of July 26, 2003, unless approved by the Engineer. The Contractor shall minimize construction materials and equipment on the bridge so as to permit the closing of Bridge 2710-2440 on July 26, 2003. The bridge will be closed for an Aquatenial Fireworks Display. The east (northbound traffic lanes) side of the bridge will be utilized for this event.

(C) The Contractor shall maintain, at all times, the existing traffic movements at the following intersections: 2nd Street S; 2nd Street SE; Ortman Street; University Avenue NE; Spring Street NE; 14th Avenue NE; Quincy Street NE; Monroe Street NE; Polk Street NE; Fillmore Street NE; Jackson Street NE; and Tyler Street NE.

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

(E) 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.

(F) 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.

(G) The Contractor shall at all times maintain a lane width of not less than 12 feet in each direction. Lane widths less than 12 feet will only be allowed if approved by the Engineer.

(H) The Contractor shall notify Douglas Maday, City of Minneapolis, phone number 612-673-5755 at least 24 hours prior to posting any parking ban within the City.

(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, they 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-10.6 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 5 days prior to beginning any work that will interfere with any traffic signal system or its detectors.

The Contractor shall maintain street lighting by means of the in place lights, except as otherwise authorized in writing by the Engineer.

S-10.7 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**
2563.618	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-11 (1506) SUPERVISION BY CONTRACTOR

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

At the Preconstruction Conference the Contractor shall designate in writing who the competent superintendent and competent individual (if different) will be for this Project. These persons can only be changed throughout the duration of the Project by submission of written authorization to the Engineer by the Contractor. The submittal of these persons shall be done before any work is performed on this Project.

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

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

S-12 (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-12.1 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.

Burlington Northern RR
City of Minneapolis
Metro Transit
CenterPoint Energy/Minnegasco
Excel Energy
Qwest Communications, Company
Transtop Minnesota
Time Warner Cable
Qwest Corporation

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

S-12.2 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-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 (1602) NATURAL MATERIAL SOURCES

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

S-14.1 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-14.2 **State Historical Preservation Office (SHPO)**

(A) It will be Mn/DOT's responsibility to obtain a SHPO concurrence for State owned or leased Natural Material Sources if listed in the Construction Plan.

(B) Existing or New Natural Material Sources

The expansion of any existing sources, if outside the previous SHPO concurrence area, or the creation of new sources, will be subject to the review of the Mn/DOT Cultural Resources Unit 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 Mn/DOT Cultural Resources Unit, at Contractor's expense, before any material from the requested sources can be used on State Projects. Any time delays are the responsibility of the Contractor and are not a basis for claim for damages due to delay of Contract.

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

Mn/DOT Cultural Resources Unit
Office of Technical Support
Mail Stop 676, Room 715
395 John Ireland Blvd.
St. Paul, MN 55155-1899
Attn: G. Joseph Hudak
Chief Archeologist
(651) 296-6116.

The request shall include:

(a) State Project No.

(b) Project Engineer's name and Phone No.

(c) Mn/DOT Aggregate source #, if applicable.
Contact: Terry Beaudry - Telephone (651) 779-5610
Aggregate Units ASIS database

(d) A location map (preferably a 1:24,000 USGS Topographic Map with the Map Name included) which shall show the following:
- The County
- Township and Range, Township Name, Section No.__, with 1/4 1/4 land description
- Dimensions of the area

(e) Close up photographs of any buildings in or adjacent to the material source.

The Contractor shall give the Project Engineer a copy of the request, Mn/DOT's determination of effect and the SHPO concurrence before material from these sources can be used on any State Project.

(2) If the Mn/DOT Cultural Resources determines that no historic properties will be affected and SHPO concurs, no further action is required by the Contractor. This process, including both the review by Mn/DOT and the SHPO, can take up to 60 days, once the request has been received by the Mn/DOT Cultural Resource Unit.

HOWEVER

(3) When Mn/DOT requires a Cultural Resource Field Survey, the Contractor shall secure professional services to make a survey and prepare a report for Mn/DOT's review and SHPO concurrence.

(a) The survey must be done when the ground is free of snow and frost.

(b) The Contractor must choose an Archaeologist or Historian from the list on file at the SHPO.

(c) The cost and scheduling of the Survey and Report are the Contractor's responsibility.

(d) Mn/DOT's review may take up to 30 days and SHPO's review will take at least 30 days after the receipt of the field survey report.

S-15 (1706) EMPLOYEE HEALTH AND WELFARE

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.

(C) A $50.00 penalty (per incident) will be assessed against the Contractor each time failure to comply with these backup requirements is observed on the Project site.

(D) None of the penalty(ies) listed above shall be considered by the Contractor as allowance of noncompliance incidents of these backup requirements on this Project. The Contractor is advised that at any time the Contractor is not in compliance, the Engineer may take additional remedial

measures which may include, but not be limited to, contacting the Contractor's insurance company and/or MN/OSHA.

S-16 (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:

The Contractor shall conform with all NCHRP Report 350 requirements for temporary traffic control devices used on this Project. Crash testing of work zone Category II devices went into effect on October 1, 2000. Crash testing requirements will only apply to those devices purchased after October 1, 2000. Devices purchased prior to October 1, 2000, may be used through their useful life.

S-17 (1801) SUBLETTING OF CONTRACT

The provisions of Mn/DOT 1801 are modified as follows:

S-17.1 The second sentence of the first paragraph of Mn/DOT 1801 is modified to read:

In case consent is given, the Contractor will be permitted to sublet a portion thereof, but the Contractor's organization shall perform work amounting to not less than 30 percent of the total original Contract cost.

S-17.2 The first sentence of the second paragraph of Mn/DOT 1801 is modified to read:

On Contracts with Disadvantaged Business Enterprise (DBE) or Targeted Group Business (TGB) established goals, or both, the Contractor's organization shall perform work amounting to not less than 30% of the total original Contract cost.

S-18 (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-19 (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-19.1 Construction operations shall be started on or before July 7, 2003 or within eight (8) Calendar Days after the date of Notice of Contract Approval, whichever is later.

S-19.2 All work required under this Contract for Bridge 2710-27164, except maintenance work and Final Clean Up shall be completed to the satisfaction of the Engineer on or before August 29, 2003.

S-19.3 All work required under this Contract for Bridge 2710-2440, except maintenance work and Final Clean Up shall be completed to the satisfaction of the Engineer on or before October 17, 2003.

S-19.4 All work including maintenance and Final Clean Up shall be completed to the satisfaction of the Engineer on or before October 31, 2003.

S-20 (1807) FAILURE TO COMPLETE THE WORK ON TIME

Liquidated damages will be assessed in accordance with the provisions of Mn/DOT 1807, as modified herein, and the amount(s) deducted from any monies due or coming due to the Contractor in an amount(s) equal to the following:

S-20.1 If, at any time, the Contractor fails to, in a timely manner, properly furnish, install, maintain or remove any of the required traffic control devices as set forth in Section S-10 (MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL) of these Special Provisions, the Department reserves the right to properly correct the deficiency. Each time the Department takes such corrective action, the costs thereof, including mobilization, plus $5,000 will be deducted from monies due or coming due the Contractor.

S-20.2 The Contractor will be subject to an hourly charge for failure to maintain the traffic control devices as set forth in Section S-10.1E (MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL) of these Special Provisions. Non-compliance charges, for each incident, will be assessed at a rate of $250.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.

S-20.3 The Contractor will be subject to an hourly charge for failure to remove temporary lane restrictions outside the permitted hours as set forth in Section S-10.3E (MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL) of these Special Provisions unless authorized by the Engineer. Non-compliance charges, for each incident, will be 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.

S-20.4 The Contractor will be subject to an hourly charge for failure to furnish, install and/or maintain the interim pavement markings as set forth in the Traffic Control Plans. 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. However, no charge will be made if the deficiency is corrected within one hour of notification.

S-20.5 Liquidated damages will be assessed in accordance with the provisions of Mn/DOT 1807, except that in lieu of 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 $2,500 per Calendar Day for failure to complete all the work under the Contract in the time specified in Sections S-19.2, S-19.3 and S-19.4 (DETERMINATION AND EXTENSION OF CONTRACT TIME) of these Special Provisions, until that work is, in all things, completed to the satisfaction of the Engineer.

S-20.6 The liquidated damages as set forth above may apply equally, separately, and may be assessed concurrently.

S-21 (1904) EXTRA AND FORCE ACCOUNT WORK

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

S-21.1 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-21.2 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-21.3 The third paragraph of Mn/DOT 1904 (4) Miscellaneous Compensation is hereby deleted and the following substituted therefore:

For any Force Account work performed by a subcontractor, the Contractor will be paid the actual costs, if considered reasonable by the Engineer, of its performance as computed on the foregoing basis. The Department will pay one, and only one, additional allowance to cover administration, general superintendence, overhead, profit, and expenses not otherwise recoverable. The additional allowance will be a percentage of the total Force Account invoice equal to 10 percent of the first $50,000 plus 2 percent of the balance in excess of $50,000.

S-22 (2102) PAVEMENT MARKING REMOVAL

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

S-22.1 The second sentence of Mn/DOT 2102.1 is changed to read as follows:

"The markings will usually be in the form of 100 mm (4 **inch**) wide widths, in solid line or skip line lengths, but may include other patterns or widths and the type will be as (one) of the following:"

(A) Pavement Marking Removal: this work shall consist of the removal of non-durable pavement markings such as paint type markings as commonly used by Mn/DOT stripers.

(B) Pavement Marking Removal - Permanent: this work shall consist of the removal of durable pavement markings. Examples are epoxy, polymer preformed or thermoplastic markings.

S-22.2 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' 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-22.3 Measurement will be in accordance with Mn/DOT 2102.4.

S-22.4 Payment will be in accordance with Mn/DOT 2102.5 and the following is added to the schedule:

Item No.	Item	Unit
2102.501	Pavement Marking Removal - Permanent	square meter **(square foot)**
2102.502	Pavement Marking Removal - Permanent	meter **(linear foot)**

S-23 (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-23.1 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-23.2 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 method of waste material transport and waste material disposal site.
- Dispose material at an endsite and method pre-approved by Mn/DOT i.e.: green treated wood/creosote treated wood waste disposed of at landfill or creosote treated wood burned at an incinerator that is permitted by the Minnesota Pollution Control Agency for burning creosote. Disposal must meet Minnesota Pollution Control Agency Regulations and Mn/DOT ***Criteria***.
- Within 30 days provide the Project Engineer all records indicating type of treated wood, quantity, date, and location of disposal of all waste taken off site. Records include but are not limited to invoices and scale tickets.

(B) ***Criteria***

For each site the Contractor shall:

- Dispose arsenically treated wood (chromated copper arsenate, CCA, green, brown, ammoniacal copper arsenate, ACA, ammonial copper zinc arsenate, ACZA).
- The Contractor has the option to dispose creosote treated wood in a pre-approved landfill. A list of Mn/DOT pre-approved landfills for disposal is listed below in (C). **This is presently the only option of disposal for green treated wood.**
- Have the option for creosote treated wood to be transported, chipped, and incinerated at a Mn/DOT pre-approved chipper and incinerator. The following are Mn/DOT approved wood transporters and chippers: Wood Recyclers of America Inc. (WRA) and Environmental Management Resources (EMR, Inc.). The following are Mn/DOT approved incinerators: Northern States Power, Lake Superior Paper, and Blanden Paper. **This applies to waste creosote treated wood only.**
- All records indicating type of treated wood, quantity, date, and location of disposal shall be kept on file. Records include but are not limited to invoices and scale tickets.

(C) ***Non-hazardous waste, Landfill Disposal***

The following solid waste/industry/sanitary land fills are currently acceptable for this use:

LANDFILL	LOCATION	TELEPHONE
*Brown County	Sleepy Eye, MN	(507)233-6660
Cottonwood County	Windom, MN	(507)831-3781
*Crow Wing County	Brainerd, MN	(218)828-4392
Elk River	Elk River, MN	(763)441-2106
Fergus Falls**	Fergus Falls, MN	(218)736-5916
Forest City	Buffalo, MN	(320)963-3158
Kandiyohi	New London, MN	(320)354-2707
Lyon County	Marshall, MN	(507)537-6733
Mar-Kit	Hallock, MN	(218)754-4581
Nobles County	Rushmore, MN	(507)478-4596
Northeast Ottertail**	Fergus Falls, MN	(218)739-2271
Olmsted County-Kalmar	Rochester, MN	(507)285-8515
Polk County	Fosston, MN	(218)281-5419
*Renville County	Olivia, MN	(320)523-3676
Rice County	Dundas, MN	(507)332-6101
St. Louis County***	Virginia, MN	(218)741-2011
Steele County	Blooming Prairie, MN	(507)583-7766
USPCI	Rosemount, MN	(651)438-1500

* Will ***not*** accept waste outside of county.
** Will ***not*** accept creosote treated wood and green treated wood.
Will ***not accept creosote treated wood.

S-24 (2105) EXCAVATION AND EMBANKMENT

Excavation and embankment shall be performed in accordance with the provisions of Mn/DOT 2105 and the following:

S-24.1 The first sentence of the second paragraph of Mn/DOT 2105.3D is hereby revised as follows:

The Contractor shall use disks, plows, graders or other equipment to blend and mix suitable grading soils to produce uniformity in soil texture, moisture content and density; except that, all soils that contain 20 percent or more clay particles shall be blended, mixed and dried with a disk meeting 2123 within the entire upper six feet of the embankment. A disk is also to be used below the upper six feet of the embankment fill area, if in the opinion of the Engineer, the Contractor is not producing a uniform soil texture.

S-24.2 The fifth line in Mn/DOT 2105.3E (3) is revised to read:

"..... top of the subgrade, in layers not to exceed 600 mm **(24 inches)** ..."

S-24.3 The following is added to Mn/DOT 2105.3E:

(6) Granular Materials (i.e., 3149.2B1 and 3149.2B2) which are excavated from below the water table shall not be placed on compacted subgrade soils if the water content of the excavated soils is such that, in the Engineer's opinion, it is causing saturation of the previously placed embankment soils and resulting in the loss of stability and density of these soils.

S-24.4 The following is added to the beginning of Mn/DOT 2105.3F:

The rate of depositing material on the embankment shall not exceed the capacity of the leveling and compaction equipment. Compaction of this material should not be delayed after being placed.

Rollers shall be used to compact the embankment materials in totality (area, layers, etc.). The type of rollers(s) used for compaction shall be sufficient to meet the density requirements, as specified.

The minimum size, gross weight and applied pressure exerted by the roller(s) shall be in accordance with the equipment requirements specified under 2123.

The use of truck, carryall, scrapers, tractors, tractor wagons, or other haulage equipment shall not be considered in lieu of the specified compaction equipment. Construction traffic from such hauling equipment shall be distributed uniformly over the entire embankment to the maximum extent possible.

S-24.5 The following is hereby deleted from Mn/DOT 2105.5 (Basis of Payment)

Item No.	Item	Unit
2105.605	Subsoiling	hectare (**acre**)

S-24.6 The following is added to Mn/DOT 2105.5 (Basis of Payment)

Item No.	Item	Unit
2105.550	Subsoiling	hectare (**acre**)

S-25 (2123) EQUIPMENT RENTAL

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

S-25.1 The first sentence of Mn/DOT 2123.3B (Dozer) is hereby changed to read:

The dozer may be of either the angle-dozer or bull-dozer type attached to a crawler-type tractor having at least 104 kw [**140 horsepower**] at the draw-bar and power operated controls.

S-25.2 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-25.3 The following is added to Mn/DOT 2123.5 BASIS OF PAYMENT:

2123.610 Disk Harrow ..... hour

S-26 (2211) AGGREGATE BASE

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

S-26.1 Compaction shall be achieved by the "Quality Compaction Method" described in Mn/DOT 2211.3C.

S-26.2 Mn/DOT 2211.3F2(d) 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. All gradation tests will be reported to the nearest one-tenth of one percent for the specified sieves.

S-26.3 Mn/DOT 2211.3F2(f) is revised to read as follows:

(f) Each lot will be divided into four sublots.

S-26.4 Table 2211-C in Mn/DOT 2211.3F2 is hereby deleted and replaced with the following:

Table 2211-C
AGGREGATE BASE PAYMENT SCHEDULE
(Individual Test)

% Passing Outside Specified limits *

ALL SIEVES EXCEPT

75 µm (#200) Sieve	75 µm (#200) Sieve	Acceptance Method**
0.1-1.0	0.1-1.0	Substantial Compliance
1.1-2.0	1.1-1.5	5.0 % Price Reduction
2.1-3.0	1.6-2.5	15.0% Price Reduction.
>3.0	>2.5	Corrective Action Reqd.

* Based on individual sample test results.

** To be applied to occasional failure. If the material consistently fails to meet specification requirements, it will be subject to price reduction as determined by the Engineer.

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; however, the reduction will not exceed 50 percent.

S-27 CERTIFIED READY-MIX CONCRETE PLANTS

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

S-27.1 Mn/DOT 2461.4D7 is modified as follows.

The Minnesota Department of Transportation Concrete Manual is available on the internet at the website listed in the Materials Control Schedule.

S-27.2 The following is hereby added to Mn/DOT 2461.4D7a:

Computerized Certificates of Compliance

Computerized means that the concrete mix design quantities actually batched are recorded from load cells and meters. Quantities manually recorded and typed into a computer and printed, do not meet the requirement of a computerized Certificate of Compliance.

S-27.3 The first paragraph of Mn/DOT 2461.4D7c is deleted and the following substituted therefore: (The changes are double underlined).

The ready-mix producer shall determine the moisture content in the fine aggregate (sand), the fine fraction of the coarse aggregate (19 mm- [3/4 **inch**-]), and the coarse fraction (19 mm+ [3/4 **inch**+]) of the coarse aggregate at a rate of one test per 200 cubic meters [**cubic yards**] of Agency concrete production with a minimum of one test per day when more than 20 cubic meters [**cubic yards**] of Agency concrete are produced. Additional tests may be required as dictated by changes in the material. The producer shall complete the initial moisture content and adjust the batch water prior to the start of concrete production each day. If weather conditions allow, the producer may perform moisture testing on representative material the prior evening. The producer shall be responsible for all costs associated with determining the moisture content, including equipment, labor and materials.

S-27.4 The following is hereby inserted after the second sentence in the third paragraph of Mn/DOT 2461.4D7c:

When using a moisture probe, the producer shall verify and chart both the probe moisture content and the oven dry verification moisture test at a minimum rate of once per week.

S-27.5 Mn/DOT 2461.4D7d is modified as follows:

"Audit" Samples are also referred to as " Verification " Samples in the Schedule of Materials Control.

"Companion" Samples are also referred to as "Quality Assurance (QA)" Samples in the Schedule of Materials Control.

S-27.6 The fourth sentence in the first paragraph of Mn/DOT 2461.4D7d is hereby modified to read:

The producer shall complete the initial aggregate gradations prior to the start of concrete production each day. The producer may perform testing on representative material the prior evening

S-27.7 The second and third sentences of the third paragraph of Mn/DOT 2461.4D7d are hereby deleted and replaced with the following:

The audit gradations will be taken at the rate of 1 per day or 1 per 500 cubic meters [**cubic yards**] whichever results in the lowest sampling rate with a minimum of 1 per week. A minimum of 2 audit samples per week is required when Agency production is 3 or more days per week.

For 2003 Construction Season

S-28 (2360) SPECIFICATION SUPERPAVE HOT MIX ASPHALT (TYPE SP)

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

S-28.1 Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

Type SP 12.5 Wearing Course -SPWEB440L

S-28.2 Mix Designations for bituminous mixtures contain the following information:

(1) The first two digits indicate the mix type.
SP = Gyratory Mixture Design
SM = Gyratory Mixture Design for Stone Matrix Asphalt (SMA)

(2) The third and forth digits indicate the course:
WE = Wearing and Shoulder Wearing Course
NW = Non-Wearing Course

(3) The fifth digit (letter) indicates maximum aggregate size:
A = 12.5mm [**1/2 inch**], 9.5 mm [**3/8 inch**] nominal size
B = 19.0mm [**3/4 inch**], 12.5 mm [**1/2 inch**] nominal size
C = 25.0mm [**1 inch**], 19.0 mm [**3/4 inch**] nominal size
E = See provision for SMA design

(4) The sixth digit indicates the Traffic Level (ESAL'S x 10^6).
The requirements for gyratory mixtures in this specification are based on the 20-year design traffic level of the Project expressed in Equivalent Single Axle Loads (ESAL's). The five traffic levels are shown below in Table 2360.1-A.

Table 2360.1-A
Traffic Levels

Traffic Level	20 Year Design ESAL's (1 x 10^6 ESAL's)
2[1]	< 1
3[2]	1 to < 3
4	3 to < 10
5	10 to ≤ 30
6	SMA

1 -- (AADT ≤ 2300)
2 -- (2300< AADT <6000)

(5) The last two digits indicate the air void requirement.
40 = 4.0% for SP and SM Wear mixtures
30 = 3.0% for SP Non-Wear and Shoulder

(6) The letter after the mix designation identifies the performance grade of asphalt cement.
A = PG 52 - 34
B = PG 58 - 28
C = PG 58 - 34
D = PG 58 - 40
E = PG 64 - 28
F = PG 64 - 34
G = PG 64 - 40
H = PG 70 - 28
I = PG 70 - 34
L = PG 64 - 22

S-28.3 Pavement smoothness requirements will be waived for this Project.

S-28.4 The attached **Combined 2360/2350 (Gyratory/Marshall Design) Specification** is hereby modified with the following:

(A) Modify **2360.4F (2a)1** to read:

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-28.5 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 design bulk density 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 (Design bulk Density - 2565)} / 2565]}
% Payment = {100 - [{100 x (Design bulk Density - 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-28.6 Payment for the item of asphalt mixture production at the Contract unit price of mixture produced shall be compensation in full for all costs of producing the mixture and loading it on board the Department's trucks at the mixing plant. The provisions of Mn/DOT 1903 are modified to the extent that the Department will not make a price adjustment in the event of increased or decreased quantities of asphalt mixture items. Payment for plant mixed asphalt surface will be made on the basis of the following schedule:

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-29 (2461) STRUCTURAL CONCRETE

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

S-29.1 The last sentence in Mn/DOT 2461.4D7 is hereby changed to read:

The manual may be obtained via the INTERNET at the following address:

www.mrr.dot.state.mn.us/pavement/concrete/concrete.asp

S-30 (2506) MANHOLES AND CATCH BASINS

Mn/DOT 2506, 3106, and 3616 are modified as follows:

S-30.1 A minimum 690 mm **[27 inch]** opening round cone shall be used instead of the present 600 mm **[24 inch]** opening round cone for all manholes and catch basins. The appropriate existing Standard Plates will be modified accordingly.

S-30.2 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-30.3 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-31 (2533) CONCRETE MEDIAN BARRIER

The provisions of Mn/DOT 2533 are modified with the following:

S-31.1 The following is deleted from Mn/DOT 2533.5:

Item No.	Item	Unit
A	Concrete Median Barrier, Design 8334 Type A	meter (**linear foot**)
2533.504	Concrete Median Barrier, Design 8323	meter (**linear foot**)

S-31.2 The following is added to Mn/DOT 2533.5:

Item No.	Item	Unit
2533.501	Concrete Median Barrier, Design 8334 Type A	meter (**linear foot**)
2533.504	Concrete Median Barrier, Design 8337	meter (**linear foot**)

S-32 (2533) CONCRETE MEDIAN 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-32.1 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-32.2 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.

(4) Shall, upon completion of the Project, dispose of the barrier outside of the Right of Way.

S-33 (2533) RELOCATE CONCRETE MEDIAN BARRIER

This work shall consist of relocating portable concrete median barrier within the Project limits as directed by the Engineer and the following:

S-33.1 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 2533.603 (Relocate Concrete Median Barrier). 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-33.2 Measurement will be made by the length of portable barrier relocated. Payment will be made under Item 2533.603 (Relocate Concrete Median Barrier) at the Contract bid price per meter [**linear foot**], which shall be compensation in full for all costs incidental thereto.

S-34 (2563) POLICE OFFICER

The Contractor shall provide off-duty police officers in accordance with the applicable provisions of the Mn/DOT Standard Specifications, as determined by the Engineer, these Special Provisions, and the following:

S-34.1 Off-Duty police officers shall be provided in order to safely provide for traffic in such numbers and for such times as determined by the Engineer.

S-34.2 The police officers shall be properly uniformed and fully equipped including police car, and shall be paid for by the hour.

S-34.3 The provisions of Mn/DOT 1903 shall not apply to providing police officers.

S-34.4 Payment for police officers at the Contract bid price shall be compensation in full for all costs for providing the police officers. Such payments will be measured and paid for in accordance with the following schedule:

Item No.	Item	Unit
2563.610	Police Officer	Hour

S-35 (2563) RAISED PAVEMENT MARKERS TEMPORARY (TRPMS)

This work shall consist of constructing temporary raised pavement markers and the selected mounting system, placing the marker on the roadway, and removing the marker in accordance with the applicable Mn/DOT Standard Specifications and the attached specification TEMPORARY RAISED PAVEMENT MARKERS (TRPM).

TRPMs will be measured by the number of markers installed. Payment will be made under Item 2563.602 (Raised Pavement Marker Temporary) at the Contract bid price per each.

S-36 (2564) PAINT PAVEMENT MARKINGS

This work shall consist of furnishing and applying paint pavement markings for control and guidance of traffic in accordance with the details shown in the Plans, the attached specifications "THREE MINUTE DRY ALKYD TRAFFIC PAINTS", "HIGH SOLIDS WATER BASED TRAFFIC PAINT", "The Application Specification for Conventional Traffic Marking Paint", and "Specification for Glass Beads, Drop-on Type for Reflectorizing Traffic Paints", and the following:

S-36.1 The white and organic pigmented yellow paints shall be free of toxic heavy metals. The Contractor may furnish and place either the 3- minute alkyd or the water-base material (the latter requires stainless steel components in the delivery system).

S-36.2 Pavement markings will be measured separately by length of each type constructed complete in place as specified. Broken line will be measured by the actual length of line marked and will not include the gap between the broken lines. Pavement messages of each type will be measured separately by the number thereof constructed as specified. Crosswalk markings shall be measured by the area of marking furnished and installed as specified.

S-36.3 Payment for pavement markings of each type and width will be made in accordance with the schedule set forth below at the appropriate Contract bid price for the specified unit of measure. Such payment, in each instance, shall be compensation in full for all costs incidental thereto including, but not limited to; (1) all costs of preparing the surface, (2) controlling and protecting traffic, and (3) maintaining the work, together with any other expenses incurred in completing the work that are not specifically included for payment under other Contract Items.

ITEM NO.	DESCRIPTION	UNIT
2564.602	Pavement Message (____) Paint	Each
2564.603	__ mm [__"] Solid Line White - Paint	meter **[linear foot]**
2564.603	__ mm [__"] Solid Line Yellow - Paint	meter **[linear foot]**
2564.603	__ mm [__"] Double Solid Line Yellow - Paint	meter **[linear foot]**
2564.603	__ mm [__"] Broken Line White - Paint	meter **[linear foot]**
2564.603	__ mm [__"] Broken Line Yellow - Paint	meter **[linear foot]**

S-37 (2564) EPOXY PAVEMENT MARKINGS

This work shall consist of furnishing and applying epoxy resin pavement markings with "beads-on" for the control and guidance of traffic in accordance with the details shown in the Plans, the attached "Specification for Epoxy Resin Pavement Markings" and the following:

S-37.1 Traffic control for striping operations shall be executed in accordance with the "Field Manual for Temporary Traffic Control Zone Layouts", except as may be approved by the Engineer.

S-37.2 Line pavement markings will be measured separately by length of each type placed as specified. Broken lines will be measured by the actual length of line placed and will not include the gap between the skip marks. Crosswalk markings shall be measured by the area of marking furnished and installed as specified.

S-37.3 The epoxy pavement marking thicknesses shall be increased from 15 mil to 20 mil on all 2360 SUPERPAVE wearing courses, on concrete, and on micro-surfacing.

S-37.4 All epoxy pavement markings shall be placed within _3_ Working Days of the completion of the wearing course mixture.

S-37.5 Payment for pavement markings of each type and width will be made in accordance with the schedule set forth below at the appropriate Contract bid price for the specified unit of measure. Such payment, in each instance, shall be compensation in full for all costs incidental thereto including, but not limited to: (1) all costs of preparing the surface, (2) controlling and protecting traffic, and (3) maintaining the work, together with any other expenses incurred in completing the work that is not specifically included for payment under other Contract Items.

ITEM NO.	DESCRIPTION	UNIT
2564.602	Pavement Message (____) Epoxy	Each
2564.603	__ mm [__"] Broken Line White - Epoxy	meter **[linear foot]**
2564.603	__ mm [__"] Solid Line White - Epoxy	meter **[linear foot]**
2564.603	__ mm [__"] Broken Line Yellow - Epoxy	meter **[linear foot]**
2564.603	__ mm [__"] Solid Line Yellow - Epoxy	meter **[linear foot]**
2564.603	__ mm [__"] Double Solid Line Yellow - Epoxy	meter **[linear foot]**
2564.603	__ mm [__"] Stop Line White - Epoxy	meter **[linear foot]**
2564.604	Zebra Crosswalk White – Epoxy	square meter
2564.618	Zebra Crosswalk White – Epoxy	**[square foot]**

S-38 (2581) PAVEMENT MESSAGE REMOVABLE POLY PREFORMED

This work shall consist of the placement of Removable Poly Preformed Pavement Messages in accordance with the applicable Mn/DOT Standard Specifications, at locations shown in the Plan, and the following:

S-38.1 MEASUREMENT

Pavement messages of each type will be measured separately by the number thereof constructed as specified.

S-38.2 PAYMENT

Payment for pavement markings for each type and width shall be made in accordance with the schedule set forth below at the appropriate Contract bid price for the specified unit of measure. Such payment, in each instance, shall be compensation for all costs incidental thereto including, but not limited to; (1) all costs of preparing the surface, (2) controlling and protecting traffic, and (3) maintaining the work, together with any other expenses incurred in completing the work that are not specifically included for payment under other Contract Items.

ITEM NO.	DESCRIPTION	UNIT
2581.602	Pavement Message (____) Removable Poly Preformed	Each

S-39 (2581) REMOVABLE PREFORMED PLASTIC MASK (BLACK)

This work shall consist of furnishing, placing and removing temporary pavement marking material over inplace pavement markings when traffic control must be temporarily changed. This work shall be in accordance with the provisions of Mn/DOT 2581, as modified below. The removable preformed plastic pavement marking material shall conform to the requirements of Mn/DOT 3355.

S-39.1 The 2nd paragraph of Mn/DOT 2581.4 is changed to read as follows:

The measurement is based on a 150 mm [**6 inch**] wide marking tape. Broken line marking will be measured by the actual length of material used and will not include the gap between the broken lines.

S-39.2 Measurement will be made by the length in **linear feet**.

S-39.3 Payment for pavement markings of each type will be made in accordance with the schedule set forth below at the appropriate Contract bid price for the specified unit of measure. Such payment, in each instance, shall be compensation for all costs of furnishing, placing, maintaining, replacing, and removing the Marking.

ITEM NO.	DESCRIPTION	UNIT
2581.603	Removable Pref. Plastic Mask (Black)	meter [**linear foot**]

S-40 (3137) COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE

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

S-40.1 Mn/DOT 3137.2D1(l) is hereby changed to read:

(l) Soundness (Magnesium Sulfate),
Loss at 5 cycles for any fraction of the coarse aggregate as used in the work 15
Materials from two or more sources may not be blended to obtain a fraction meeting this sulfate soundness requirement.

S-41 (3355) REMOVABLE PREFORMED PLASTIC PAVEMENT MARKINGS FOR TRAFFIC LANE DELINEATION AND LEGENDS

The provisions of Mn/DOT 33558 are hereby modified and/or supplemented with the following:

S-41.1 The first paragraph of Mn/DOT 3355.2 is hereby deleted and replaced with the following:

The markings shall be precoated with a pressure sensitive adhesive and shall be capable of adhering to asphalt concrete and Portland cement concrete surfaces in accordance with manufacturer's instructions and shall be immediately ready for traffic after application.

S-41.2 The Qualified Product List is as follows:

3M Stamark Removable Tape Series 620CR
3M Scotch-Lane Wet Reflective Removable Tape Series 750
Garlock Rubber Technologies Series 2000 Removable Tape
Trelleborg R-140 Series Removable Tape

S-42 FINAL ESTIMATE AND FINAL PAYMENT

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

S-42.1 Final Estimate

State Law provides that the final estimate will be made within 90 days after completion of all work required under this Contract. If, however, the total value of the Contract exceeds $2,000,000.00, the 90 day requirement will not apply and the time allowed for making such final estimate shall be 180 days after the work under this Contract has been, in all things, completed to the satisfaction of the Commissioner.

S-42.2 Final Payment

If this Contract contains a "Disadvantage Business Enterprise or Targeted Group Business" goal, the following requirement shall apply:

"Before final payment is made, the Contractor shall also complete an affidavit showing the total dollar amounts of work performed by disadvantaged business enterprise (DBE) and targeted group business (TGB)."

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SB-1 BRIDGE PLANS

Plans of existing structures are available at the Minnesota Dept. of Transportation, Office of Bridges & Structures, 3485 Hadley Avenue N., Oakdale, MN, 55128, for review and inspection by Bidders; however, the State neither warrants nor represents that existing structures conform exactly to the details shown in those Plans.

SB-2 (1706) EMPLOYEE HEALTH AND WELFARE

The provisions of Mn/DOT 1706 are supplemented as follows:

The Contractor shall submit a plan, at the preconstruction conference, for providing all OSHA required safety equipment (safety nets, static lines, false decks, etc.) for all work areas whose working surface is 1.8 meters (**6 feet**) or more above the ground, water, or other surfaces. Submittal of this plan will in no way relieve the Contractor of his/her responsibility for providing a safe working area.

All safety equipment, in accordance with the Contractor's plan, must be inplace and operable in adequate time to allow Mn/DOT personnel to perform their required inspection duties at the appropriate time. No concrete shall be placed in any areas affected by such required inspection until the inspection has been completed.

The installation of safety lines, safety nets, or other systems whose purpose is to reduce the hazards of bridge work may require the attachment of anchorage devices to beams, girders, diaphragms, bracing or other components of the structure. Clamp type anchorage systems which do not require modification of structural members may be used provided they do not interfere with proper execution of the work; however, if the Contractor desires to use an anchorage system which requires modification of structural members, s/he shall request approval, in writing, for plan modification as provided in Mn/DOT Specifications. Requests to install systems which require field welding or drilling of primary stress carrying members of a bridge will not be approved. The Contractor shall indicate any portions of anchorage devices which will remain permanently in the structure.

On both ends of each pier cap extending 1.8 meters (**6 feet**) or more above the ground, the Contractor shall install an insert or other suitable anchorage to which safety lines can be attached. Any portion of said device extending outside the finished lines of the pier cap shall be removed unless otherwise approved by the Engineer. Any void or cavity resulting from the installation or removal of this device shall be repaired or sealed to prevent the ponding or entry of water as directed by the Engineer.

Approved anchorage systems shall be furnished, installed, and removed at no increased cost to the State for materials, fabrication, erection, or removal of the bridge component or anchorage system.

SB-3 (1709) NAVIGABLE WATERWAYS

All work on navigable waters shall be performed in accordance with the provisions of Mn/DOT 1709 and the following:

All work on or in navigable waters shall be subject to regulations formulated by the United States Coast Guard, Department of Transportation.

The Contractor shall prepare plans showing the location and dimensions of his/her proposed cofferdams and other temporary construction which may directly or indirectly affect navigation clearances or impede or divert steam flow, as well as his/her proposed method of furnishing, installing, operating and maintaining temporary navigation lights.

The Contractor shall forward 8 sets of prints to the Commander, (OBR), 8th Coast Guard District, 1222 Spruce Street, St. Louis, Missouri 63103 for approval. When approval has been obtained from the Coast Guard, two sets of prints with such approval noted thereon, shall be furnished to the Project Engineer.

No work shall be started on any construction which requires approval of the above noted governmental agency until notice of approval has been furnished the Project Engineer.

Approval by the Coast Guard of the location and dimensions of cofferdams and other temporary construction shall not in any way relieve the Contractor of his/her responsibility for providing adequate and safe construction; nor shall it in any way alter any requirements for forwarding plans of cofferdams and other temporary construction to the Project Engineer for approval as to type of construction.

All costs incurred by compliance with the above requirements will be considered to be incidental expense for which no direct compensation will be made.

SB-4 (1717) AIR, LAND AND WATER POLLUTION

The provisions of 1717 are supplemented as follows:

The Contractor's attention is hereby directed to MPCA Rule 7011.0150 as it relates to sandblasting and/or concrete removal operations.

Unless otherwise provided in these special provisions, construction, demolition and/or removal operations conducted over or in the vicinity of public waters shall be so controlled as to prevent materials from falling into the water. Any materials which do fall into the water, or onto areas where there is a likelihood that they will be picked up by rising water levels, shall be retrieved and stored in areas where such likelihood does not exist.

SB-5 (1803) PROSECUTION OF WORK

The work under this Contract shall be prosecuted in accordance with the provisions of Mn/DOT 1803, except as modified below:

The provisions of Mn/DOT 1803.3 are supplemented as follows:

The Contractor's attention is hereby called to the requirements for stage construction as indicated in the Plans and/or Special Provisions. The Contractor shall submit plans and schedules to the Engineer for approval detailing his/her proposed scheme and sequence of operations, including traffic channelization, flagging, protective installations, and other pertinent procedures to be employed both on and off of the structure.

No compensation, other than for plan pay items, will be made for complying with the above requirements.

SB-6 (2401) CONCRETE BRIDGE CONSTRUCTION

This work shall be performed in accordance with the provisions of Mn/DOT 2401 except as modified herein:

SB-6.1 Concrete Aggregate for Bridges

Delete the second paragraph of 2401.2A and substitute the following therefore:

Class A or Class C coarse aggregate, as defined in 3137.2B, shall be used in all concrete for bridge superstructures, except that coarse aggregate requirements for precast concrete members fabricated under 2405 shall be as specified in 2461.2D.

SB-6.2 Falsework and Forms and Bridge Slab Placement - Bridge No. 2440

The existing slab of Br. No. 2440 is designed to be supported at each cap beam. Adequate support of the slab during reconstruction of the joints is dependent on the Contractor's removal limits and the Contractor's care during removal and reconstruction operations. Subject to the Engineer's approval, it shall be the Contractor's responsibility to determine if the slab requires a temporary support during reconstruction and what type of system to use. The hanger assembly shown in the plans is one possible support system.

Delete paragraphs 2, 3 and 4 of 2401.3B2 and substitute the following:

At least six weeks before starting reconstruction of the deck joints, the Contractor shall supply the Engineer with three copies of the detailed Plans and Specifications and two copies of the associated calculations of the proposed temporary support system for reconstructing the deck joints forms. Design shall be in accordance with AASHTO "Guide Design Specifications for Bridge Temporary Works". The Plans and Specifications shall be prepared by an engineer, thoroughly checked for completeness and accuracy, and certified by a professional engineer licensed in the State of Minnesota. The documents shall include sufficient details so that construction of the proposed system can be completed solely by reference to the Plans and Specifications. The design criteria shall be shown on the first sheet of the Plans.

As a minimum, plans shall contain the following:

(1) The size of all load-supporting members and all transverse and longitudinal bracing. Connection details for load-supporting members must be included.

(2) All design-controlling dimensions must be shown, including beam length and spacing; post location and spacing; overall height of falsework bents; vertical distance between connectors in diagonal bracing; and similar dimensions that are critical to the design.

(3) The location and method by which the falsework will be adjusted to final grade must be shown.

Add the following to 2401.3B4:

The Contractor will not be permitted to place the concrete for the superstructure until (1) Plans and Specifications meeting the above requirements have been provided to the Engineer; (2) the engineer who has certified plans and specifications for the falsework and forms has inspected the falsework after erection; and (3) the engineer inspecting the as-constructed falsework certifies in writing that all details are approved.

Add the following to 2401.3F3b(1):

If concrete is cast by means of a pumping operation, the Contractor shall maintain a standby pump or crane capable of delivering an uninterrupted flow of concrete in case of a pump breakdown.

Payment for the temporary slab support materials, installation, removal and deck repair shall be included in price bid for Item 2433.603, "RECONSTRUCT EXPANSION JOINT TYPE A OR D".

SB-6.3 The provisions of 2401.3J1 are modified as follows:

Prior to installation of sealing materials, concrete curing shall be completed. A minimum of 7 days drying is required prior to application of sealers. Sawcut joints shall be sandblasted and blown clean and the concrete surfaces shall be dry at the time sealer is installed.

SB-6.4 Joint and Crack Sealing

Preformed joint shall be as detailed in the Plans and in conformance with the following requirements.

1. Bituminous felt shall comply with AASHTO M33, modified to the extent that the load required to compress the test specimen to 50 percent of its thickness before test shall be not more than 8274 kPa **(1200 psi)**.

2. Cork shall comply with Mn/DOT 3702 and AASHTO M153 Type II.

3. Polystyrene shall comply with the following:

Type	Minimum Compressive Strength (5 percent deflection)	Characteristics
A	207 kPa (**30 psi**)	Closed Cell Expanded Polystyrene
B	69 kPa (**10 psi**)	Molded Polystyrene

Testing for compressive strength of polystyrene shall be in accordance with ASTM D 1621. The Contractor shall, if requested by the Engineer, furnish evidence that the material meets these requirements.

SB-6.5 Finish of Inplace Concrete

A "special surface finish" as described in 2401.3F2c will be required on the following exposed concrete surfaces of Bridge No. 2440:

Roadway face of both "J" barriers

The concrete surfaces shall be etched by sandblasting before applying the special surface finish.

Payment for Item No. 2401.618 "SPECIAL SURFACE FINISH (INPLACE)", at the Contract price per square foot shall be compensation in full for performing all work described above complete in place.

SB-6.6 Ordinary Surface Finish

Add the following to the fourth paragraph of 2401.3F2a:

At locations where surface is not exposed or where the Engineer determines that the appearance of the completed structure will not be adversely affected, cavities caused by removal of falsework brackets, form ties or hanger rods may be filled with an approved silicone caulk. The cavities shall be thoroughly cleaned prior to filling with caulk.

SB-6.7 Curing Bridge Deck Slabs

Delete the first sentence of the 11th paragraph of 2401.3G and substitute the following:

After completion of the tine texturing for bridge deck slabs and after free water has disappeared from the surface, the Contractor shall apply a white pigmented linseed oil curing emulsion.

The linseed oil curing emulsion shall be in accordance with one of the following, or an approved equal.

A. "TK-L368 White" as manufactured by TK Products, 11400 West 47th Street, Minnetonka, Minnesota 55343.

B. "TRI-DAR 33/2" as manufactured by Tamms Industries Co., 3835 State Route 72, Kirkland, Illinois 60146.

C. "Lin-Seal White" as manufactured by W.R. Meadows Inc., P.O. Box 543, Elgin, Illinois 60121.

SB-7 (2402) STEEL BRIDGE CONSTRUCTION

This work shall be performed in accordance with the provisions of Mn/DOT 2402 except as modified below:

SB-7.1 Expansion Joint Devices

The following consists of fabricating waterproof expansion devices in accordance with 2402 and installing them on Bridge No. 2440 at the locations shown in the Plan.

A. The Contractor shall:

1. Furnish a single diaphragm unreinforced neoprene gland whose physical and chemical properties conform to 3721 except:

(a) Do not use the requirements and test methods for the Compression-Deflection Characteristics and the Recovery Under Deflection specified in 3721.2A3 and

(b) Substitute Durometer requirement of 60 plus or minus 5 for that which is shown in 3721.2A3.

2. Make the gland 6.4 mm (**¼ inch**) thick, subject to a minimum thickness of 5.6 mm (**7/32 inch**).

3. Submit 300 mm (**12 inches**) of seal material from each lot of material for testing if required by the Project Engineer.

4. Furnish certified test results from the manufacturer attesting to the physical and chemical properties of the expansion joint devices in accordance with 1603. Provide copies of the test results for the Project Engineer, the Materials Engineer, and the Structural Metals Engineer.

B. The Contractor shall provide one of the devices shown below or an approved equal. The components shall be in accordance with the physical and chemical properties shown in the brochure and drawing described below except as modified by these Special Provisions.

1. "Wabo Strip Seal" as manufactured by Watson Bowman Acme Corporation and as detailed in Wabo Strip Seal System Product Data brochure dated 1995. Use Type A (previously designated A3) steel extrusion with SE Series neoprene gland.

2. "Steelflex® SSA2 Series" as manufactured by the D. S. Brown Company and as detailed in their 2000 SteelFlex Brochure. Use the A2R series neoprene gland. Joints shall be modified as detailed on the manufacturer's drawing dated 10-28-92: for joints with skews from 5 to 50 degrees, modify one rail by welding a 13 mm x 38 mm (**½" x 1½"**) backer bar at locations shown on Mn/DOT Fig. 5-397.628. Backer bar lengths shall be 102 mm (**4"**) for skews between 5 and 15 degrees, 127 mm (**5"**) if greater than 15 but not exceeding 35 degrees and 165 mm (**6½"**) over 35 degrees. When plow fingers are required by the plan, modify both rails as detailed.

C. The Fabricator will be permitted to weld pre-galvanized sections of expansion device steel rail, complete with anchorages. If the steel rail is pre-galvanized, the Fabricator shall:

1. Provide roadway sections that are not less than 3 meters (**10 feet**) long.

2. Provide an anchorage within 229 mm (**9 inches**) of each end of the sections. This may require inclusion of additional anchorages.

3. Bevel abutting ends 6 mm (¼ **inch**) on 3 edges and de-burr the edges.

4. Prepare the surfaces to be welded as per 2471.3F5.

5. Groove weld the sections on 3 sides and take care to prevent weld metal from entering the gland groove.

6. Grind the weld smooth that is across the top of the extrusion.

7. Repair the welded surface as per 2471.3L1.

D. Unless the gland is shop installed, the Fabricator shall install filler material in the gland groove in the steel rail to protect against entry of dirt and debris. Filler material shall be installed at the fabrication shop prior to storage or transportation of completed expansion device.

E. The Contractor shall:

1. Remove filler material and clean all neoprene to steel contact areas of all dirt, oil, grease, or other contaminants before installing the neoprene gland.

2. Lightly sandblast the contact areas so as to roughen but not damage the galvanized surface just before applying the lubricant adhesive.

3. Apply lubricant adhesive on both neoprene and steel contact areas when installing the gland.

4. Install the gland with tools recommended by the manufacturer for gland installation (use of other tools is prohibited).

F. Lubricant Adhesive

The lubricant adhesive shall conform to the requirements of ASTM D 4070. The Contractor may supply one of the following brands or an approved equal.

1. Delastibond part no. 1520 as supplied by the D.S. Brown Co.

2. Prima-Lub as supplied by the Watson Bowman Acme Corp.

3. Lube Plus 4070 as manufactured by The Spray Cure Co.

4. Neoprene Adhesive D 4070-81 as manufactured by Pacific Polymers Inc.

G. All expansion joint cover plates on pedestrian bridges and sidewalk areas shall be raised pattern plate.

H. Payment shall be made as Item No. 2402.591, "Expansion Joint Devices Type Special" and shall include all labor and materials required to fabricate and install.

SB-8 (2404) CONCRETE WEARING COURSE FOR BRIDGES

This work shall be performed in accordance with the provisions of Mn/DOT 2404 except as modified below:

SB-8.1 Concrete Wearing Course 3U17A - Bridge No. 2440

Delete the provisions of 2404.1 and substitute the following:

This work shall consist of constructing a portland cement concrete wearing course to a 50 mm (**2 inch**) minimum depth in the Type 1 and Type 3 slab removal areas of Bridge No. 2440.

Delete the first paragraph of 2404.2, delete 2404.2A in its entirety, and substitute the following:

The wearing course shall be composed of Low Slump Concrete, produced in accordance with the following:

Add the following to 2404.2B:

The substitution of Ground Granulated Blast Furnace Slag Cement is not permitted regardless of any other provision of the Contract.

Add the following to 2404.3A:

After the surface to be overlaid has been cleaned, and immediately before placing the wearing course, the surface shall be sandblasted in accordance with the following:

The sandblasting shall be of sufficient force and duration to remove all surface film, latence, fractured concrete particles, and other materials that may impede the bond of the subsequent overlay.

Use of steel shot for sandblasting is permitted provided that materials that may impede the bond of the overlay are removed.

Special precautions shall be taken to control and abate the dust generated by the blasting operation in accordance with MPCA Rule 7005.0550. The Contractor shall submit his/her proposed plan for dust abatement at least 14 days before the start of this work. This abatement plan shall include, but not necessarily be limited to, the following operations and procedures:

A. The surface shall be thoroughly swept prior to blasting. A power sweeper shall use the least amount of water necessary to minimize the dust from the sweeping operation.

B. The blast wheel or blasting nozzle or nozzles shall be enclosed in a housing or directed into a housing. The housing shall have a negative air emission control system that draws the confined air and dust into an adequate filter collection system. The capacity of the exhaust system shall be sufficient to readily relieve the pressure generated within the housing by the blasting equipment. The filter collection system shall be cleaned, as necessary, to assure proper filtration. The sides and corners of the housing shall be flexible at the bottom to the extent that the bottom of the housing shall be in contact with the deck surface during all blasting operations.

C. The housing and/or filter collection system shall be constructed, maintained, and operated so that avoidable dust emissions are eliminated.

D. After blasting, the prepared surface shall be thoroughly hand swept or swept with a "Pickup" type power sweeper equipped with adequate dust storage capacity. All minor debris remaining after the sweeping operation shall be completely removed by airblasting. The air supply system shall be so constructed that a suitable oil trap is placed in the air supply line between the storage tank and the nozzle.

Measurement will be made by the area, in square meters (**feet**), based on the Type 1 removal area.

Payment for performing this work, as described above, will be made under Item No. 2404.618 "BLASTING (SPECIAL)", at the Contract price per square foot.

Delete the second paragraph of 2404.5 and substitute the following:

Payment for concrete wearing course will be made as Item No. 2404.501, "CONCRETE WEARING COURSE (3U17A)", at the Contract price per square foot.

SB-9 (2433) STRUCTURE RENOVATION

This work shall be performed in accordance with the applicable provisions of Mn/DOT 2433 and the following:

SB-9.1 Remove Slab

This work shall consist of the removal and disposal of all patches and areas of delaminated or unsound concrete in accordance with the following requirements and as directed by the Engineer:

A. Construction Requirements

Removal and disposal shall be restricted to methods which, in the Engineer's judgement, will not damage the structure. In addition, the following restrictions are placed on power equipment:

1. Scarifying shall be done with power equipment which has previously demonstrated satisfactory performance on the type of work for which it is to be used. The Contractor may, if permitted by the Engineer, use newly developed power equipment on a performance basis, but s/he shall discontinue such usage if so directed by the Engineer.

2. Jack-hammers heavier than a nominal 13.6 kg (**30 pound**) class shall not be used for Type 1 removal; except that the Engineer may permit the use of up to 27.2 kg (**60 pounds**) hammers, by individual operators on a performance basis, but will order discontinuance of their use if s/he determines that the heavier hammers are creating additional delamination, or that they are not being used with proper discretion.

3. Pointed bits for power hammers will not be permitted except in areas where full depth removal is specifically authorized.

4. Power hammers heavier than a nominal 6.8 kg (**15 pound**) class shall not be used for removal below the top layer of reinforcing bars unless full depth removal is designated by the Engineer.

After removal operations are completed, the removal area shall be cleaned of all remaining loose concrete by sandblasting. Exposed reinforcing bars shall be cleaned by sandblasting to remove loose rust and Mill scale. Tightly adherent rust and Mill scale may remain on the surface. Spent sand and debris shall be removed by airblasting.

All deck reinforcement steel shall be left inplace as it was before concrete removal, unless otherwise ordered by the Engineer. All reinforcement bars damaged by the Contractor's operations shall be replaced, as directed by the Engineer, at the Contractor's expense.

All damage to other portions of the structure which are to remain inplace which is due to the Contractor's operations shall also be repaired at the Contractor's expense.

No removal shall be performed in any area until the perimeters for removal in that area have been outlined by the Contractor and approved by the Engineer for that type of removal.

All materials removed shall be disposed of in accordance with Mn/DOT 2104.3C.

B. Remove Slab, Type 1 - Bridge No. 2440

This work shall be performed in accordance with the requirements of Section A above and shall consist of removal and disposal of portions of the bridge roadway surface to the depth of the top of the top bars in the top mat of reinforcement. (In extensive areas of Type 1 removal, this removal will be considered to be accomplished when 80% of these bars are exposed in any 9 m^2 (**100 ft^2**) area.) The Engineer may require additional removal of deteriorated concrete below the top of these bars but only to the extent that the additional removal can be performed by sandblasting.

C. Remove Slab, Type 1 - Bridge No. 27164

This work shall be performed in accordance with the requirements of Section A above and shall consist of removal and disposal of portions of the bridge roadway surface to the depth of the top of the bottom bars in the top mat of reinforcement located in the wearing course. (In extensive areas of Type 1 removal, this removal will be considered to be accomplished when 80% of these bars are exposed in any 9 m^2 (**100 ft^2**) area.) The Engineer may require additional removal of deteriorated concrete below the top of these bars but only to the extent that the additional removal can be performed by sandblasting.

D. Remove Slab, Type 2 - Bridge No. 27164

This work shall be performed in accordance with the requirements of Section A above and shall consist of the removal and disposal of that portion of the bridge roadway slab which the Engineer specifically designates for Type 2 removal after Type 1 removal has been performed. Type 2 removal shall include all removal which the Engineer designates after the Type 1 removal is completed but which is not full depth removal. The minimum depth of Type 2 removal shall be 19 mm (¾ **inch**) below the bottom of the bottom bars in the middle mat of reinforcement, located in the structural slab.

E. Remove Slab, Type 3 - Bridge No. 2440

This work shall be performed in accordance with the requirements of Section A above and shall consist of the removal and disposal of that portion of the bridge roadway slab which the Engineer specifically designates for full depth removal after Type 1 removal has been performed.

The Engineer may, as an alternate, permit removal to a depth of 19 mm (¾ **inch**) below the bottom of the transverse bar in the top mat of reinforcement. This alternate will be allowed only if the concrete below this 19 mm (¾ **inch**) depth is and remains sound, as determined by the Engineer. If the partial depth removal alternate is used, payment for patching will be made in accordance with the provisions for partial depth slab patching.

F. Measurement

Measurement of each type of slab removal will be based only on that area, in m^2 (ft^2), designated by the Engineer for removal. Areas of Type 2 and 3 removal will <u>not</u> be subtracted from areas of Type 1 removal.

G. Payment

Payment will be made as Item No. 2433.505, "REMOVE SLAB TYPE 1, 2 OR 3" at the contract price per m^2 (ft^2) for each. Removal of concrete below the defined limits of Type 1 removal, which may occur during the course of the Type 1 removal and subsequent sandblasting, will be considered as included in the unit price bid for Type 1 removal.

SB-9.2 Full Depth Slab Patching - Bridge No. 2440

This work shall consist of furnishing, placing, finishing, and curing concrete for full depth patches in the bridge roadway slab, and shall be performed in accordance with Mn/DOT 2401 and the following:

The patching concrete shall be Mix No. 3Y33 or 3Y37 with the maximum dosage of approved water reducer as permitted by the Department's Concrete Manual.

The patching concrete shall be bonded to the inplace concrete with the same bonding grout used for placement of the concrete wearing course.

The grout shall be brushed or scrubbed into the inplace concrete immediately prior to placement of patching concrete.

The concrete shall be placed to the top of the structural slab and internally vibrated.

Full depth concrete patches shall be wet cured, in accordance with 2401.3G, until the concrete has reached 45% of the anticipated compressive strength. All strength gain percentages shall be derived from the strength gain chart in Table 2401-1. The Engineer may allow control cylinders to be used to determine required strength gain, but in no case shall any curing be considered completed in less than 72 hours.

The area of full depth patching will be field measured and will include only those areas specifically designated or authorized for full depth slab patching. Full depth patching of areas of the roadway slab where full depth removal was not designated or authorized by the Engineer will not be measured for payment.

Payment will be made as Item No. 2401.511, "STRUCTURAL CONCRETE, 3Y33", at the Contract price per m^2 (ft^2), complete in place, and shall include all necessary slab forming.

SB-9.3 Partial Depth Slab Patching - Bridge No. 2440

This work shall consist of furnishing, placing, finishing and curing concrete for partial depth patches that result from the Contractor's use of the partial depth removal alternate for Type 3 slab removal, or from Type 1 removals or other areas with a depth 50 mm **(2 inches)** or more below the surrounding concrete. This work shall be performed in accordance with Mn/DOT 2401 and the following:

The patching concrete shall be Mix No. 3Y37 with the maximum dosage of approved water reducer as permitted by the Department's Concrete Manual.

The patching concrete shall be bonded to the inplace concrete with the same bonding grout used for placement of the concrete wearing course.

The grout shall be brushed or scrubbed into the inplace concrete immediately prior to placement of patching concrete.

The concrete shall be placed to the top of the structural slab and internally vibrated. The surface of the patches shall be roughened, grooved, or serrated to the extent, and by methods and equipment, approved by the Engineer.

The patches shall be wet cured, in accordance with 2401.3G, for at least 24 hours and then allowed to air dry for at least 4 hours before the wearing course is placed in that area.

Furnishing, placing, finishing, and curing the concrete for partial depth patches that result from the Contractors use of the partial depth removal alternate for Type 3 slab removal, will be considered an incidental expense for which no direct compensation will be made.

Payment for furnishing, placing, finishing, and curing the concrete for Type 1 patches that are prefilled before overlay placement will be made at the set price of $53.82 per square meter **($5 per square foot)**, complete in place.

SB-9.4 Partial Depth Slab Patching - Bridge No. 27164

This work shall consist of furnishing, placing, finishing and curing concrete for partial depth patches that result from Type 1 or Type 2 removal. This work shall be performed in accordance with Mn/DOT 2401 and the following:

The patching concrete shall be Mix No. 3X33A with the maximum dosage of approved water reducer as permitted by the Department's Concrete Manual.

The patching concrete shall be bonded to the inplace concrete with a bonding grout approved for use by the Engineer.

The grout shall be brushed or scrubbed into the inplace concrete immediately prior to placement of patching concrete.

The concrete shall be struck off at the approximate level of the surrounding concrete and internally vibrated. The surface of the patches shall be roughened, grooved, or serrated to the extent, and by methods and equipment, approved by the Engineer.

SB-9.5 Reconstruct Expansion Joints

This work shall consist of providing all labor, materials, and equipment required to reconstruct the expansion joint openings as indicated in the Plans and in accordance with Mn/DOT 2401 and the following:

Concrete removal and disposal shall be in accordance with the requirements of SB-9.1 "Remove Slab" unless otherwise directed by the Engineer.

All inplace joint material or joint forming materials, and all other incompressible materials that would impede the subsequent expansion device from performing throughout the full anticipated range of movement, shall be completely removed.

For Bridge No. 2440, new concrete shall be Mix No. 3Y33 or 3Y37. For Bridge No. 27164, new concrete shall be Mix No. 3X33A.

The new concrete shall be bonded to the inplace concrete with the same bonding grout used for placement of the concrete wearing course.

The grout shall be brushed or scrubbed into the inplace concrete immediately prior to placement of new concrete.

New concrete shall be wet cured, in accordance with 2401.3G, until the concrete has reached 45% of the anticipated compressive strength. All strength gain percentages shall be derived from the strength gain chart in Table 2401-1. The Engineer may allow control cylinders to be used to determine required strength gain, but in no case shall any curing be considered completed in less than 72 hours.

Expansion joint reconstruction will be measured by length, in linear meters (**feet**), based on the distance along the centerline of the joint opening from face of rail to face of rail.

Payment for Item No. 2433.603, "RECONSTRUCT EXPANSION JOINT TYPE A", at the contract price per linear foot shall be compensation in full for performing all work described above, including all slab forming and reinforcement bars required.

Payment for Item No. 2433.603, "RECONSTRUCT EXPANSION JOINT TYPE D", at the contract price per linear foot shall be compensation in full for performing all work described above, including all slab forming and reinforcement bars required.

Payment for Item No. 2433.603, "RECONSTRUCT EXPANSION JOINT TYPE SPECIAL", at the contract price per linear foot shall be compensation in full for performing all work described above, including all slab forming and reinforcement bars required.

SB-9.6 Seal Overlay Cracks

This work consists of sealing cracks in the existing bridge deck of Bridge No. 2440. This work shall be performed in accordance with the applicable requirements of Mn/DOT 2433, the Plans, as directed by the Engineer, and the following:

Material for crack sealing shall be a two-part epoxy penetrant sealer formulated for this purpose, and must be included on the Mn/DOT list of approved "Epoxy Crack Sealers for use in non-load bearing applications".

Cracks narrower than 0.008", in the judgment of the Engineer, will not be sealed.

Before application of the sealer, the Contractor shall cleanse the deck of all loose material including water, sand, dirt, etc, by air blasting. The cracks shall then be marked with a lumber crayon and lightly sandblasted. The deck shall be blown clean again to remove residual sand and dirt from the cracks. Cracks shall be completely dry prior to sealant placement.

Epoxy crack sealant may be applied by a special applicator or with a plastic squeeze bottle. Pressure injection is not required. The sealer shall flow into the crack and shall form a strip approximately ½" wide on the surface. Sealer application rate is estimated at 450 linear feet of crack per gallon. Sealer shall be fully cured, as per manufacturers recommendations, before subjecting the surface to vehicle or foot traffic. Air temperatures less than 65 degrees F will increase cure times and may require that silica sand be placed over the sealed cracks to prevent tracking.

Sealing of cracks will be measured by volume in gallons of epoxy penetrant sealer applied to the cracks that have been designated by the Engineer. Cracks sealed by the Contractor that have not been reviewed and designated by the Engineer will not be included for payment.

Payment for Item No. 2433.606 "Seal Overlay Cracks", will be made at the Contract price per gallon and shall be compensation in full for all costs of sealing the cracks in the bridge deck, as described above, and all incidentals thereto.

SB-9.7 Clean and Seal Joints Type 1

This work consists of removal and disposal of existing joint sealing compound, light sandblasting of the cleaned joint and re-sealing the joint with a hot-poured elastic type per Mn/DOT 3723.

After removal of the existing sealer and before application of the new sealer, the Contractor shall cleanse the deck or sidewalk of all loose material including water, sand, dirt, etc., by air blasting. The joints shall then be lightly sandblasted . The deck or sidewalk shall be blown clean again to remove residual sand and dirt from the joints. Joints shall be completely dry prior to sealant placement.

Payment for performing this work, as described above, will be made under Item No. 2433.603 "Clean and Seal Joints Type 1", at the Contract price per lineal foot.

SB-9.8 Concrete Surface Repair

This work shall consist of repairing the spalled concrete surface of the sidewalk on Bridge 27164. This work shall be performed in accordance with Mn/DOT 2401 and the following:

Unsound concrete in the spalled area shall be removed in accordance with SB-9.1A.

The patching concrete shall be Mix No. 3Y37 with the maximum dosage of approved water reducer as permitted by the Department's Concrete Manual.

The patching concrete shall be bonded to the inplace concrete with a bonding grout approved for use by the Engineer.

The grout shall be brushed or scrubbed into the inplace concrete immediately prior to placement of patching concrete.

The concrete shall be struck off at the approximate level of the surrounding concrete and internally vibrated. The surface of the patch shall be finished to match the adjacent sidewalk.

Payment for Item No. 2433.618, "CONCRETE SURFACE REPAIR", at the contract price per square foot, shall be compensation in full for performing all work described above.

SB-10 REPAIR CONCRETE SURFACE

SB-10.1 Description of Work

This work consists of repairing deteriorated and delaminated concrete surface areas on the bottom of the roadway deck, cap beams and arch columns of Bridge No. 2440. Estimated areas of concrete surface repair are shown in the Plans. Exact areas to be repaired will be marked by the Contractor and approved by the Engineer and shall be in accordance with these Special Provisions and the Concrete Repair Detail shown in the Plans. Repair shall be by the *dry-mix shotcrete* process. In lieu of shotcrete, the Contractor may use conventional formed concrete procedures, as approved by the Engineer.

The Contractor shall provide all labor, materials and equipment to perform the following work:

A. Remove and dispose of all spalled and deteriorated concrete as directed by the Engineer.

B. Prepare concrete and reinforcement bar surfaces by sandblasting or high-pressure water blasting.

C. Furnish, apply, finish and cure shotcrete.

D. Provide a quality control program.

The work shall be performed in accordance with the applicable provisions of Mn/DOT 2433, the Concrete Repair Detail contained herein, as directed by the Engineer, and the following:

SB-10.2 Shotcrete Specifications

Shotcreting shall conform to all applicable requirements of "Specification for Shotcrete (ACI 506.2-95)" and as referenced herein to "Guide to Shotcrete (ACI 506R-90)" contained in the latest edition of the ACI Guide to Concrete Practice, Part 5 published by the American Concrete Institute (ACI); and the following special provisions:

SB-10.3 Submittals

At least 10 days prior to commencement of shotcreting operations, the Contractor shall submit written documentation that provides proof of the following:

A. Qualifications of Shotcrete Work Crew

The shotcrete crew foreman shall have had at least five years experience in shotcrete repair work on projects of similar size and character. Provide five references of those responsible for supervision of similar projects. Include name, address and telephone number of references who will testify to the successful completion of these projects by the shotcrete crew foreman.

Nozzle operators shall have successfully completed three projects of similar size and character. Provide three references of those responsible for supervision of these projects. Nozzle operators shall also pass a test, described in SB-6.8 demonstrating their competence.

B. Shotcrete Mixtures

Furnish details of proposed shotcrete mixture(s), including proportions and means of supply.

C. Describe proposed curing procedures and protection to be provided to shotcrete.

D. Furnish a description of the proposed quality control testing program. Testing of shotcrete work shall be in accordance with the requirements of ACI 506.2.1.6 Quality Assurance, or as otherwise specified.

SB-10.4 Materials

A. Portland cement shall conform to 3101, Type I, air entraining.

B. Water shall conform to 3906.

C. Fine aggregate shall be natural siliceous and consisting of hard, clean, strong, durable and uncoated particles, conforming to the requirements of ASTM C 33. Gradation shall be even from fine to coarse and shall be within the following limits:

Sieve Size	**Percent Passing**
9.50 mm	100
4.75 mm	95-100
2.36 mm	80-100
1.18 mm	55-85
600 μm	25-60
300 μm	10-30
150 μm	2-10

D. No admixtures, except air-entraining admixtures, shall be added to the shotcrete *without* approval of the Engineer. Admixtures containing chlorides and accelerators shall not be used.

E. Reinforcement shall conform to 3301 and/or 3303. Reinforcement shall be epoxy coated or galvanized material may be used, but is not required. Inserts for steel fabric shall be galvanized and of adequate length and strength to resist a 10-kN (2250 pound) pull-out force.

F. Handling and Storage of Materials

All shotcrete material shall be handled, transported and stored with adequate provisions for the prevention of absorption of moisture. Ambient temperatures shall be maintained in a temperature range of 5°C (40°F) to 30°C (90°F).

SB-10.5 Shotcrete Proportioning

The Contractor shall be responsible for shotcrete mixture proportioning. The following information shall be submitted to the Engineer for review and approval per SB-7.3.

A. An easily identifiable mix designation, number or code.

B. Batch quantities of fine aggregate, coarse aggregate, cement, expected water demand (to include all water from moisture in aggregates, and water added in the premoisturizer and at the nozzle) and all other shotcrete ingredients, in kg/m^3 (lb/cy), based on saturated surface-dry aggregates.

C. Aggregate Source, Gradation, Relative Bulk Density and Absorption.

Shotcrete shall be proportioned to meet the following minimum performance requirements:

TEST DESCRIPTION	TEST METHOD	AGE (Days)	SPECIFIED REQUIREMENT
Min. Compressive Strength MPa (psi) (f'_c)	ASTM C39 ASTM C 42	7 28	28 (4000) 35 (5000)
Max. Boiled Absorption, %	ASTM C 642	7	8
Max Volume of Permeable Voids, %		7	17

Allowances shall be made for the shooting orientation and rebound in shotcrete mixture proportioning.

SB-10.6 Supply and Equipment

A. Batching, Mixing and Supply

Dry-mix shotcrete shall be batched, mixed and supplied as dry-bagged premix material packaged in small bags of approximately 30 kg (65 lbs.) each. Dry-bagged premixed shotcrete materials shall be produced in conformance with the pertinent requirements of ASTM C 387. In particular, all aggregates shall be dried to a moisture content of less than 0.1% by mass, based on oven drying at 105°C (220°F) to 110° C (230°F).

B. Shotcrete Placing Equipment

Shotcrete supply equipment shall be capable of discharging the dry-mix shotcrete materials without segregation.

Dry-bagged premixed shotcrete materials shall be predampened to provide a consistent moisture content in the range of 3% to 5% by mass in a predampener, prior to discharge into the shotcrete gun. Discharge of completely dry materials into the shotcrete gun will not be permitted unless satisfactory performance is demonstrated in the test panel per SB-7.8.

The mixing and predampening units shall be capable of producing a shotcrete mixture with a uniform moisture content, such that the nozzle operator is not required to repeatedly adjust the water content at the nozzle water ring.

The delivery equipment (gun) shall be capable of discharging a continuous, smooth stream of uniformly mixed material into the delivery hose.

The discharge nozzle shall be equipped with a manually operated perforated water feed ring inside the nozzle. The water valve shall be capable of ready adjustment to vary the quantity of water and shall be convenient to the nozzle operator.

Water pressure at the discharge nozzle shall be sufficiently greater than the operating air pressure so that the water is intimately mixed with the predampened shotcrete materials. If the line water pressure is inadequate, a water booster pump shall be introduced into the water line to provide a steady, non-pulsating water pressure.

The Contractor shall supply a clean, dry air supply, capable of maintaining sufficient nozzle velocity for all parts of the work. The air supply shall contain a moisture and oil trap to prevent contamination of the shotcrete.

SB-10.7 Preparation for Shotcreting

A. Surface Preparation of Concrete

For approval by the Engineer, the Contractor will locate and outline all loose, spalled and deteriorated concrete to be removed. Care shall be exercised to not damage areas of sound concrete or reinforcing steel during concrete removal operations. Unless specifically directed by the Engineer, depth of removal shall not exceed 100 mm (4").

Concrete removal shall be accomplished using one or more of the following methods:

1. Chipping with hand picks, chisels or light duty jackhammers not to exceed 7 kg (15 pound) mass;

2. Scarifiers, scabblers or other suitable mechanical means; and/or

3. High-pressure (100 to 275 MPa) (14,500 to 40,000 psi) water jetting.

If sound concrete is encountered before existing reinforcing steel is exposed, the surface shall be prepared and repaired without further removal of concrete. When corroded reinforcing steel is exposed, concrete removal shall continue until there is a minimum 19 mm (3/4") clearance around the exposed corroded reinforcing bar. Care shall be taken to not damage bond to adjacent non-exposed reinforcing steel during the concrete removal process.

The perimeter of all areas where concrete is removed shall be tapered at an approximate 45° angle, except that the outer edges of all chipped areas shall be sawcut to a minimum depth of 25 mm (1") to prevent feather edging, unless otherwise approved by the Engineer.

After all deteriorated concrete has been removed, the repair surface to receive shotcrete shall be prepared by sandblasting or high-pressure (100-275 MPa) (14,500 to 40,000 psi) water jetting. The repair surface shall have an adequate surface roughness determined as three peak-to-valley measurements of 5 mm (3/16").

Sandblasting or high-pressure water jetting shall remove all fractured surface concrete and all traces of any unsound material or contaminants such as oil, grease, dirt, or any materials which could interfere with the bond of freshly placed shotcrete.

Cleaned areas shall have shotcrete applied within 48 hours, or shall be reblasted.

All material removed shall be disposed of in accordance with the requirements of 2104.3C.

B. Reinforcement

All inplace reinforcement exposed during surface preparation shall be cleaned by sandblasting to remove all loose rust and concrete, but not necessarily to white metal. Remove remaining dust and loose concrete with compressed air or high-pressure water jetting.

Inplace reinforcement displaying deep pitting or loss of more than 20% of cross-sectional area shall be augmented with additional epoxy coated reinforcement as directed by the Engineer. Loose reinforcement shall be removed and replaced with equal size bars. In the case of lapped splices, bars shall not be bundled, but shall be placed such that the minimum spacing around each bar is three times the maximum aggregate size or 20 mm (7/8"), whichever is larger, to allow for proper encapsulation with shotcrete.

Steel fabric shall be provided at each repair area larger than 0.1 square meter (1 square foot) if the depth of the repair exceeds 70 mm (2 ¾") from the original surface of the member to be repaired. Sheets of adjoining fabric shall be lapped by at least one and one-half spaces at all intersections. Minimum shotcrete cover on steel fabric shall be 50 mm (2"). Fabric shall be fastened to preset anchors or existing reinforcing using 1.6 mm or heavier gauge tie wire on a grid not more than 300 mm square (1/2 square inch). Any given area where anchors are used shall have minimum of four anchors. Large knots of tie wire which could result in sand pockets and voids during shotcreting shall be avoided. The minimum clearance between reinforcing bars and steel fabric shall be 20 mm (7/8").

C. Alignment Control and Cover

Alignment control shall be implemented to establish control to ensure that the minimum specified shotcrete thickness and reinforcement cover are maintained. Alignment control shall be accomplished by means of shooting wires, guide strips, depth gauges or forms. The proposed means of alignment control shall be submitted to the Engineer for review and approval. Shooting wires (ground wires) shall consist of high-strength steel wire (piano wire) kept taut during shotcreting. Shooting wires shall be removed after completion of shotcreting and screeding operations.

Guide strips and forms shall be of such dimensions and installation configuration so as to not impede the production of uniform, dense, properly consolidated shotcrete. Installations conducive to the formation of sand pockets shall not be used.

SB-10.8 Quality Assurance and Quality Control Testing

A. Quality Control Testing

The Contractor shall establish and maintain a quality control program for the shotcrete work. Such a program shall include, but not be limited to the following:

1. Maintenance of test records for all quality control operations;
2. Wash-out testing of dry-bagged premix materials to check cementitious content and aggregate gradation.
3. Physical testing of the hardened shotcrete.

B. Preconstruction Trials

The Contractor shall implement a preconstruction trial to enable the Engineer to evaluate conformance of the proposed materials, shotcrete mixture, equipment and crew to the Project specifications. Acceptance of the preconstruction trial results by the Engineer is required prior to performance of any work on the Project.

C. Construction Testing

One construction test panel for the pier concrete surface repair shall be shot by each nozzle operator. The panel shall be shot in the same position as the repair work being done. Test panels shall be produced in accordance with the requirements of ASTM C 1140, but shall have minimum dimensions of 450 mm x 450 mm x 100 mm (18" x 18" x 4") deep. Panels shall be constructed of wood and sealed plywood, with 45° sloped edge forms to permit escape of rebound. Construction test panels shall contain no reinforcement or embedments. The panels shall be cored or cut to provide three compression test specimens as described below.

Construction test panels shall be stored, handled and cured in accordance with 2461.4A5.

Compressive strength test specimens shall be either:

1. 75 mm (3") diameter cores with length/diameter ratios preferably 2:1 and not less than 1:1, or

2. 75 mm (3") cubes.

Compressive strength tests shall be conducted in accordance with ASTM C 42. Measured compressive strengths shall be corrected to equivalent 2:1 cores, using the core correction factors in C 42.

The mean compressive strength for a set of three cores shall equal or exceed f'_c. Specimens for boiled absorption and permeable voids testing to ASTM C 642 shall be 75 mm (3") cubes, or extracted 75 mm (3") diameter cores at least 100 mm (4") long. Three specimens shall be tested at age 7 days after shooting.

SB-10.9 Shotcrete Application

All areas prepared for shotcrete repair must be inspected and approved by the Engineer prior to application of any shotcrete.

Shotcrete shall be applied in accordance with good practice as detailed in Chapter 8 of ACI 506R. Application requirements of Section 8.5 of ACI 506R shall apply. Whenever possible, shotcrete shall be applied to the full thickness in a single layer.

The concrete substrate shall be saturated the day before shotcreting and then re-wetted prior to shooting. At least one hour prior to application of shotcrete, all surfaces to be shotcreted shall be flushed with water. Wetted surfaces shall be allowed to dry back to a saturated-surface-dry condition prior to application of shotcrete. If necessary, a blowpipe shall be used to facilitate removal of surface water. Only oil-free compressed air shall be used in the blowpipe. In the event a work stoppage longer than two hours takes place on any shotcrete layer prior to the time it has been built up to required thickness, the surface shall be re-wetted prior to continuing. No shotcrete shall be applied to a dry surface or to a surface with free surface water.

Care shall be exercised to protect adjacent surfaces from build-up of rebound and overspray. Rebound will not be permitted in the completed work. Hardened rebound and hardened overspray shall be removed prior to application of additional shotcrete using sandblasting, chipping hammers, high-pressure water blasting or other suitable techniques.

The water ring in the nozzle shall be carefully monitored for any signs of blockage of individual water spray holes. If non-uniform wetting of discharged shotcrete becomes apparent, shooting shall be stopped, and the water ring cleaned or other appropriate corrective actions taken.

The delivery equipment shall be thoroughly cleaned at the end of each shift. Any build-up of coatings in the delivery hose and nozzle liner shall be removed.

Shotcrete nozzling shall follow acceptable shooting practice, as detailed in Section 8.5 of ACI 506R. In particular,

(a) The nozzle shall be generally operated at a distance of one-half to one-and-one-half meters from the receiving surface and shall be orientated at right angles to the receiving surface, except as required to fill corners, cover edges and encase large diameter reinforcement bars.

(b) The combination of air pressure at the nozzle, moisture content of the shotcrete and the distance of the nozzle from the receiving surface shall be optimized to achieve maximum compaction of the shotcrete.

(c) Care shall be taken while encasing reinforcement and steel fabric to keep the front face of the reinforcement clean during shooting operations so that shotcrete builds up from behind to encase the reinforcement and prevent voids and sand pockets from forming.

(d) Accumulations of rebound and overspray shall be continuously removed by the blowpipe operator in advance of the deposition of new shotcrete. Rebound material shall not be used.

Shotcrete shall not be applied during periods of rain or high wind which could interfere with the shotcrete stream unless suitable protective covers, enclosures or wind breaks are installed.

Nozzle operators shall bring the shotcrete to an even plane and to well-formed corners by working up to ground wires or other guides, using a lower-than-normal placing velocity.

Shotcrete shall be applied to build up the piers to the original surfaces using alignment control measures described in SB-7.7C. All repaired members shall be restored as close as practicable to their original dimensions.

SB-10.10 Shotcrete Finishing

The surface of the shotcrete shall be built up slightly and trimmed to the final surface by cutting with the leading edge of a sharp trowel. Any imperfections shall be floated using a rubber float. Work done to the finished surface shall be limited to correcting imperfections cause by cutting with the trowel.

Final finishing shall be accomplished by using a wood float for a preliminary finish, with the final finish using a rubber float.

All shotcrete and overspray shall be trimmed back from adjacent non-prepared concrete surfaces. The edges of all shotcrete repairs shall have minimum square saw-cut edge 25 mm (1") deep and shotcrete shall be finished up to this edge. Feather-edging of shotcrete will not be allowed.

SB-10.11 Curing and Protection

On completion of finishing of a repaired area, shotcrete shall be immediately be prevented from drying out by fogging or wetting. Once shotcrete has attained final set, it shall be kept continuously moist for a minimum period of seven days. Moist curing shall be accomplished using one or more of the following procedures:

A. Wrapping the elements in wet burlap which has been presoaked in water for 24 hours prior to installation. Wrapping the wet burlap in plastic is useful for retarding the rate of drying of the burlap.

B. Installation of sprinklers, soaker hoses or other devices which keep the shotcrete surface continuously wet. The use of intermittent wetting procedures which allow the shotcrete to undergo wetting and drying during the curing period will not be allowed.

SB-10.12 Special Surface Finish

The provisions of Mn/DOT 2401.3F2C shall apply except as modified herein:

A special surface finish shall be applied to the concrete surfaces of all concrete surface repair areas. The finish color shall match the existing color and be approved by the Engineer.

The concrete to which the special surface finish is to be applied must be a minimum of 28 days old. All surfaces that are to receive a special surface finish shall be thoroughly flushed with clean water not more than 24 hours before commencing with the finishing.

SB-10.13 Hot and Cold Weather Protection

The general requirements for hot and cold weather concreting, detailed in ACI 305R and ACI 306R, shall also apply to shotcrete remedial work, except that the maximum temperature of the shotcrete shall not exceed 35° C (95°F).

If the prevailing ambient conditions are such that the shotcrete develops plastic shrinkage and/or early drying shrinkage cracking, shotcrete application shall be terminated.

The Contractor shall:

A. Reschedule the work to a time when more favorable ambient conditions prevail; and/or

B. Adopt corrective measures, such as installation of sun-screens, windbreaks, surface evaporation retardants or fogging devices to protect the work.

Shotcrete application shall be terminated if the ambient temperature rises above 30°C (85°F), unless the Contractor adopts special hot weather shotcreting procedures, which are approved by the Engineer.

The temperature of the applied shotcrete shall be preferably in the range of 10° to 20° C (50° to 70°F), but not outside the range of 5° to 35°C (40° to 95°F). Cooler mix temperatures are preferred during hot weather shotcreting operations and warmer mix temperatures during cold weather shotcreting.

SB-10.14 Shotcrete Acceptance

Shotcrete that does not conform to these special provisions may be rejected either during the shotcrete application process, or on the basis of tests on the test panel or completed work.

Deficiencies observed during the shotcrete application process, such as, but not limited to:

(a) failure to properly control and remove build-up of overspray and rebound;

(b) incomplete encasement of or incomplete consolidation around reinforcement bars, steel fabric or anchors;

(c) incorporation of sand lenses, excessive voids, delaminations, sags, rebound, and sloughing; or

(d) failure to apply shotcrete to the required line and grade tolerance shall constitute cause for rejection of the plastic shotcrete. If plastic shotcrete is rejected, the Contractor shall stop the work and take all measures necessary to correct deficiencies. All remedial work to correct deficiencies shall, whenever possible, be made while the shotcrete is still plastic.

Shotcrete that is determined by the Engineer to be defective or non-conforming to the Project specifications based on evaluation of cores from the finished shotcrete, shall be repaired or removed and replaced by the Contractor at no cost to the Department. Repairs of non-conforming shotcrete are subject to the same testing, evaluation and acceptance criteria as the original repair shotcrete.

SB-10.15 Shotcrete Repair

Shotcrete that is identified as being non-conforming while still plastic shall be removed using spades, scrapers or other suitable mechanical devices. High-pressure water jetting may be used, subject to acceptable disposal of the removed shotcrete and slurry.

Hardened shotcrete that is identified as being non-conforming shall be removed using the same basic procedures used for removal of deteriorated concrete. Care shall be taken to avoid damage to reinforcement, steel fabric or anchors. Any embedments damaged during the shotcrete removal process shall be replaced at no cost to the Department.

Repair shotcrete shall be placed, finished, cured and protected in the same manner specified for all shotcrete work. The Contractor shall bear the costs of all repair and tests for non-conforming shotcrete.

SB-10.16 Method of Measurement

Measurement will be by area in square feet of concrete surface repaired by the shotcrete method that has been specifically designated by the Engineer for repair by this method. Work outside of these designated areas will not be measured for payment.

SB-10.17 Basis of Payment

Payment for Item No. 2433.618 "REPAIR CONCRETE SURFACE" will be made at the Contract price per square foot and shall be compensation in full for all costs of repairing the designated deteriorated concrete surfaces on the culvert as described herein, including all incidentals thereto.

SB-11 (2461) STRUCTURAL CONCRETE

The provisions of 2461 shall apply except as modified herein.

Add the following to Item (c) in the fourth paragraph of 2461.3B2:

The minimum cement content for bridge deck concrete shall be 362 kg per m^3 **(611 pounds per yd^3)**.

SB-12 (2471) STRUCTURAL METALS

The provisions of 2471 shall apply except as modified herein:

Add the following to 2471.2:

For all Major Structural Components, the fabricator shall indicate, by writing or ink stamp on any certified mill test report furnished, that the report has been checked for compliance with the applicable specification. The name of the individual who checked the report shall be included.

Delete the fourth paragraph of 2471.3A and substitute the following:

For the fabrication of rolled beam bridges having a pay quantity for structural steel of less than 136 000 kg (**300,000 pounds**), pedestrian bridges, modular expansion joints, overhead signs, pot bearings, steel diaphragms having a linear quantity of more than 1500 m (**5000 feet**), diaphragms designated Major Structural Components (curved steel bridges) or any other item designated by the Engineer, the Fabricator shall be certified under AISC Quality Certification Program Category, Simple Steel Bridge Structures (Sbr).

Delete the first and second sentence of 2471.3D2 and substitute the following:

In accordance with OSHA Subpart R 1926.754 shear stud connectors or other similar devices shall not be attached to the top flange of beams, or other steel components, until after the decking falsework, or other walking surface, has been installed.

Delete the first paragraph of 2471.3E2e and substitute the following:

Warped or deformed plates or flanges shall be machine finished or straightened by an approved method to provide the proper fit. Surfaces that will be in contact bearing with other structural parts shall be machined finished as required to achieve full contact for all parts. Full contact shall be defined as surface flatness that is less than .005 x nominal thickness dimension of the part.

Delete 2471.3 F2d and substitute the following:

2471.3 F2d Gas Metal Arc (GMAW) and Flux Cored Arc (FCAW) Welding

Wire for each process shall be clean, bright, and free of all moisture, rust, grease, and any other foreign matter. The shielding gas and flow rate for each wire used shall be per the manufacturers recommendation.

GMAW-S (short circuiting) is considered to be short circuiting when the Argon content is less than 80%. GMAW-S shall not be used in the fabrication of major structural components.

FCAW innershield filler metals shall not be used in the fabrication of bridge components.

Add the following to 2471.3H1b and 2471.3J2:

In lieu of using Full Assembly specified in the plans, the Contractor will be permitted to substitute Computerized Numerical Control (CNC) drilling of diaphragms and stiffeners, subject to the following additional requirements:

The Contractor must submit a written request to the Engineer including a Quality Control document describing the operational processes, required inspections, and verification steps which should include some partial check assembly. Holes drilled by CNC in diaphragms and stiffeners shall be standard-sized. Girder field splices shall not be CNC drilled.

Delete the last two sentences of 2471.3M1e.

SB-13 RECONSTRUCT CONDUIT SYSTEM LIGHTING

This work shall consist of the removal and disposal of a small portion of the concrete barrier rail at the southeast corner of Bridge No. 2440, reconstruction of existing conduit system and reconstruction of the barrier rail.

Each Conduit System shall be furnished and installed in accordance with the Plans, approved erection drawing, the applicable requirements of 2545, 2550, 2565 and the following:

All conduit runs shall be straight and true and all offsets and bends shall be uniform and symmetrical. The Contractor shall adjust the elevations of the conduit assembly, for its full length, to approximately the same gradient as the finished roadway, and s/he shall furnish and install in the approaches such suitable spacers and framing as may be necessary to maintain the correct grade and alignment.

Ferrous components of fittings shall be hot dip galvanized. All fittings shall be carefully installed according to the manufacturer's recommendations and at the locations shown in the Plans. At time of installation, adjacent conduit sections to be coupled by fittings shall be in true alignment.

Fabrication and inspection of structural metals used for each Conduit System shall be in accordance with the applicable requirements of 2471.

The ends of conduits shall be identified as lighting, signals, telephone, telegraph, power, etc. by the use of embossed metallic tags or other equally durable identification.

Non-metallic conduit and fittings shall conform to the requirements of the NEMA Standards Publication No. TC 14, entitled "Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings."

Three sets of erection drawings of each Conduit System shall be furnished to the Engineer for preliminary review. Two sets will be forwarded to the Bridge Construction and Maintenance Engineer for review and one set will be returned to the Contractor showing any necessary corrections.

The drawings shall be to a scale of not less than 50:1 (**1/4" = 1'-0"**) and shall show the locations of the diaphragms and inserts, a conduit placement scheme, and detailed views of the placement of the sleeves through the parapets, end webs, and diaphragms. The locations of the sleeves shall be defined from established reference points or lines and elevations, such as working points or centerlines and bridge seat elevations. The locations and manufacturer of expansion fittings shall be shown in the drawings.

A combination expansion/deflection fitting shall consist of an expansion fitting and an expansion/deflection fitting connected by a nipple. The expansion fitting shall be in accordance with 3839, except that the fitting shall provide for greater than 100 mm (**4 inch**) linear movement when required by the Plans. Each expansion/deflection fitting shall be an approved watertight unit which can accommodate 20 mm (**3/4 inch**) of linear expansion or contraction of conduit, 20 mm (**3/4 inch**) of parallel misalignment of adjacent conduit sections, and up to 30° of angular misalignment of the axes of adjacent conduit sections. To prevent damage to internal bonding jumper, fittings should not be twisted during installation.

The Contractor shall seal any remaining conduit opening at the back face of each abutment with an approved sealant after the conduit is in place.

After removal operations are completed and conduit system reconstructed, the removal area shall be cleaned of all remaining loose concrete by sandblasting. Exposed reinforcing bars shall be cleaned by sandblasting to remove loose rust and Mill scale. Tightly adherent rust and Mill scale may remain on the surface. Spent sand and debris shall be removed by airblasting.

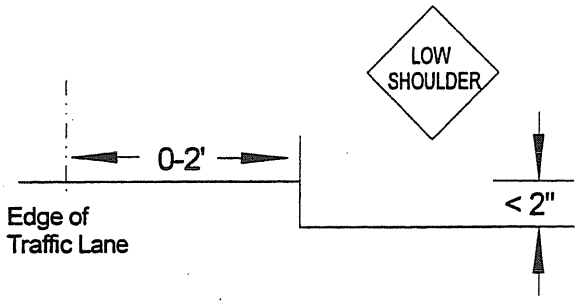
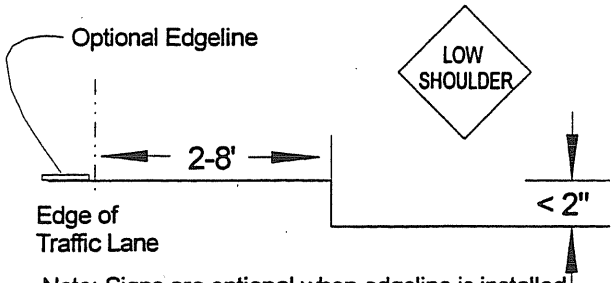
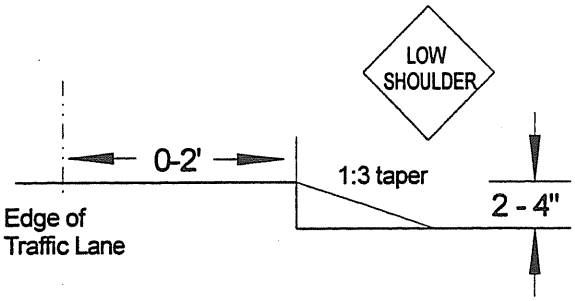
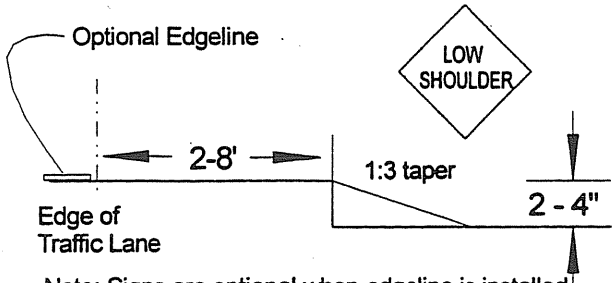
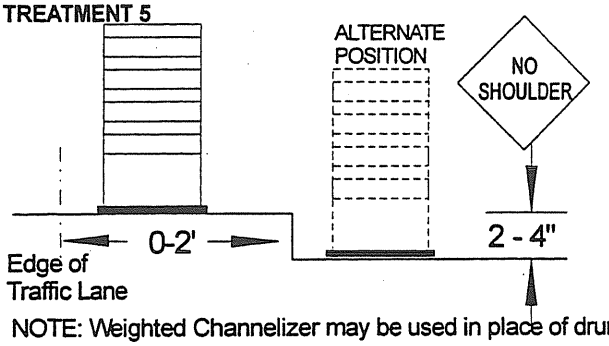
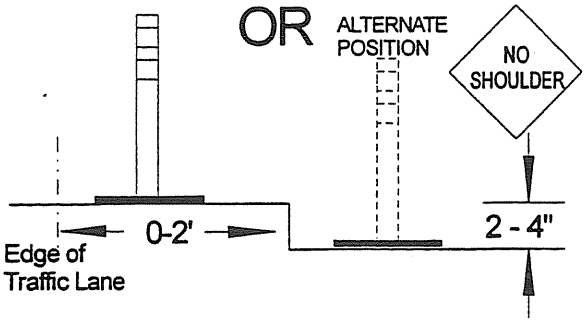
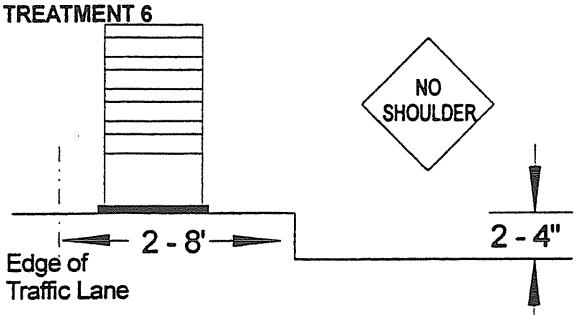
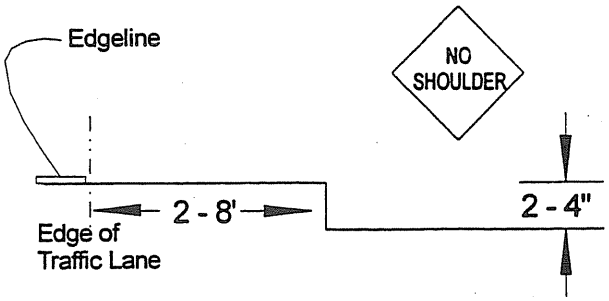
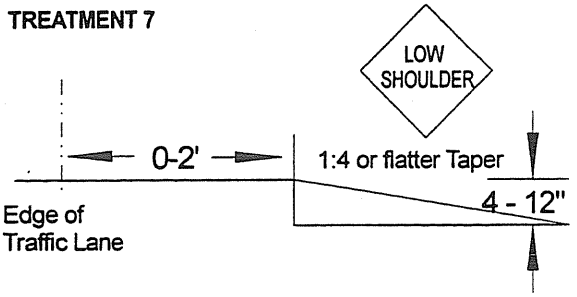
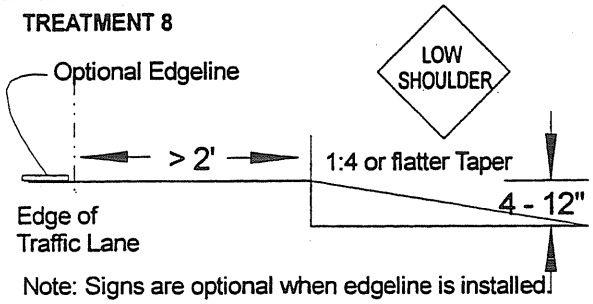
All deck reinforcement steel shall be left inplace as it was before concrete removal, unless otherwise ordered by the Engineer. All reinforcement bars damaged by the Contractor's operations shall be replaced, as directed by the Engineer, at the Contractor's expense.

All damage to other portions of the structure which are to remain inplace which is due to the Contractor's operations shall also be repaired at the Contractor's expense.

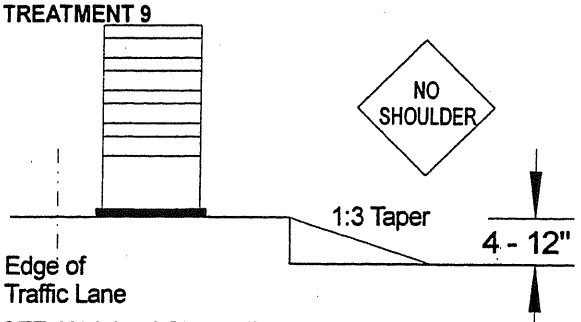
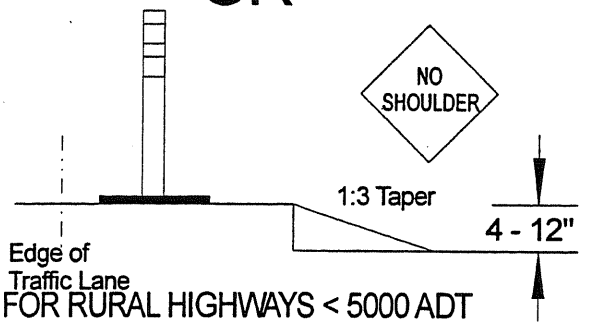
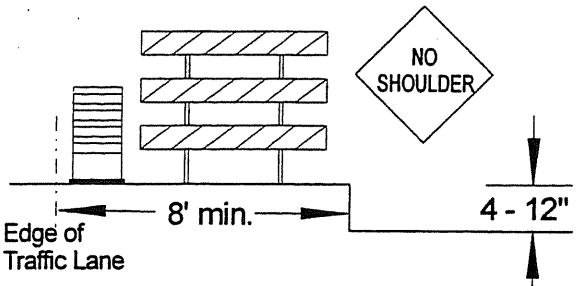
Barrier rail concrete shall be Mix No. 3Y33.

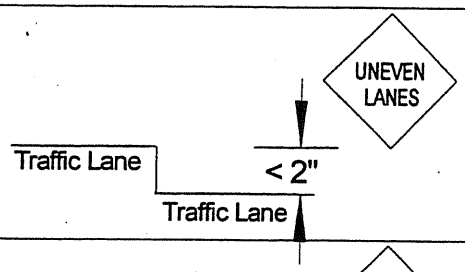
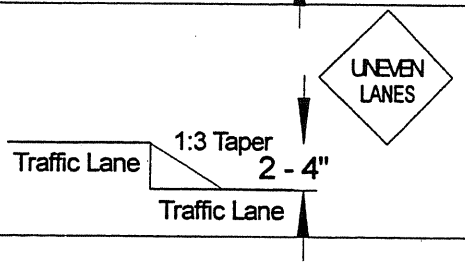
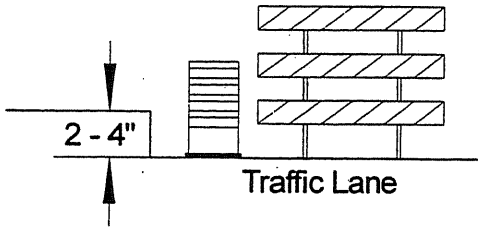
Payment will be made as Item No. 2545.509, "RECONSTRUCT CONDUIT SYSTEM (LIGHTING)" at the lump sum Contract price, complete inplace, and shall include all necessary work and materials.

DROP OFF GUIDELINES

EDGE DROP OFF	DISTANCE FROM TRAFFIC LANE	
	0 - 2 FEET	2 - 8 FEET
< 2 INCHES WITHOUT TAPER	**TREATMENT 1** 	**TREATMENT 2**  Note: Signs are optional when edgeline is installed.
2 - 4 INCHES WITH 1:3 TAPER	**TREATMENT 3** 	**TREATMENT 4**  Note: Signs are optional when edgeline is installed.
2 - 4 INCHES WITHOUT TAPER	**TREATMENT 5**  NOTE: Weighted Channelizer may be used in place of drum. OR  FOR RURAL HIGHWAYS < 5000 ADT	**TREATMENT 6**  NOTE: Weighted Channelizer may be used in place of drum. OR 
	0 - 2 FEET	> 2 FEET
4 - 12 INCHES WITH 1:4 TAPER	**TREATMENT 7** 	**TREATMENT 8**  Note: Signs are optional when edgeline is installed.

DROP OFF GUIDELINES

EDGE DROP OFF	DISTANCE FROM TRAFFIC LANE ALL DISTANCES
4 - 12 INCHES WITH 1:3 TAPER	**TREATMENT 9**  NOTE: Weighted Channelizer may be used in place of drum. OR  FOR RURAL HIGHWAYS < 5000 ADT
	> 8 FEET
4 - 12 INCHES WITHOUT TAPER	**TREATMENT 10**  NOTE: Weighted Channelizer may be used in place of drum.
> 12"	For any excavation or drop-offs in excess of 300mm (12 inches) see the Minnesota Manual on Uniform Traffic Control Devices, Section 6F-83 – Portable Barriers.

DROP OFF	UNEVEN LANES
< 2 INCHES WITHOUT TAPER	
2 - 4 INCHES WITH 1:3 TAPER	
2 - 4 INCHES WITHOUT TAPER	

TRAFFIC LANE MILLED EDGE

TRAFFIC LANE | SHOULDER

NOTE: Milled edges greater than 2 inches require tapers and/or delineation as detailed for edge drop-offs in addition to the HIGH SHOULDER signs.

General Guidelines

These guidelines are intended to increase traffic safety using traffic control devices safety related appurtenances and construction techniques for uneven lanes, milled edges, and edge drop-offs that occur in highway work zones. The best way to increase traffic safety is to make every attempt to minimize exposure to uneven lanes, milled edges and edge drop-offs. Only when uneven lanes, milled edges and edge drop-offs are deemed necessary, shall the appropriate portion(s) of these guidelines be applied to enhance traffic safety.

No traffic control treatments are needed if edgelines are installed and shoulder widths and cross section slopes are the same as existing adjacent roadway sections.

Drop-offs of 0-100mm (**0-4 inches**) more than 2.4m (**8 feet**) from the edge of traffic carrying lanes do not require any traffic control treatments.

Drop-offs of 100-300 mm (**4-12 inches**) adjacent to traffic carrying lanes are permitted without tapers or portable concrete barriers for:

A. Projects within an urban area when the speed limit is 30 mph or less; or
B. Short term (3 calendar days or less) repair, less than 15m (**50 feet**) in length when the speed limit is greater than 30 mph.

Weather permitting, milling and paving operations shall be required to complete the full width of the section under construction at the end of each work period. At no time shall there be more than one uneven lane condition between the traffic carrying lanes which include auxiliary lanes, turn lanes and ramp access or egress areas.

Tapered slopes shall be adequately compacted to provide a firm driving surface.

Appropriate Uneven Lane warning signs or shoulder warning signs shall be repeated after each intersection.

Maximum warning sign spacing shall be:

A. 1600 m (**1 mile**) when the speed limit is greater than 30 mph and
B. 400m (**1/4 mile**) when the speed limit is 30 mph or less.

Maximum drum spacing shall be 4S, where S is the posted speed limit in feet.

Maximum weighted channelizer or tubular marker spacing shall be 2S, where S is the posted speed limit in feet.

Maximum Type III spacing shall be 20S, where S is the posted speed limit in feet.

Temporary Raised Pavement Markers (TRPMs)

TRPMs may be used to simulate solid lines without the use of any other pavement marking material and may be used to supplement other types of pavement markings.

TRPMs shall not be used as an interim pavement marking between October 1 and May 1 because of snowplowing operations.

Simulating a Solid Line and a Broken Line

When TRPMs are used to **simulate** a line the following guideline applies, unless otherwise indicated in the Plan or directed by the Engineer:

- Broken Line - place two (2) TRPMs per 2-meter-skip stripe, 2 m on center, and eight (8) meter gap (**use four (4) TRPMs per 10-foot skip strip, 3-1/3 feet on center and 40 foot gap**). The same spacing shall be used whether the marking is for an interim or long-term situation.
- Solid Line - place TRPMs, 3 m (**10 foot**) on center for tangent sections; place TRPMs, 1.5 m (**5 foot**)on center for curve sections over six (6) degrees (291-m radius), steep grades, and concrete pavements.
- Double Solid Line - place two (2) TRPMs separated by 100 mm (**4 inches**) side-by-side using the same spacing required for Solid Lines.

Refer to the details on Page 2 of 2.

Supplementing a Solid Line and a Broken Line

In the following situations, TRPMs do not provide adequate simulation of solid lines and shall only be used to Supplement Solid Lines:

- Areas where the markers, even 1.5 m (**5 foot**) on center, become visually separated. This occurs frequently on low speed urban highways with sharp curves and short transition areas. This also occurs where there are steep grades and dips.
- Areas with high ambient lighting which may diminish the retroreflective capabilities of the markers.

When TRPMs are used to **supplement** a line, the following guideline applies, unless otherwise indicated in the Plan or directed by the Engineer:

- Solid Line - place TRPMs, 3 m (**10 foot**) on center.
- Double Solid Line - place two (2) TRPMs separated by 100 mm (**4 inches**) side-by-side, using the same spacing required for Solid Lines.
- Broken Line – place two (2) TRPMs to supplement each broken line segment.

Types of TRPMs

The TRPMs are classified into four types as follows:

- TRPM Type 1 - These markers are acceptable for use on all roadways for short or long term projects. They may be used to supplement or simulate solid or broken lines.
- TRPM Type 2 - These markers are acceptable for use on projects with Average Daily Traffic (ADT) of less than 3,000. They may be used to supplement or simulate solid or broken lines.
- TRPM Type 3 - These markers are acceptable for use on all roadways for short or long term projects. They may be used to supplement solid or broken lines. These markers are **NOT** acceptable to simulate solid or broken lines. If these markers do not conform to the color requirements herein they shall not be placed directly on the pavement marking line.
- TRPM Type 4 - These markers are acceptable for use on chip or sand sealing operations. These markers are designed to be placed prior to the sealing operation with a protective cover that is removed after the seal coat is applied.

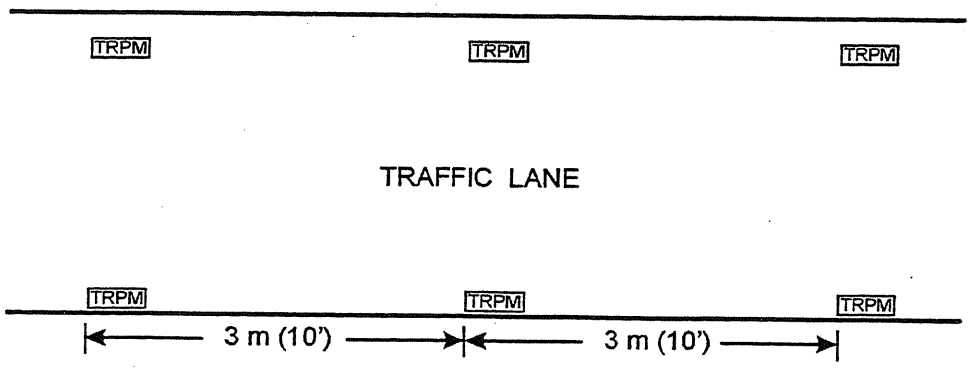
A list of approved raised pavement markers of each type is available from Mn/DOT Office of Traffic Engineering's Work Zone Safety Engineer, 395 John Ireland Blvd., St. Paul, MN 55155.

Installation, Maintenance and Removal

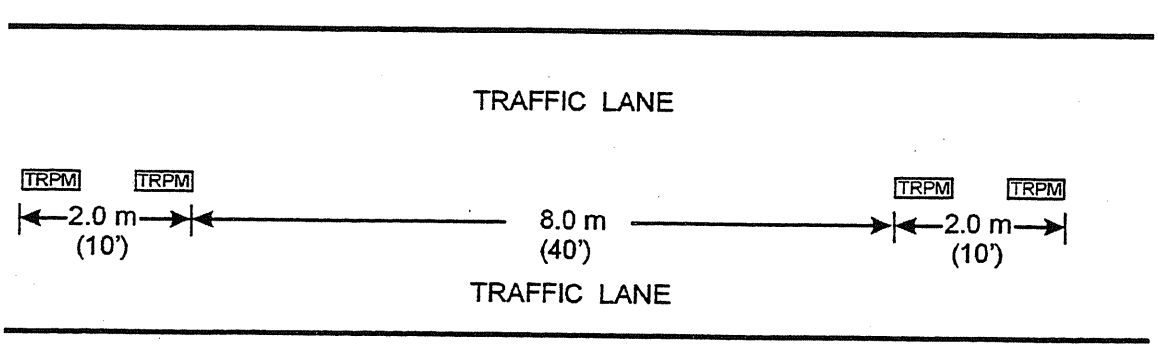
Installation, maintenance and removal of the TRPMs shall be done on a continuous basis as directed by the Engineer. The Contractor shall remove all containers, wrappers and used or damaged markers, etc. from the job site at the time of installation, during the project, and at the time of removals. All TRPMs shall be new and unused when placed.

Damaged or missing TRPMs shall be replaced by the Contractor within twenty-four (24) hours after notification by the Engineer, at no cost to the Department.

Prior to installing TRPMs, the pavement surface shall be air blown or brushed to remove surface dust and dirt. The TRPMs shall then be fixed to the pavement surface as per the manufacturer's recommendation.



SIMULATING A SOLID LINE



SIMULATING A BROKEN LINE (10 m (50') CYCLE)

ATTACHMENT
SPECIFICATIONS FOR EPOXY RESIN PAVEMENT MARKINGS
(FREE OF TOXIC HEAVY METALS)

1.0 DESCRIPTION

The work shall consist of furnishing and installing reflectorized white and yellow two-component, 100 percent solids epoxy pavement markings. Applications are lines, legends, symbols, crosswalks and stop lines placed on properly prepared asphaltic and portland cement concrete pavement surfaces in accordance with the Special Provisions, Plans, this Attachment and as directed by the Engineer. Upon curing, the materials produce pavement markings of specified thickness, width and retroreflectivity that resist wear from high traffic volumes for several years. During darkness and weather permitting, yellow markings shall be readily distinguishable from white markings.

Values stated in the International System of Units SI apply only to projects to be constructed in Metric units of measure. Values stated in inch-pound units (in parenthesis) apply only to projects to be constructed in English units of measure.

2.0 QUALIFICATIONS

2.1 Epoxy striping is a technical process requiring specialized equipment, quality controlled materials and well-trained operators to produce functional, long life pavement markings. To minimize application failures, Mn/DOT requires epoxy materials, beads, the pavement marking contractor, and striper to be approved prior to the bidding process.

2.1.1 A pavement marking contractor and/or equipment may be qualified as follows:

1. No previous epoxy striping on any construction contract-- contact Mn/DOT to arrange for field demonstration.
2. Recent epoxy striping experience with other state transportation departments-- contact Mn/DOT and provide experience summary, including names of persons to be contacted.
3. If striper is new, contact Mn/DOT to arrange for field demonstration.

2.1.2 Before any epoxy product is acceptable for bid, it shall be field tested, evaluated, approved and assigned a product identification number by the Mn/DOT Materials Engineering Section. An approved product is placed on the APPROVED PRODUCTS LIST which is shown in Section 2.1.4.

2.1.3 No change in product identification, chemical composition as indicated by infrared spectrophotometry and/or chemical analysis, or changes in the application requirements will be allowed. Any such changes shall be submitted for further evaluation.

Mn/DOT EPOXY PAVEMENT MARKING MATERIAL APPROVED PRODUCTS LIST

2.1.4

Fast Dry (Type I)

Manufacturer	Product	Appr Date
Polycarb Inc.	MARK 55.3	1998
Epoplex	LS 50	1998

Slow Dry (Type II)

Manufacturer	Product	Appr Date
Polycarb Inc.	MARK 55	1991
Epoplex	LS 60	1998

3.0 MATERIAL CLASSIFICATIONS

3.1 This specification provides for the classification of epoxy resin pavement marking systems by type.

3.1.1 Type I - A fast cure material suitable for line applications and, under ideal conditions , may not require coning.

3.1.2 Type II - A slow cure material suitable for all applications of pavement markings under controlled traffic conditions, i.e., coning is required and flagging may be as directed by the Engineer.

3.1.2 **Only Slow Dry Type II epoxy material shall be used for epoxy pavement markings** except when specified as otherwise in the Special Provisions.

4.0 EPOXY AND BEAD REQUIREMENTS

4.1 Epoxy Resin Material

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

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

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

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

x | 0.470 | 0.485 | 0.520 | 0.480
y | 0.440 | 0.460 | 0.450 | 0.420

Daylight Directional Reflectance (Y), white, minimum	83
Daylight Directional Reflectance (Y), yellow, minimum	50

Testing will be according to :

Daylight Directional Reflectance	ASTM D 2805
Color	ASTM D 2805

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

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

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

4.1.8 Tensile Strength -- The tensile strength of the material, when tested according to ASTM D 638, shall not be less than 41,370 kPa (6,000 psi.) after 72 hours cure at 23±2°C.

4.1.9 Compressive Strength -- The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 82,700 kPa (12,000 psi.) after 72 hours cure at 23±2°C.

4.1.10 Shelf Life -- The individual components shall not require mixing prior to use when stored for a period of 12 months.

4.2 Glass Beads

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

a. Coatings -- the beads shall be treated according to the manufacturers recommendations and meet the requirements of Section 4.4.2 of M247, and
b. Roundness-- the beads shall have a roundness of at least 80%.

4.2.2 For 380 µm (15 mil) applications, glass beads shall be applied at a rate of at least 3.0 kg/L (25 lb./gal.). **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

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

5.0 APPLICATION EQUIPMENT AND PROCEDURES

5.1 Equipment

5.1.1 Equipment furnished shall include an applicator truck of adequate size and power, designed to apply an epoxy resin material and glass beads in a continuous or intermittent line pattern. The equipment shall be capable of placing stripes on the left and right sides. The left carriage shall be capable of placing two lines simultaneously with either line in a solid or intermittent pattern in yellow or white. With change in color usage, an amount of material equal to fifteen 3 m (10 ft.) stripes shall be wasted to eliminate the change of the incorrect color being applied.

5.1.2 The applicator truck (striper) and other vehicles in the striping train shall have permanently mounted Type C flashing arrowboards. They shall be visible to oncoming or following traffic, depending on the type of line being placed. Arrowboard requirements are detailed in the "Field Manual" of the *Minnesota Manual of Traffic Control Devices*. Also, truck equipment shall be capable of accumulating the footage applied per gun, individually each day. Only material application shall activate the footage accumulators. The readout shall be digital and not adjustable.

5.1.3 The equipment shall be capable of applying glass beads in a pressurized system at a rate of at least 3.0 kg/L (25 lb./gal.). **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

5.1.4 All guns on the spray carriages shall be in full view of the operator(s) during operation.

5.1.5 Each crew shall include at least one technical expert knowledgeable in equipment operation, application techniques, control of traffic, and safety regulations.

5.2 Procedures

5.2.1 Pavement markings shall be placed in accordance with the details shown in the Plans and the control points established by the Engineer.

5.2.2 The road surface shall be cleaned at the direction of the Engineer just prior to an application. Pavement cleaning shall consist of at least brushing with a rotary broom (non-metallic), or as recommended by the material manufacturer and acceptable to the Engineer. New Portland cement concrete surfaces shall be sandblasted clean to remove any surface treatments and/or laitance. On low speed [Speed Limit 65 km/h (40 mph) or less] urban portland cement concrete roadways, sandblast cleaning shall be used for all epoxy pavement markings.

5.2.3 If the roadway surface is dry, the epoxy material application shall immediately follow the pavement cleaning and be preceded by an air blast. However, markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface before the material can be applied.

5.2.4 The Engineer will place necessary spotting at appropriate points as overall horizontal control for striping and to indicate necessary starting and cutoff points. Broken line intervals will not be marked. Longitudinal joints, pavement edges, and existing markings shall serve as control points when so directed.

5.2.5 A 380 µm (15 mil) epoxy line requires a liter of mixed components for every 25.8 m (84.5 ft.) of 100 mm (4 in.) wide line. Field measurements are inserted into the following equation: Line Thickness in micrometers = Liters x 0.001 x 10^{-3} x m^3 divided by the quantity Length in meters x width in meters (Thickness in inches = Gallons x 231 cubic inches divided by the quantity Length (inches) x Width (inches)). Use 3.785 liters per gallon if epoxy is metered in gallons.

5.2.6 The minimum line width shall be its nominal width with 6 mm (¼ in.) greater than the nominal width allowed provided the variation is gradual and does not detract from the general appearance. Broken line segments, normally 2 m (6.56 ft.) every 10 m (32.81 ft.), may vary up to 75 mm (3 in.) from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guide shall not exceed , except when approved by the Engineer. Material shall not be applied over a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of his responsibility to comply as closely as practicable with the planned dimensions.

5.3 Spraying Operation

5.3.1 Placement of epoxy materials shall be permitted only on a clean, dry pavement surface and air and pavement temperatures at least 10° C (50° F) unless the manufacturer, in writing, approves a lower temperature.

5.3.2 Two parts of epoxy component A (pigment) and one part component B (hardener) shall be heated separately at 43°±1° C (110°±30° F) and thoroughly mixed. All material heated over 60° C (140° F) shall be discarded. The sprayed epoxy shall be applied at 43°±1° C (110°±30°F) **or as recommended by the manufacturer.**

5.3.3 Glass beads shall be applied immediately after the placement of the epoxy. If two bead gradations are required by the Special Provisions, two bead dispensers are required to deliver the specified drop rates. Otherwise the dispenser system must deliver at a minimum 3.0 kg (25 lb./gal.) of beads per liter of epoxy material. **A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.**

5.3.4 The Contractor shall cooperate with inspection personnel in reviewing operation of the equipment, safety precautions, measurement of materials (components and beads), computations to determine specific and daily application rates, sampling materials, making other measurements, such as epoxy thickness, and notifications as to work schedule.

5.3.5 **Only Type II epoxy material shall be used for epoxy pavement markings except when specified as otherwise in the Special Provisions.**

5.3.6 Traffic control for the pavement marking operations shall be in substantial conformance with the "Field Manual," *Minnesota Manual of Uniform Traffic Control Devices* . **A shadow vehicle with a truck-mounted attenuator shall be used on high speed [SPEED LIMIT (65 km/h) (40 mph) and greater], high volume (ADT 1500 and greater) highways.**

6.0 SAMPLING RATE & PROCEDURES

6.1 One pint samples of each manufacturer's lot or batch furnished for the contract shall be **submitted to Mn/DOT at the time of manufacturing.** One pint samples of both Part A (yellow/white) & part B must be submitted to the Mn/DOT Materials Laboratory, 1400 Gervais Ave., Maplewood, Minnesota 55109. (612) 779-5550 or 5549, FAX: (612) 779-5616. Samples shall be identified as follows:

1. Manufacturer's Name
2. Manufacturer's Product Number
3. Lot/Batch Number
4. Date Manufactured
5. Color
6. Intended state project numbers.

6.2 Contractors will not be allowed to use material that has not meet the requirements of Sections 6.1 & 7.0. Contractors will be asked to remove material that does not conform to Sections 6.1 & 7.0 and replace with material that does.

7.0 CERTIFICATIONS

7.1 The manufacturer shall certify that the components meet the requirements of these specifications and are on the Mn/DOT Approved Product List.

7.2 Certifications shall be sent along with the samples in section 6.1.

8.0 CONTAINER MARKINGS

8.1 Containers for epoxy components shall be marked with the manufacturer's name, product identification number, lot or batch number, date of manufacture, color, net weight of contents.

8.2 Containers for glass beads shall be marked with the name of manufacturer, the wording "Glass Beads," lot or batch number, coating type, date manufactured, and the net weight.

9.0 ACCEPTANCE OF PAVEMENT MARKINGS

In order to be a long-life pavement marking, epoxy markings placed in Minnesota must retain a satisfactory level of retroreflectivity in addition to demonstrating good adhesion, resisting chipping, and exhibiting proper daytime and nighttime colors. These attributes have been observed and evaluated for several years and are the basis for acceptance/rejection procedures and values used herein.

9.1 Retroreflectivity

9.1.1 Acceptable Minimum Retroreflectivity Values

MINIMUM AVERAGE RETROREFLECTIVITY VALUES
FOR EPOXY MARKINGS
(mcd/m^2/lux)

Period	White	Yellow
Initial*	300	200
After-One-Winter*	175	140

* Described in Section 9.1.4 Miscellaneous Traffic Controls, Numbers 4 and 5.

9.1.2 Retroreflectometers-- Measurements shall be taken with either a portable or mobile retroreflectometer conforming to 30-meter geometry which is defined as: the entrance angle (the angle between the illumination axis and the retroreflector axis) shall fall between 88.50° and 88.76° and the observation angle (the angle between the illumination axis and the observation axis) shall fall between 1.0° and 1.05°; and, the co-viewing angle (the complement of the entrance angle) shall fall between 2.29° and 2.50°. All retroreflectivity readings and data analysis will be provided by Mn/DOT at no cost to the Contractor. Mn/DOT reserves the right to:

- make daytime and/or nighttime visual inspections with or without the presence of the Contractor's representative, mainly to locate obvious or suspect areas of deficiency, and

- determine retroreflectivity of symbols, legends and lines wider than 200 mm (8 in.) using the portable retroreflectometer only.

9.1.3 Test Segments -- The following methodology will be used to evaluate retroreflectivity performance of in-service longitudinal line pavement markings:

LENGTH AND NUMBER OF TEST SEGMENTS[a] PER ROADWAY[b] PER LINE TYPE[c]

Length of Roadway	Number of Test Segments	Length of Test Segments
Less than 1.5 km (1 mi.)	1	300 m (0.2 mi.)
Greater than or equal to 1.5 km (1 mi.)	1 per 1.5 km (1 mi.)	300 m (0.2 mi.)

[a] TEST SEGMENTS-- Areas of a roadway chosen for measuring retroreflectivity of the line types.

[b] ROADWAY--As used here, means that portion of a street or highway ordinarily used for vehicular traffic. In the event a street or highway includes two or more separate roadways, the term roadway shall refer to each roadway separately.

[c] LINE TYPE-- Longitudinal lines of the same color and function. For example, white and yellow edge lines are each a line type.

9.1.4 Measurements in Test Segments

Portable Retroreflectometer

1. Take a minimum of 20 readings in each test segment per line type.
2. On broken lines (skip striping), measure every other stripe, taking no more than two readings per stripe with readings 0.5 m (20 in.) from the ends of the marking.
3. For solid lines, divide test segment into ten areas of 30 m (100 ft.); space readings a minimum of 10 m (33 ft.) and a maximum of 30 m (100 ft.) apart.
4. For 10 percent of each message type, take 5 readings on each message line; for 10 percent of each symbol type, take 5 readings on each symbol.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Mobile Retroreflectometer

1. Calibration of the instruments shall be in accordance with the manufacturer's instructions.
2. Retroreflectivity shall be measured at a minimum rate of 20 percent of each roadway length by line type.
3. Should another mobile unit be available, the maximum acceptable deviation for measurements made by the two different instruments of the same manufacturer and for the same roadway length shall be ± 10%.
4. Repeatability for the given mobile unit shall be ± 6%.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Miscellaneous Controls

1. Take measurements on a clean, dry roadway.
2. Collect data in direction of traffic flow.
3. Measurement units are: mcd/m^2/lux.
4. Wait at least two (2) weeks from date of placement of the markings before taking initial readings.
5. Take after-one-winter readings in May or June to assure that spring rains have cleaned the beads.
6. Randomly select test segments unless night reviews or other knowledge supersedes a random selection process.
7. Measure each line type separately.
8. The Engineer may request additional readings or test segments.
9. In the event LASERLUX is not available, the Engineer may require the use of the portable retroreflectometer or establish an alternative evaluation plan.

9.1.5 Contents of Retroreflectivity Report

The report shall consist of:

- State Project number
- Trunk Highway number
- Test date
- Geographical location of the test site(s), including distance from the nearest permanent site identification, such as a reference point.
- Identification of the pavement marking material tested: type, color, age, and transverse location on the road
- Identification of the retroreflectometer
- Remarks concerning the overall condition of the line, messages and symbols such as carryover of asphalt, snow plow damage, uneven distribution of beads, etc.
- Average of the readings for each test segment with one standard deviation calculated.
- Average of the readings for each message and symbol type.

9.2 Correction of Defects/Penalties

1. All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are authorized by the Engineer.
2. Where yield computations show a deficiency in material usage of not more than 20 percent, Mn/DOT may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in material usage exceeds 20%, Mn/DOT may require removal and replacement to the satisfaction of the Engineer unless other means are approved by the Engineer.
3. If the Engineer requires removal and replacement, the contractor shall remove (by an approved process) at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking to be removed.

4. Where initial retroreflectivity falls below the minimum acceptable levels but not more than 20%, the Engineer may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in retroreflectivity exceeds 20%, i.e., less than 240 mcd/m^2/lux for white and 160 mcd/m^2/lux for yellow, the Engineer may require the removal and replacement to the satisfaction of the Engineer unless other means are approved by the Engineer. Where minimum levels after one winter fall below the specified levels (170 mcd/m^2/lux - 135 mcd/m^2/lux), Mn/DOT will notify the project contractor and manufacturer(s) of the failure. If the initial readings were above Mn/DOT's specified initial minimum levels (300 mcd/m^2/lux - 200 mcd/m^2/lux), the Engineer, contractor, and manufacturer(s) of the material(s) shall review the project together. Based on the review an of all known aspects, the Engineer will make a determination as to why the job failed and notify the Contractor, pavement marking contractor, and/or manufacturer(s) in writing.
5. If this process has to be repeated on several projects with either the same contractor and/or manufacturer(s), Mn/DOT will take corrective action. This corrective action will be a two step process:

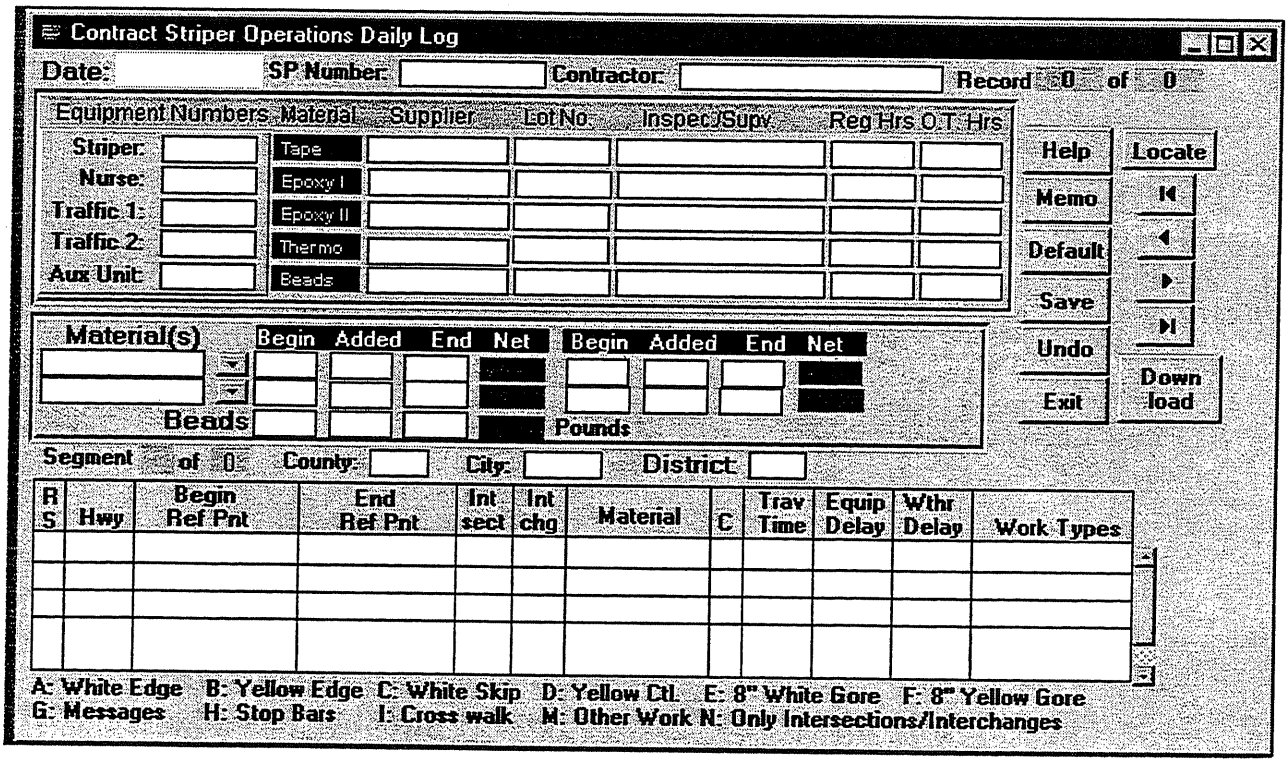
   Step 1 Pavement marking contractor/manufacturer(s) will be considered not approved for Mn/DOT projects, except to bring workmanship/product back into compliance.

   Step 2 If the first step cannot be attained, pavement marking contractor/ manufacturer(s) will not be allowed to participate in Mn/DOT projects and/or be removed from Approved Product List.

10.0 DOCUMENTATION

Contractors applying epoxy pavement markings for Mn/DOT under a contract **are required** to fill out the attached "Construction Striper Operations Daily Log" form. These forms shall be completed at the end of each project and faxed to the "Reflective Systems Unit" at (612) 797-3181 Attn: Jim Carlson. **Failure to submit completed forms may result in 10% of the overall contract price for epoxy pavement markings held back.** Also, if forms are not sent in to the reflective systems unit in a timely manner projects will not be inspected during optimum times for meeting their performance criteria. Any questions regarding this form can be answered by calling the Reflective Systems Unit at (612) 797-3183.

Construction Striper Operations Daily Log



January 16, 1998

MINNESOTA DEPARTMENT OF TRANSPORTATION
SPECIFICATION
HIGH SOLIDS WATER BASED TRAFFIC PAINT

I. SCOPE

This specification covers fast-dry white and yellow acrylic latex traffic marking paints for use with drop-on glass beads for application on concrete and bituminous pavements at spray temperatures of up to 75°C (160°F). When applied with glass beads at pavement temperatures above 10°C (50°F) and at relative humidities of up to 75 percent, the paint shall dry to a no-track condition within 3 minutes. The paints shall be free of lead, mercury, cadmium, hexavalent chromium or any other toxic heavy metals.

This paint is intended for use with dual coated drop-on glass beads, having both a silicone moisture resistance coating and a silane adherence coating. Glass beads are to be applied at a rate of eight pounds per gallon.

II. GENERAL REQUIREMENTS

A. Quality

The paint shall be formulated from first-grade materials and shall be suitable in all respects for application at elevated spray temperatures with drop-on glass beads using conventional traffic striping equipment.

The finished paint shall be smooth and homogeneous, free of coarse particles, skins or any other foreign materials that are detrimental to its application or appearance.

B. Package Stability

Within a period of twelve months from the time of delivery, the paint shall not cake, settle, liver, thicken, skin, curdle, gel or show any other objectionable properties which cannot readily be corrected with minimal stirring. Any paint with properties that make it unsuitable for use within the specified twelve months shall be returned to the supplier for credit.

It shall be the manufacturer's responsibility to add sufficient anti-settling agents, stabilizers and other additives to insure proper storage stability.

C. Manufacturing and Packaging

Manufacturer shall be capable of producing paint in batches of 3,500 liters (1,000 gallons) or larger. The paint shall be screened with a 420 μm (40) mesh or finer screen to remove any coarse particles, skins or foreign material.

The paint shall be packaged in lined, new 55 gallon or 5 gallon containers as specified. To prevent formation of "skins", the manufacturer shall use a "float" of ammonia water on the paint surface, or a "floating type" plastic liner on the top of the filled container, or some other means that will effectively prevent skinning.

Drums shall be Full Removable-Head Universal meeting the requirements of DOT-17H; covers shall have one 2-inch and one 3/4 inch fitting. Each container shall be marked with the manufacturer's name, type of paint, batch number, date of manufacture, gross weight and container weight.

III. SPECIFIC REQUIREMENTS

Properties of the finished paint.

The exact composition of the paints shall be left to the discretion of the manufacturer, provided the finished paint meets the requirements of this specification.

The vehicle shall be composed of a 100% acrylic polymer such as Rohm and Haas E-2706, or an approved equal.

Unit Weight, 25°C, g/L, min	1440
Viscosity, Krebs Stormer, 25°C, K.U.	80 - 100
Grind, Hegman, minimum	3
Total Solids, % by weight, minimum	73
Non-volatile vehicle, % by weight, minimum	43
Pigment, % by weight	45 - 62
Titanium Dioxide, white paint, g/L, minimum	120
Dry Time, 300μm wet film,@ 65% RH, minutes, max	12
Dry Through, @ 90 % RH, minutes, max	130
Daylight Directional Reflectance, white, minimum	83
Daylight Directional Reflectance, yellow, minimum	50
Contrast Ratio, minimum	0.98
Bleeding Ratio, minimum	0.97

Flexibility and Adhesion	No cracking or flaking
Water Resistance	No blistering or loss of adhesion
Settling	Rating of 6 or better
Skinning, 48 hrs	None
Track Free Time, minutes, maximum	3
pH, minimum	9.6
Lab Retro-reflectivity, white, minimum, mcd/m^2/lux	300
Lab Retro-reflectivity, yellow, minimum, mcd/m^2/lux	200
Field Retro-reflectivity, white, minimum, mcd/m^2/lux	275
Field Retro-reflectivity, yellow, minimum, mcd/m^2/lux	180

Organic Yellow Pigment. The prime pigment in the organic yellow paint shall be Colour Index Pigment Yellow Number 65 or Number 75.

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

x	0.470	0.485	0.520	0.480
y	0.440	0.460	0.450	0.420

Heavy Metals. The white and organic yellow paints shall be free of lead, mercury, cadmium, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.

IV. TESTING

Weight Per Gallon	ASTM D 1475
Viscosity	ASTM D 562
Fineness Of Grind	ASTM D 1210
Total Solids	ASTM D 2369
Total Pigment	ASTM D 2371
Titanium Dioxide	ASTM D 4563 ; D 1394
Dry Time(12 mils wet)	ASTM D 711 (modified)
Daylight Directional Reflectance	ASTM D 2805
Contrast Ratio(15 mils wet)	ASTM D 2805
Bleeding Ratio	Federal Specification TT-P-85
Color	ASTM D 2805
pH	ASTM E 70
Retro-reflectivity	Mn/DOT Method

Flexibility and Adhesion. Apply 380µm (15 mil) wet film thickness to 75 mm by 125 mm (3" by 5") tin panel. Dry at 25°C (77°F) for 24 hrs followed by 2 hrs at 60°C (122° F). When bent over a 12.5 mm (1/2") mandrel the paint shall adhere firmly without evidence of cracking or flaking.

Water Resistance. Apply 380µm (15 mil) wet film thickness to 100 mm by 200 mm (4" by 8") glass plates; dry at 25°C (77°F) for 72 hrs. Immerse in distilled water at 25°C (77°F) for 24 hrs. Allow to air dry for 2 hrs on a flat surface. Paint shall show no blistering or loss of adhesion.

Skinning. After 72 hrs in a tightly sealed 3/4 filled container, the paint shall be free of lumps and skins when strained through a 149 µm (100) mesh screen.

Settling. A homogeneous sample of paint in a full 450 to 500 mL (one-pint) friction-top can shall be inverted for one hour to insure a complete seal between the cover and body of the can. After one hour the can shall be placed upright in a 60°C (122° F) oven. After 5 days the can shall be cooled to room temperature for 4 hours. When evaluated according ASTM D 869, the degree of settling shall have a rating of 6 or better.

Track Free Time. When applied under the following conditions, the line shall show no visual tracking when viewed from 15 m (50 feet) after driving a passenger vehicle over the line at a speed of 40 - 55 km/h (25-35 mph).

380 µm (15 mils) wet film thickness.
960 grams (8 pounds) of glass beads per liter (gallon) of paint.
Paint temperature at nozzle between 45 - 70°C (110 - 160° F).
Pavement temperature of 10 - 50°C (50 to 120° F).

Dry Time. Tested according to ASTM D 711, except wet film thickness shall be 300 ± 25 µm (12±1 mils). The applied film shall be immediately placed in an humidity chamber controlled at 65±3 % R.H. and 24±2°C (72.5±2.5°F) and with minimal air flow.

Dry Through. The film shall be applied to a non-absorbent substrate at a wet film thickness of 300 ± 25 µm (12±1 mils) and placed in a humidity chamber controlled at 90±5 % R.H. and 24±2°C (72.5±2.5°F). The dry through time shall be determined according to ASTM D 1640, except that the pressure exerted shall be the minimum needed to maintain contact with the thumb and film.

Retro-reflectivity. The lab will draw three - 100 mm (4 inch) wide lines, with wet film thickness of 380µm ± 25 (15±1 mils). Glass beads will be dropped on at a rate of 960 g/L (8lbs/gal). A total of 3 readings will be conducted on each sample with a 30 meter geometry LTL 2000. The average of those 9 readings will be the retro-refectivity of the system (paint and beads). The

Field studies will be conducted using a 30 meter geometry Laserlux®. These studies will be conducted at random throughout the year.

V. MANUFACTURERS CERTIFICATION

Manufacturer shall submit certified test results with each batch of paint produced for use in Minnesota under this specification. Tests conducted on each batch shall include; weight per gallon, viscosity, and drying time. Testing for all other parameters in this specification shall be carried out annually at the start of production. Certified test results shall be promptly submitted to the Mn/DOT Materials Laboratory at 1400 E. Gervais, Maplewood, Minnesota, 55109.

VI. SAMPLING

All paint manufactured under contract for Mn/DOT shall be inspected at the factory by Mn/DOT personnel or representatives at a frequency determined by Mn/DOT. When the place of manufacture is located outside the boundaries of the State of Minnesota, the manufacturer shall bear all costs of sampling and plant inspection.

For paint ordered by private contractors for use on Minnesota painting contracts, the manufacturer shall submit a one-pint sample of each batch along with a letter certifying the sample represents the full manufactured batch.

The department reserves the right to base acceptance upon samples taken at the point of delivery or from a contractors supply. Sample size shall be one pint.

APPLICATION SPECIFICATION
CONVENTIONAL PAVEMENT MARKING MATERIALS
3 MINUTE DRY ALKYD AND HIGH SOLIDS LATEX

Values stated in the International System of Units SI apply only to projects to be constructed in Metric units of measure. Values stated in inch-pound units (in parenthesis) apply only to projects to be constructed in English units of measure.

Materials

The traffic marking paint shall be yellow or white in color and shall conform to the attached Mn/DOT Specification. ALL MATERIALS shall be free of lead, cadmium, mercury, hexavelent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.

The material shall be marked as follows:

1. Manufacturer's Name
2. Place of Manufacture
3. Date of Manufacture
4. Color of Material
5. Batch Number

Only material manufactured by a Mn/DOT approved manufacturer will be allowed for use on Mn/DOT projects. The following manufacturers are approved to supply material:

Beads	Quality Paint
Potters, Inc.	Vogel Paints, Inc.
	Linear Dynamics, Inc.
	Centerline Industries, Inc.
	Sherwin Williams, Inc.

A sample from each batch shall be submitted to the Mn/DOT Laboratory for inspection and testing at least 15 days prior to use in the field.

Equipment

Application equipment for permanent markings shall consist of a machine of the spray type capable of applying the material under pressure at a controlled temperature through nozzles equipped with remotely controlled cutoff mechanisms and suitable line guides that will produce clean cut lines and prevent excessive material drift. The marking material shall be applied with truck-mounted traveling units properly equipped to apply the paint stripes as required. Where two or more lines are to be applied closely spaced, the machine shall be equipped to apply those stripes simultaneously. For application of broken lines, the spray unit shall include an automatic feed control device capable of being set to produce the specified stripe to gap ratio. The truck

equipment shall be capable of accumulating the length applied by each gun individually each day. Only material application shall activate the length accumulators. The read out shall be digital and not externally adjustable.

Vehicles in the striper train shall be deployed and equipped with traffic control devices as set forth in the "Field Manual" of the *Minnesota Manual on Uniform Traffic Control Devices*. Additionally, the shadow vehicle shall be equipped with a truck-mounted attenuator on high speed (SPEED LIMIT 65 kmph (40 mph) and greater), high volume (ADT 1500 and greater) highways.

The equipment shall also be capable of applying glass beads by a pressurized system. All guns on the spray carriage shall be in full view of the operators during the spraying operation.

Application

The Engineer will place necessary "spotting" at appropriate points to provide horizontal control for longitudinal striping, determine starting and cutoff points and provide inspection of all work. Broken line intervals will not be marked. The Contractor shall cooperate with inspection personnel and take appropriate actions to assure quality pavement marking installations.

Pavement markings shall only be applied when the air temperature is at least 10 C (50 F) unless the manufacturer, in writing, authorizes a lower temperature. Markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface after cleaning and before the marking material can be applied. No striping operations will be permitted between sundown and sunrise without written permission from the Engineer.

At the time of applying the marking material, the application area shall be free of contamination. The contractor shall clean the roadway surface prior to the line application in a manner and to the extent required by the Engineer.

The filling of tanks, pouring of materials or cleaning of equipment shall not be performed on unprotected pavement surfaces unless adequate provisions are made to prevent spillage of the material. Waste material, spent solvents and cleaning materials shall be properly stored and disposed of in accordance with all federal, state and local laws, regulations and ordinances.

Glass beads shall be applied immediately after application of a paint line at a rate of 960 g/L (8 lbs./gal.). Beads shall be evenly distributed on pavement. All material shall be placed in a workmanlike manner, which shall result in a clearly defined line that has been adequately reflectorized with glass beads.

All pavement striping shall be 100 mm (4 in.) wide, unless otherwise specified, and broken line shall be in lengths of 2 m (6.56 ft.) separated by a gap of 8 m (26.25 ft.) for a 10 m (32.81 ft.) cycle length. All pavement striping shall be a minimum of 380 m thick (wet thickness) and the thickness shall be uniform across the width of the line.

A tolerance of 6 mm (¼ in.) over or under the specified width will be allowed for striping provided the variation is gradual and does not detract from the general appearance. Broken line segments may vary up to 75 mm (3 in.) from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guides shall not exceed 50 mm (2 in.). Material shall not be placed over a longitudinal joint. Establishment of application tolerances shall not relieve the contractor of his responsibility to comply as closely as possible with the planned dimensions.

Application for the marking material shall be such as to provide uniform film thickness throughout the coverage area. Stripe ends shall be clean cut and square, with a minimum of material beyond the cutoff.

Acceptance/Rejection of Pavement Markings

Acceptance or rejection of pavement markings will be based on thickness and width of material placed as determined by field measurements and yield calculations. Visual observations will determine whether adhesion, chipping and color of the inplace pavement markings is acceptable. The minimum acceptable initial retroreflectivity, as determined in the attached METHOD OF MEASUREMENT FOR DETERMINING AVERAGE RETROREFLECTIVITY shall equal or exceed 275 mcd/m^2/lux for white and 180 mcd/m^2/lux for yellow material, respectively. All retroreflectivity readings and data analysis will be provided by Mn/DOT at no cost to the Contractor. Mn/DOT reserves the right to:

make daytime and/or nighttime visual inspections with or without the presence of the Contractor's representative, mainly to locate obvious or suspect areas of deficiency, determine retroreflectivity of symbols, legends and lines wider than 200 mm (8 in.) using a portable unit only, and

accept initial retroreflectivity based on random sampling by color of all markings if computed averages exceed the specified minimum values.

Reduction in Payment

A reduction in pay shall be made for reduced thickness, retroreflectivity and width. Thickness and retroreflectivity shall be computed by random measuring. Thickness shall be computed by the following formula:

$$\text{Thickness (micrometers)} = \frac{\text{Liters} \times 0.001 \text{ meters}^3 \times 10^{-3}}{\text{Length (meters)} \times \text{Width (meters)}}$$

Use 3.785 liters x gallons if paint is metered in gallons.

Example: A 380 micrometers thick paint line requires a liter of material for every 25.8 m of 100 mm wide line.

The equation in English units is:

$$\text{Thickness (inches)} = \frac{\text{Gallons x 231 cubic inches}}{\text{Length (inches) x Width (inches)}}$$

And, 1 mil = 0.001 of an inch.

A 15 mil thick 4 inch wide line yields 320 feet per gallon.

Correction of Defects

All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are approved by the Engineer.

Where yield computations show a deficiency in material usage of not more than 20 percent, the Engineer may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in material usage exceeds 20 percent, the Engineer may require removal and replacement or otherwise corrected to the satisfaction of the Engineer.

If the Engineer requires removal and replacement of a deficient line, message or symbol, the contractor shall remove, by an approved process, at least 90% of the marking material without excessive scarring the existing pavement. The removal width shall be approximately 25 mm (1 in.) wider all around the deficient marking.

Where initial reflectivity readings fall below the minimum acceptable levels by not more than 20%, the Engineer may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in retroreflectivity exceeds 20 percent, i.e., less than 220 mcd/m^2/lux for white and 145 mcd/m^2/lux for yellow, the Engineer may require removal and replacement or otherwise corrected to his satisfaction.

If this process has to be repeated on several projects with either the same Contractor, subcontractor and/or manufacturer(s), Mn/DOT will take corrective action. This corrective action will be a two step process:

Step 1 Pavement marking contractor/manufacturer(s) will be considered not approved for Mn/DOT projects, except to bring workmanship/product back into compliance.

Step 2 If the first step cannot be attained, the pavement marking contractor/manufacturer(s) will not be allowed to bid on Mn/DOT projects and/or will be removed from product lists.

METHOD OF MEASUREMENT FOR DETERMINING AVERAGE RETROREFLECTIVITY

Measurements shall be taken with either a portable or mobile retroreflectometer conforming to 30-meter geometry which is defined as: the entrance angle (the angle between the illumination axis and the retroreflector axis) shall fall between 88.50 and 88.76 and the observation angle (the angle between the illumination axis and the observation axis) shall fall between 1.0 and 1.05 ; and, the co-viewing angle (the complement of the entrance angle) shall fall between 2.29 and 2.50 .

The following methodology will be used to evaluate retroreflectivity performance of in-service longitudinal line pavement markings:

LENGTH AND NUMBER OF TEST SEGMENTS[a] PER ROADWAY[b] PER LINE TYPE[c]

Length of Roadway	Number of Test Segments	Length of Test Segments
1.5 km (1 mi.)	1	300 m (0.2 mi.)
Greater than or 1.5 km (1 mi.)	1 per 1.5 km (1 mi.)	300 m (0.2 mi.)

[a] TEST SEGMENTS-- Areas of a roadway chosen for measuring retroreflectivity of the line types.

[b] ROADWAY-- As used here, means that portion of a street or highway ordinarily used for vehicular traffic. In the event a street or highway includes two or more separate roadways, the term roadway shall refer to each roadway separately.

[c] LINE TYPE-- Longitudinal lines of the same color and function. For example, white and yellow edge lines are each a line type.

Measurements in Test Segments

PORTABLE RETROREFLECTOMETER

1. Take a minimum of 10 readings in each test segment per line type.
2. On broken lines (skip striping), take no more than two readings per stripe, with readings 0.5 m (20 in.) from ends of marking.
3. For solid lines, divide test segment into ten areas of 30 m (100 ft.); space readings a minimum of 10 m (32.81 ft.) and a maximum of 30 m (100 ft.) apart.
4. For 10 percent of each message type, take 5 readings on each message line; for 10 percent of each symbol type, take 5 readings on each symbol.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

MOBILE RETROREFLECTOMETER

1. Calibration of the instruments shall be in accordance with the manufacturer's instructions.
2. Retroreflectivity shall be measured at a minimum rate of 10 percent of each roadway length by line type.
3. Should another mobile unit be available, the maximum acceptable deviation for measurements made by the two different instruments of the same manufacturer and for the same roadway length shall be ± 10%.
4. Repeatability for the given mobile unit shall be ± 6%.
5. Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

MISCELLANEOUS CONTROLS

1. Take measurements on a dry, clean roadway.
2. Collect data in direction of traffic flow.
3. Measurement units are mcd/m^2/lux.
4. Wait at least two (2) weeks from date of placement of the markings before taking initial readings.
5. Randomly select test segments unless night reviews or other knowledge supersedes a random selection process.
6. The Engineer may request additional readings or test segments.
7. Measure each line type separately.
8. In the event LASERLUX is not available, the Engineer may require the use of the portable retroreflectometer or establish an alternative evaluation plan.

Contents of Retroreflectivity Report

The Report shall consist of:

State Project number.
Trunk Highway number.
Test date.
Geographical location of the test site(s), including distance from the nearest permanent site identification, such as a reference point.
Identification of the pavement marking material tested: type, color, age, and transverse location on the road.
Identification of the retroreflectometer.
Remarks concerning the overall condition of the lines, messages and symbols such as carryover of asphalt, uneven distribution of beads, etc.
Average of the readings for each test segment with one standard deviation calculated.
Average of the readings for each type of message and symbol.

January 16, 1998

MINNESOTA DEPARTMENT OF TRANSPORTATION
SPECIFICATION
THREE MINUTE DRY ALKYD TRAFFIC PAINTS

I. SCOPE

This specification covers solvent based fast-dry white and yellow alkyd traffic marking paints for use with drop-on glass beads for application on concrete and bituminous pavements at spray temperatures of up to 70° C (160°F). When applied with glass beads, the paint shall dry to a no-track condition within 3 minutes. The paints shall be free of lead, mercury, cadmium, hexvalent chromium and any other toxic heavy metals.

This paint is intended for use with "dry flow" treated drop-on glass beads applied at a rate of 960 grams per liter (8 pounds per gallon).

II. GENERAL REQUIREMENTS

A. Quality

The paint shall be formulated from first-grade materials and shall be suitable in all respects for application at elevated spray temperatures with drop-on glass beads using conventional traffic striping equipment.

The finished paint shall be smooth and homogeneous, free of coarse particles, skins or any other foreign materials that are detrimental to its use or appearance.

B. Package Stability

Within a period of twelve months from the time of delivery, the paint shall not cake, settle, liver, thicken, skin, curdle, gel or show any other objectionable properties which cannot readily be corrected with minimal stirring. Any paint with properties that make it unsuitable for use within the specified twelve months shall be returned to the supplier for credit.

It shall be the manufacturer's responsibility to add sufficient anti- settling agents, stabilizers and other additives to insure proper storage stability.

C. Manufacturing and Packaging

Manufacturer shall be capable of producing paint in batches of 3,500 liters (1,000 gallons) or larger. The paint shall be screened with a 420 μm (40) mesh or finer screen to remove any coarse particles, skins or foreign material.

The paint shall be packaged in new 55 or 5 gallon containers as specified. The drums shall be Full Removable-Head Universal meeting the requirements of DOT-17H; covers shall have one 2-inch and one 3/4 inch fitting. Each container shall be marked with the manufacturer's name, type of paint, batch number, date of manufacture, gross weight and container weight.

III. SPECIFIC REQUIREMENTS

Properties of the finished paint

The exact composition of the paints shall be left to the discretion of the manufacturer, provided the finished paint meets the requirements of this specification.

Unit Weight, white paint, 25°C, g/L, min	1420
Unit Weight, organic yellow paint, 25°C, g/L, min	1380
Viscosity, Krebs Stormer, 25°C, K.U.	85 - 100
Grind, Hegman, minimum	3
Total Solids, % by weight, minimum	70
Vehicle Solids, % by weight. of vehicle, minimum	38
Pigment, % by weight,	50 - 56
Titanium Dioxide, white paint, g/L, minimum	120
Drying, 380 μm (15 mil) wet thickness, minutes, maximum	8
Daylight Directional Reflectance, white, minimum	83
Daylight Directional Reflectance, yellow, minimum	50
Contrast Ratio, minimum	0.98
Bleeding Ratio, minimum	0.95
Flexibility and Adhesion	No cracking or flaking
Water Resistance	No blistering or loss of adhesion
Settling	Rating of 6 or better
Skinning, 48 hrs	None
Track Free Time, minutes, maximum	3
Lab Retro-reflectivity, white, minimum, mcd/m^2/lux	300
Lab Retro-reflectivity, yellow, minimum, mcd/m^2/lux	200
Field Retro-reflectivity, white, minimum, mcd/m^2/lux	275
Field Retro-reflectivity, yellow, minimum, mcd/m^2/lux	180

Organic Yellow Pigment. The prime pigment in the organic yellow paint shall be Colour Index Pigment Yellow Number 65 or Number 75.

Color. The color of the dry white paint shall be a pure flat white, free of tint. The color of the yellow paint shall closely match Color Number 33538 of Federal Standard 595 and shall conform to the following CIE Chromaticity limits using illuminant "D65":

x	0.470	0.485	0.520	0.480
y	0.440	0.460	0.450	0.420

Heavy Metals. The white and organic yellow paints shall be free of lead, mercury, cadmium, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency. Lead driers shall not be allowed.

IV. TESTING

Weight Per Gallon	ASTM D 1475
Viscosity	ASTM D 562
Fineness Of Grind	ASTM D 1210
Total Solids	ASTM D 2369
Total Pigment	ASTM D 2371
Titanium Dioxide	ASTM D 4563 ; D 1394
Dry Time (15 mils wet)	ASTM D 711
Daylight Directional Reflectance	ASTM D 2805
Contrast Ratio (15 mils wet)	ASTM D 2805
Bleeding Ratio	Federal Specification TT-P-85
Color	ASTM D 2805
Retro-reflectivity	Mn/DOT Method

Flexibility and Adhesion. Apply 380 μm(15 mil) wet film thickness to 75 mm by 125 mm(3" by 5") tin panel. Dry at 25° C for 24 hrs followed by 2 hrs at 50°C . When bent over a 12.5 mm mandrel the paint shall adhere firmly without evidence of cracking or flaking.
Water Resistance. Apply 380 μm(15 mil) wet film thickness to 100 mm by 200 mm (4" by 8") glass plates; dry at 25°C for 72 hrs. Immerse in distilled water at 25°C for 24 hrs. Allow to air dry for 2 hrs on a flat surface. Paint shall show no blistering or loss of adhesion.

Skinning. After 72 hrs in a tightly sealed 3/4 filled container, the paint shall be free of lumps and skins when strained through a 149 μm (100) mesh screen.

Settling. A homogeneous sample of paint in a full 450 to 500 mL triple sealed can shall be inverted for one hour to insure a complete seal between the cover and body of the can. After one hour the can shall be placed upright in a 50°C oven. After 5 days the can shall be cooled to room temperature for 4 hours. When evaluated according ASTM D 869, the degree of settling shall have a rating of 6 or better.

Track Free Time. When applied under the following conditions, the line shall show no visual tracking when viewed from 15 meters (50 feet) after driving a passenger vehicle over the line at a speed of 40 - 55 km/h (25-35 mph).

380 μm (15 mils) wet film thickness.
960 grams (8 pounds) of glass beads per liter (gallon) of paint.
Paint temperature at nozzle between 45 - 55°C (110 - 130°F).
Pavement temperature of 10 - 50°C (50 to 120°F).

Retro-reflectivity. The lab will draw three - 100mm (4 inch) wide lines, with wet film thickness of 380 μm ± 25 μm (15±1 mils). Glass beads will be dropped on at a rate of 960 grams per liter (8 pounds per gallon). A total of 3 readings will be conducted on each sample with a 30 meter geometry LTL 2000. The average of those 9 readings will be the retro-refectivity of the system (paint and beads). The Field studies will be conducted using a 30 meter geometry Laserlux®. These studies will be conducted at random throughout the year.

V. MANUFACTURERS CERTIFICATION

Manufacturer shall submit certified test results with each batch of paint produced for use in Minnesota under this specification. Tests conducted on each batch shall include; weight per gallon, viscosity, and drying time. Testing for all other parameters in this specification shall be carried out annually at the start of production. Certified test results shall be promptly submitted to the Mn/DOT Materials Laboratory at 1400 E. Gervais, Maplewood, Minnesota, 55109.

VI. SAMPLING

All paint manufactured under contract for Mn/DOT shall be inspected at the factory by Mn/DOT personnel or representatives at a frequency determined by Mn/DOT. When the place of manufacture is located outside the boundaries of the State of Minnesota, the manufacturer shall bear all costs of sampling and plant inspection.

For paint ordered by private contractors for use on Minnesota painting contracts, the manufacturer shall submit a one-pint sample of each batch along with a letter certifying the sample represents the full manufactured batch.

The department reserves the right to base acceptance upon samples taken at the point of delivery or from a contractors supply. Sample size shall be 500mL (one pint).

January 16, 1998

MINNESOTA DEPARTMENT OF TRANSPORTATION
SPECIFICATION
DROP-ON GLASS BEADS

I. SCOPE

This specification covers treated glass beads for reflectorizing traffic marking paint.

II. GENERAL REQUIREMENTS

Beads for use with solvent-based paints will have a "dry flow" type surface treatment.

Beads for use with water-based paints will have a dual surface treatment consisting of a moisture resistant silicone treatment, and a silane adherence surface treatment.

Beads for use with epoxy paints will have a moisture resistant silicone surface treatment.

The beads will be made from clean colorless transparent glass. They will be smooth, spherically shaped, and free from milkiness, pits, excessive air bubbles, chips and foreign material. The beads will be suitable for application using conventional striping equipment, and will produce a retro-reflectorized line when viewed at night with automobile headlights.

III. SPECIFIC REQUIREMENTS

The glass beads will meet the requirements of AASHTO M 247 Type 1 "standard gradation" except the beads will have a minimum of 80 percent true spheres.

The dual treated beads will meet the moisture resistant requirements of AASHTO M 247 Section 4.4.2 and pass the adherence treatment Dansyl Chloride Test.

The moisture resistant silicone treated beads will meet AASHTO M 247 Section 4.2.2.

IV. SAMPLING AND TESTING

A. SAMPLING

The beads will be sampled at the rate of one sample per 4,000 kg (10,000 lbs) of beads. For beads shipped in 22 kg (50 lbs) bags a sample will consist of two bags selected at random and reduced to approximately one quart using a sample splitter. For bulk shipments, sampling will be by means of a perforated tube type "sampling thief." Three samples from each of three separate containers will be combined for one sample.

B. TESTING

Testing will be according to the requirements of AASHTO M 247.

Adherence coating will be tested by the Dansyl Chloride Method on file at the Mn/DOT Materials Laboratory.

Retroreflectivity will be determined by the Mn/DOT Method.

1. 3 draw downs (100 mm wide, 15 mil wet thickness) will be conducted in the lab for each color of paint.

2. Glass beads will be dropped on at a rate of 3.6 kg (8 lbs) per gallon.

3. 3 readings will be taken per draw down.

4. The average of those 9 readings will be the retroreflectivity of the system (paint and beads).

Roundness will be determined by the Mn/DOT Method detailed below.

<u>Mn/DOT Method for Determining Roundness of Glass Beads.</u>

1. Reduce sample to 25 to 50 grams by means of a sample splitter. Weigh to the nearest 0.01 grams.

2. Split the reduced sample into two fractions using a 297 μm (No. 50) sieve.

3. To separate rounds from imperfects, a smooth, 30 mm by 45 mm (12 in by 18 in), inclined glass or aluminum plate is used. The plate is inclined at approximately 3 degrees for the +297 µm (+50) fraction and at approximately 10 degrees for the -297 µm (-50) fraction.

Slowly apply part of the beads to the top of the plate. Tap the plate with a wooden pencil or brush to cause round beads to roll down the incline into a collecting pan. Brush the remaining beads into a separate collecting pan. Continue with small applications until the entire sample is processed. Repeat the process with beads that rolled off plate at least three times for the +297 µm (+50) fraction and at least four times for the -297 µm (-50) fraction.

4. Weigh the separated fractions of round beads and calculate percent rounds.

V. PACKAGING

Unless otherwise specified the beads will be packaged in moisture-proof multi-wall shipping bags.

Each container will be marked with name and address of the manufacturer, type of moisture treatment, batch number and date of manufacture.

The containers and contents will be delivered in a good, dry condition.

Any beads not meeting the requirements of this specification or delivered in an unusable condition will be rejected.

January 16, 2001

(1910) FUEL ESCALATION CLAUSE

The provisions set forth in Mn/DOT 1910 are hereby deleted, and the following is substituted therefor:

These provisions provide for compensation adjustments in the cost of motor fuels (diesel and gasoline) consumed in prosecuting the Contract work. To qualify for additional payment, the Contractor shall file a written claim stating that the conditions for additional payment have been met. In the event of a fuel price decrease, the Engineer will initiate the credit to the Department. Fuel Cost Adjustments will be applied to partial and final payments for work items set forth herein as a payment to the Contractor or a credit to the Department.

For this purpose, the Department will establish a Base Fuel Index (BFI) for fuel to be used on the Project. The Base Fuel Index will be the average of the high and low prices shown for No. 2 low sulfur fuel oil in the "OPIS" tabulation titled "RackFax, OPIS/TAPE Gross Distillate Prices" for Minneapolis ***for the day of the Contract letting***.

A Current Fuel Index (CFI) in cents per gallon will be established for each month. The CFI will be the average of the high and low daily prices shown in the "OPIS" tabulation titled "RackFax, OPIS/TAPE Gross Distillate Prices" for Minneapolis averaged for the beginning and ending dates of the monthly period being adjusted.

The Engineer will compute the ratio of the Current Fuel Index to the Base Fuel Index (CFI/BFI) each month. If that ratio falls between 0.5 and 1.5, no fuel adjustment will be made that month. If the ratio is less than 0.5, a credit to the Department will be computed. If the ratio is greater than 1.5, additional payment to the Contractor will be computed.

Credit or additional payment will be computed as follows:

(1) The Engineer will estimate the quantity of work done in that month under each of the Contract items categorized below.

(2) The Engineer will compute the gallons of fuel used in that month for each of the Contract items categorized below by applying the unit fuel usage factors shown.

(3) The Engineer will summarize the total gallons (Q) of fuel used in that month for the applicable items.

(4) The Engineer will determine the Fuel Cost Adjustment (FCA) from the following formulas:

If the Current Fuel Index (CFI) is greater than the Base Fuel Index (BFI), the following formula shall be used to determine the amount of Fuel Cost Adjustment to be paid to the Contractor.

$$FCA = \left[\frac{CFI}{BFI - 1.5} \right] X Q X BFI$$

If the Current Fuel Index (CFI) is less than the Base Fuel Index (BFI), the following formula shall be used to determine the amount of Fuel Cost Adjustment to be credited to the Department.

$$FCA = \left[\frac{CFI}{BFI - 0.5} \right] X Q X BFI$$

Where FCA = Fuel Cost Adjustment
CFI = Current Fuel Index (cents per gallon)
BFI = Base Fuel Index (cents per gallon)
Q = Monthly total gallons of fuel

Basis of Payment

If the Contractor has filed a claim, a Fuel Cost Adjustment payment to the Contractor will be made as a lump sum each payment period based on the last published CFI. A Fuel Cost Adjustment credit to the Department will be deducted as a lump sum each payment period from any monies due the Contractor. Upon completion of the work under the Contract, any difference between the estimated quantities previously paid and the final quantities will be determined. The CFI in effect on the day of completion of the Contract will be applied to the quantity differences in accordance with the procedures set forth above.

Schedule of Work Items
(Only items shown will be considered for compensation adjustments.)

	ITEM		UNIT	GALLONS OF FUEL PER UNIT	UNIT	GALLONS OF FUEL PER UNIT
(1)	Earthwork:					
	2105.501	Common Excavation	Cu. Yd	0.17	m3	0.22
	2105.503	Rock Excavation	Cu. Yd	0.27	m3	0.35
	2105.505	Muck Excavation	Cu. Yd	0.17	m3	0.22
	2105.507	Subgrade Excavation	Cu. Yd	0.17	m3	0.22
	2105.515	Unclassified Excavation	Cu. Yd	0.23	m3	0.30

2105.521	Granular Borrow (EV)	Cu. Yd	0.17	m3	0.22
	Granular Borrow (CV)	Cu. Yd	0.19	m3	0.25
	Granular Borrow (LV)	Cu. Yd	0.14	m3	0.18
2105.522	Select Granular Borrow (EV)	Cu. Yd	0.17	m3	0.22
	Select Granular Borrow (CV)	Cu. Yd	0.19	m3	0.25
	Select Granular Borrow (LV)	Cu. Yd	0.14	m3	0.18
2105.523	Common Borrow (EV)	Cu. Yd	0.17	m3	0.22
	Common Borrow (CV)	Cu. Yd	0.19	m3	0.25
	Common Borrow (LV)	Cu. Yd	0.14	m3	0.18
2105.535	Topsoil Borrow (EV)	Cu. Yd	0.17	m3	0.22
	Topsoil Borrow (CV)	Cu. Yd	0.19	m3	0.25
	Topsoil Borrow (LV)	Cu. Yd	0.14	m3	0.18
(2) Aggregate Base:					
2211.501	Aggregate Base	Ton	0.55	t	0.61
2211.502	Aggregate Base (LV)	Cu. Yd	0.77	m3	1.01
2211.503	Aggregate Base (CV)	Cu. Yd	0.99	m3	1.29
(3) Aggregate Shouldering:					
2221.501	Aggregate Shouldering	Ton	0.55	t	0.61
2221.502	Aggregate Shouldering (LV)	Cu. Yd	0.77	m3	1.01
2221.503	Aggregate Shouldering (CV)	Cu. Yd	0.99	m3	1.29
(4) Concrete Pavements:					
2301.511	Structural Concrete	Cu. Yd	0.98	m3	1.28
2301.513	Structural Concrete HE	Cu. Yd	0.98	m3	1.28
(5) Bituminous Pavements:					
2350.609	Type-Wearing Course Mixture	Ton	0.90	t	0.99
2350.609	Type-Binder Course Mixture	Ton	0.90	t	0.99
2350.609	Type-Leveling Course Mixture	Ton	0.90	t	0.99
2350.609	Type-Base Course Mixture	Ton	0.90	t	0.99
2350.609	Type-Shoulder Mixture	Ton	0.90	t	0.99
2350.609	Type-Bituminous Mixture for Specified Purpose	Ton	0.90	t	0.99
2360.609	Type-Wearing Course Mixture	Ton	0.90	t	0.99
2360.609	Type-Binder Course Mixture	Ton	0.90	t	0.99
2360.609	Type-Leveling Course Mixture	Ton	0.90	t	0.99
2360.609	Type-Base Course Mixture	Ton	0.90	t	0.99
2360.609	Type- Shoulder Mixture	Ton	0.90	t	0.99
2360.609	Type-Bituminous Mixture for Specified Purpose	Ton	0.90	t	0.99

NOTE: No price adjustments will be made on fuel used for drying and heating aggregates.

Guidelines for Approval of Computer Generated Schedule of Prices

The *American Association of State Highway and Transportation Officials (AASHTO)* **"Expedite"** is an approved program that can be used to produce Computer Generated Schedule of Prices for submittal to Mn/DOT. This program and the required EBS files if available can be found at Mn/DOT's Web site www.dot.state.mn.us/bidlet/. Only projects with EBS files available on the Web site can be bid in this manner.

If programs other than **"Expedite"** are used for this purpose, they must conform to the following requirements.

Administrative Requirements

1. The Department may grant approval to individual contractors for locally developed systems; or to software developers for programs produced for use by bidders.

2. The Department will furnish, after review, written approval or denial of proposed forms or software systems.

3. Failure of a bidder to comply with the requirements of these guidelines may be cause for a proposal to be considered irregular.

Formatting Requirements

1. The forms shall be printed on good quality 8-1/2" X 11" white paper.

2. Printing shall be in the "Portrait" format; i.e. pages shall be 8-1/2" wide and 11" high.

3. Printing shall be dark enough to produce legible copies.

4. Unit prices and extensions thereof may be written in ink or typed in the respective columns if left blank by the computer printing. This will not be considered an alteration or erasure.

5. Vertical spacing shall be so aligned so that 80 lines are printed within ten inches.

6. Horizontal spacing shall be ten to twelve characters per inch.

7. Printed copy shall be aligned a minimum of ¼ inch from the left paper edge.

8. Printed pages shall be separated, placed in correct sequence and securely stapled together in the upper left corner.

9. The entire computer generated Schedule of Prices shall be firmly attached to the back cover of the proposal.

Data Requirements

1. The general appearance shall approximate the Schedule of Prices in the proposal.

2. Headings and section headers shall be included.

3. Page numbers shall be printed in the same approximate location as in the Schedule of Prices in the proposal. Page sequence number shall be included in page numbering.

4. Horizontal and vertical alignment of the various columns shall approximate those used in the Schedule of Prices in the proposal.

5. The items on each page and subtotals (where applicable) shall match those on the Schedule of Prices in the proposal, and the sequence shall be the same.

6. The page number shall match that of the Schedule of Prices in the proposal.

7. Extensions shall be rounded to the nearest cent, with a half-cent being rounded upward.

8. The computer generated Schedule of Prices shall include a title page which shall list the letting date, the State project number, the description of the project, name of the bidding firm with address and telephone number, and shall be signed by an authorized firm representative.

9. A Total Bid amount shall be printed on the last page of the schedule.

Any further additions to the schedule such as revision numbers shall not be included, and will not be approved.

For further information on guidelines for the substitute bid schedule, contact Gilbert Bonngard, telephone No. (651)297-1237.

Mn/DOT SD-15 (Rev. 2-2003)

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS ENGINEERING

Federal Aid, State Funds, County/Municipal Federal Aid Projects and State Aid Projects

This schedule outlines the minimum sampling and testing required for most materials used in highway construction. Some items that are rarely used or materials of recent development are often covered by special provisions and may not be shown on the schedule. For more information regarding contract requirements for testing, please reference the "Standard Specifications for Construction"; Specification 1603 Materials: Specifications, Samples, Tests, and Acceptance. When sample sizes required for testing exceed 35 pounds, please submit multiple containers of the material with no individual container weighing more than 35 pounds.

Small quantities of materials may be accepted without sampling and testing. A small quantity is defined as any total quantity, for the whole project, of one material which is smaller than the minimum quantity required for testing unless modified by the individual material items. These materials shall be from known, reliable sources, perform satisfactorily and meet the requirements for purpose intended. The inspection report (Form 2415) should include a statement to this effect and show the source. Form 2403 may be used to report small quantities of diverse materials from different sources. Form 2415 and Form 2403 (or approved revisions) are referenced in the Schedule of Materials Control for project record documentation and are required to be maintained in the project file.

Where items of small quantity are used in a critical location or significantly influence the safety, performance, strength or durability of major construction items, prior approval for their use without testing must be obtained.

Previously approved materials transferred from another project should be reported on Form 2415. The report should include: type of material, quantities involved, source, and supplier of materials. Whenever possible, include the project number for which the material was originally approved.

A TELEPHONE INDEX is included with the Schedule giving the numbers of contact persons if further information is required regarding the various materials.

A website (www.mrr.dot.state.mn.us) has been established for the Office of Materials and Road Research. The contributing units to the Materials Control Schedule from the Pavement Engineering Section are the Bituminous Engineering Unit, the Concrete Engineering Unit, and the Grading & Base Unit. The Materials Engineering Unit contains the Approved Products and the Certified Products and Services List, as well as, the Materials Control Schedule.

PLEASE CONTACT THE Mn/DOT DISTRICT INDEPENDENT ASSURANCE INSPECTOR WHEN PROJECT STARTS TO PROVIDE THE PROPER SERVICING OF YOUR PROJECT.

INDEX
Materials Control Schedule

TELEPHONE INDEX FOR SCHEDULE OF MATERIALS CONTROL

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (www.mrr.dot.state.mn.us/pavement/GradingandBase/gradingandbase.asp)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
1. GRADATION(5-692.210) (a) Aggregate Surfacing (2118) (b) Aggregate Base (2211) (c) Aggregate Shoulders (2221) (d) Bituminous Treated Base (2204)	3138 & Special Provisions	Random Sampling Gradation Acceptance Method (See Spec. 2211.3F) & (5-692.700)	02115-03, 02154-02 & 24346-02	1 per source (CL 7B See Note 3)	10-15 kg (25 lb.)
(e) Stabilizing Aggregate (2105)	3149 & Special Provisions				
(f) Permeable Aggregate Open Graded Aggregate Base (OGAB)	Special Provisions	1/1,000 t, 1/460 m³ (CV) [1/1,000 ton, 1/550 CuYd (CV)] (See Note 2)	02115-03, 21760-03a & 24346-02	1 per source	10-15 kg (25 lb.)
(g) Binder Soil (3138.2B)	3146	2 per source		1 per source	5 kg (10 lb.)
(h) Granular Borrow Select Granular Borrow (2105)	3149 & Special Provisions	0-50,000 m³ (CV) 1/4,000 m³ 50,000-100,000 m³ (CV) 1/8,000 m³ 100,000-200,000 m³ (CV) 1/12,000 m³ 200,000 m³ (CV) or more 1/15,000 m³ [0-65,000 CuYd (CV) 1/5,000 CuYd 65,000-130,000 CyYd (CV) 1/10,000 CuYd 130,000-250,000 CuYd (CV) 1/15,000 CuYd 250,000 CuYd (CV) or more 1/20,000 Cu Yd] (See Note 2)		1 per source (CL 7B See Note 3)	10-15 kg (25 lb.)
(i) Granular Filter	3601 & Special Provisions	1 per source		None	

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
(j) Granular Backfill (2451) (k) Aggregate Backfill (2451) (l) Granular Bedding (2451) (m) Aggregate Bedding (2451) (n) Coarse Filter (2451) (o) Fine Filter (2502) (p) Sand Cover (2206)	3149	1 per source (See Note 2)	02115-03, 21760-03a & 24346-02	1 per source (CL 7B See Note 3)	10-15 kg (25lb)
2. "ONE POINT DENSITY" (5-692.583) (a) Bituminous Stabilized Subgrade	2207	1/1,200 m³ (CV) [1/1,500 CuYd (CV)]	24587-01	None	
3. MOISTURE-DENSITY TEST* (5-592.222) (a) Aggregate Base	2211	1/40,000 t/source [(1/40,000 ton/source]	24587-01	One sample minimum and additional samples as required	25-30 kg (50 lb.)
(b) Aggregate Shoulder	2221				
(c) Soil - Cement Base	2206	1/1,270 m³ (CV) [1/350 CuYd (CV)]		None	
(d) Embankment Soil	2105	1 per major soil.		Two samples per project and additional samples as required	
**When Specified Density is Required.*					

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
4. RELATIVE DENSITY TEST* (5-692.251) (a) Aggregate Base (b) Aggregate Shoulder (c) Bituminous Stabilized Subgrade * Required for Specified density.	2211 2221 2207	1/1,800 t, 1/800 m³ (CV) [1/1,800 ton, 1/1,000 CuYd (CV)]	02115-03 & 21760-03b	None	
(d) Soil - Cement Base	2206	1/270 m³ (CV) [1/350 CuYd (CV)]			
(e) Embankment Soil (Excavation and Borrow)	2105 & Special Provisions	1/2,300 m³ (CV) [1/3,000CuYd (CV)]			
5. PENETRATION INDEX METHOD (5-692.255) (a) Aggregate Base (b) Aggregate shoulders	2211 2221	2 DCP tests/1,800 t, or 800 m³ (CV) [2 DCP tests/1,800 ton, or 1,000 CuYd (CV)]	02115-03 & 2170-02 & 21760-03b		
(c) Fine Filter Aggregate (Edge Drains)	2502 Special Provisions	See Special Provisions			
6. RELATIVE MOISTURE TEST (BEFORE PRIMING) (5-692.253) (a) Aggregate Base (2211) (b) Aggregate Shoulder (2221)	2321 & 2358 Special Provisions	Upper 75mm (3 in) 1/270 m³ (CV) [1/350 CuYd (CV)]	02115-03 & 21760-03b		

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
6. RELATIVE MOISTURE TEST * (DURING COMPACTION) (5-692.253) (a) Aggregate Base (b) Aggregate Shoulder * Required for Specified density, Quality compaction, and Penetration index method.	2211 2221	A minimum of 1/1,800 t (1/1,800 ton) or 10 tests whichever is less	02115-03 & 21760-03b	None	
(c) Bituminous Stabilized Subgrade (5-692.582) SS-1 Mixture	2207	1/800 m³ (CV) [1/1,000 CuYd (CV)]			
(d) Soil - Cement Base	2206	1/270 m³ (CV) [1/350 CuYd (CV)]			
(e) Embankment Soil (Excavation and Borrow) (5-692.253)	2105	1/1,500 m³ (CV) [1/2,000 CuYd (CV)]			
7. PULVERIZATION TEST (5-692.260) (a) Binder Soil (3138)	3146	1 per day			
(b) Soil - Cement Base	2206	1/270 m³ (CV) [1/350 CuYd (CV)] 1/hour if plant mixed			
8. PERCENT CRUSHING (a) Belt Samples (5-692.203)	3138 & 3149 & Special Provisions	Once each day	02463		
(b) Particle Count (5-692.204)		One per Project			

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
9. AGGREGATE (Quality Tests)	3138 & Special Provisions	None		1 per source	10-15 kg (25 lb.)

NOTE 1: No laboratory samples for 1,000 metric ton [1,000ton] or 600m³ (LV) [714 CuYd (LV)] or 460m³ (CV) [550 CuYd (CV)] or less. The first laboratory sample shall be taken within the first 3,000 metric ton [3,000 ton] and all laboratory samples shall have a field companion sample.

NOTE 2: No samples are required for 500 ton or less. Report small quantities on form 2415 or 2403.

NOTE 3: If salvaged bituminous material is used, submit a laboratory companion to the first Acceptance Gradation sample for a bituminous extraction and extracted gradation.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1)

(www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Agency
Verification	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results can be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Contractor or Agency	Contractor or Agency	Contractor or Agency

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2340

SAMPLE SIZE: 35 kg (75 lb.) for each aggregate type retained on 4.75mm (#4) sieve; for quality testing and Percent Crushing.

2 kg (4 lb.) for each aggregate type passing the 4.75mm (#4) sieve; for quality testing.

1kg (2 lb.) for mineral filler.

****

1. Bituminous Mix Design (QC/QA)

QC Testing

1 per mix [3-point Asphalt Cement (AC) content]
15 kg (35 lb.) of mixture at optimum asphalt content, plus 3 Marshall specimens.
REMARKS: Mix Design for Spec. 2340 is Contractor's responsibility with verification by Mn/DOT.

QA Testing

Test Contractor's samples at optimum Asphalt Content, plus 3 Marshall specimens submitted along with Trial Mix data for Approval.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part A, Cont'd)

****

2. Aggregate Quality Testing (QA Only)

QA Testing

Agency representative selects one (1) sample of each non-asphaltic aggregate type or class per source per year. When aggregate qualities approach specification limits or when material variation is observed, take additional field tests.

****

3. Mineral Filler (QA Only)

QA Testing

One (1) per shipment of 45 metric tons (50 tons) or less, unless previously inspected.

****

4. Additives (QA Only)

QA Testing

1 L (1 qt.) of blended asphalt binder and additive. Sample first shipment of each type of material, then submit one sample per 1,000,000 L (250,000 gal.) (approx. 1,000 ton)

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Cont'd)

B. BITUMINOUS PRODUCTION for Specification 2340

SAMPLE SIZE: 15 kg (35 lb.) for Aggregate for Gradation;
11 kg (25 lb.) for Mixture Properties - 1 full 6" by 12" cylinder mold for QA
1 L (1 qt) for Asphalt Binder
2 L (½ gal) for Asphalt Emulsion

****

1. Plant Mix Aggregate Gradation Testing (QC/QA)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend including non-asphaltic aggregate fraction from recycled mix with a minimum of 1 test per day.
Companion samples taken for agency for mixtures not containing salvaged asphaltic aggregate.

REMARKS: See Note #2 & Note #3

QA Testing

1 per day per mixture blend. (None from mixtures containing asphaltic aggregate.)
For Certified Plant: Agency representative will select one per day to be run as deemed necessary.

****

2. Aggregate Percent Crushing (QC/QA)(Type 41, Type 42, Type 47, Type 48)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend minimum.
For Certified Plant: See Specification/Special Provisions for modifications.

REMARKS: See Note #3
None required when tonnage/course is less than 1,360 metric tons (1,500 tons).
Type 42 Tests run on non-asphaltic aggregate only.
Additional QA samples taken at discretion of the Engineer.

QA Testing

Agency representative is required to observe 1 per day per mixture blend.

****

3. Spot Check (QC/QA)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend minimum; with a minimum of 1 test per day.

REMARKS: See Note #3
If a member of a monitoring team observes the Contractor test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking, sampling and testing procedures.
3.) Discussing QC problem with Contractor.
4.) Obtaining verification samples.

QA Testing

1 per day per mixture blend conducted by plant monitor.
For Certified Plant: One per day minimum.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part B, Cont'd)

****

4. Extraction and Gradation (QC/QA)

QC Testing

1 per 900 metric tons (1,000 tons) per mix blend for first 3,600 metric tons (4,000 tons) of mixture produced to verify mix design. Additional tests, at the same testing rate, required only when mixture property test results between Contractor and Agency are beyond the allowable differences as defined in Section .400 of the Mn/DOT Bituminous Manual or when either Contractor or Agency results fail specification criteria.

e.g.: Individual air voids less than 2.0% or greater than 6.0%.
Moving average air voids less than 3.0% or greater than 5.0%.
Total extracted asphalt content below mixture type minimum or below recommendation target minimum.
Asphalt spot-check below mixture type minimum or below recommendation target minimum.
Extracted gradation beyond broad-band requirements.

REMARKS: See Note #2 & Note #3.
Extractions on Type 32, Type 42 and Type 48 mixtures only.
Testing at plant site is not required if approved by the Engineer.

QA Testing

1 per day per mixture blend.
For Certified Plant: Agency representative will select one per day.

****

5. Mixture Properties (QC/QA, Verification) (Maximum Gravity, Marshall Density-3 Specimen Average, Air Voids)

QC Testing

1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced; then 1 per 900 metric tons (1,000 tons) with a minimum of 2 tests per day.
Verification Companion testing from Agency split sample is required to be performed and may be used as a QC sample.

REMARKS: See Note #2 & Note #3
Calibration factors shall be established regarding reheated samples.

QA Testing

The agency representative shall observe QC testing as needed.

Verification Testing: An Agency representative will take 1 verification sample per mixture blend per day for Mn/DOT laboratory testing. A verification companion sample will be given to contractor for QC testing.

****

6. Core Density (Option 1)/Nuclear Density(Option 2) For Modified Specified Density Only

---

QC Testing

1 lot per day
5 sublots per lot
2 density determinations per sublot

REMARKS: Sawing of cores into separate lifts is required (Option 1). Contractor is required to have a saw capable of separating the core lifts without damaging the material at the field testing lab.

QA Testing

Option 1:

3 companion cores per lot per day for verification. Companion cores tested on Agency equipment. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported to the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat.

For Certified Plant:
Agency representative observes weighing of cores in water and saturated surface dry weights.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part B, Cont'd)

6. Core Density (Option 1)/Nuclear Density(Option 2) For Modified Specified Density Only (Cont'd)

Option 2:

For nuclear gauge calibration an Agency representative shall observe all Contractor testing and select 3 companion cores to verify Contractor's results for each mix design or change in mix design. Companion cores tested on Agency equipment. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported to the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat.

Agency representative observes all nuclear density readings per lot per day.

****

7. Nuclear Density Control Strip

QC Testing

Each Control Strip: 10 Random Tests
Each lot for Quality Level: 5 Random Tests

QA Testing

Agency representative observes all Contractor Testing

****

8. Bituminous Materials including Asphalt Emulsion ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

QC Testing ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED

QC Testing is the responsibility of the bituminous material supplier. Random sampling is arranged the Chemical Laboratory.

QA Testing ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

Asphalt Binder: Sample first shipment of each grade of material at the start of a plant's production each year or after set-up of a portable plant. Thereafter, submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton).

Asphalt Emulsion: Tack material only when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 (50,000 gal.) (approx. 200 ton).

REMARKS: State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

****

9. Moisture Content in Mixture

QA Testing

When conditions are such (rainy weather and/or saturated stockpiles) that the Engineer suspects the mixture as sampled from behind the paver may have a moisture content exceeding 0.5%, a sample should be taken for each individual course and, at the discretion of the Engineer, tested according to the procedures in the Bituminous Manual (5-693.950). Moisture content above 0.5% are not allowed.

Note #1: Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 2415 or Form 2403 in the Project File.

Note #2. All QA test samples shall be from split samples.
If a member of the monitoring team observes the Contractor Test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking sampling and testing procedures.
3.) Discussing QC problems with the Contractor.
4.) Obtaining Verification Samples.
5.) When additional testing is necessary, collect QA samples which have been acquired and retained by the Contractor.

Note #3. For process control testing, acceptance will be based on Contractor's test results as verified by Mn/DOT test results.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1)

(All bituminous mixtures are from Certified Plants) (www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Agency
Verification	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results shall be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Contractor or Agency	Contractor or Agency	Contractor and/or Agency

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2350/2360

SAMPLE SIZE:
- 35 kg (80 lb.) - plus #4 aggregate sample for quality testing and Percent Crushing
- 15 kg (35 lb.) - minus #4 aggregate for quality testing
- 18 kg (40 lb.) - bituminous mixture plus 3 Marshall specimens for volumetric testing (2350)
- 30 kg (75 lb.) - bituminous mixture plus 2 Gyratory specimens for volumetric testing (2360)
- 35 kg (80 lb.) - bituminous mixture for TSR testing (option A)
- 8.2 kg (18 lb.) - bituminous mixture for TSR testing plus 9 Marshall specimens (option B) (2350)
- 8.2 kg (18 lb.) - bituminous mixture for TSR testing plus 6 Gyratory specimens (option B) (2360)
- 1 kg (2 lb.) - for mineral filler.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part A, Cont'd) (All bituminous mixtures are from Certified Plants)

****

1. Bituminous Mix Design (QC/QA)

QC Testing

REMARKS: Mix Design for Spec. 2350/2360 is Contractor's responsibility with review by Mn/DOT.

QA Testing

Test Contractor's samples at optimum Asphalt Content, TSR, plus 3 Marshall specimens submitted along with Trial Mix data for review. (2350)

Test Contractor's samples at optimum Asphalt Content, TSR, plus 2 Gyratory specimens submitted along with Trial Mix data for review. (2360)

****

2. Aggregate Quality Testing (QA Only)

QA Testing

Contractor shall provide 24 hour notice of intent to sample aggregates for quality testing. Agency has the option to monitor sampling.

Contractor submits to the Bituminous Engineer or the District Materials Engineer one (1) sample of each non-asphaltic aggregate type or class per source per year. Quality testing will be performed as directed by the Bituminous Engineer or the District Materials Engineer. When aggregate qualities approach specification limits or when material variation is observed, take additional field samples.

****

3. Mineral Filler (QA Only)

QA Testing

One (1) per shipment of 45 metric tons (50 tons) or less, unless previously inspected.

****

4. Additives (QA Only)

QA Testing

1 L (1 qt.) of blended asphalt binder and additive. Sample first shipment of each type of material, then submit one sample per 1,000 m^3 (250,000 gal.) (approx. 1,000 ton)

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Cont'd)
(All bituminous mixtures are from Certified Plants)

B. BITUMINOUS PRODUCTION for Specification 2350/2360

SAMPLE SIZE: 15 kg (35 lb.) for Aggregate for Gradation (QC/QA)
11 kg (25 lb.) for 2350 Mixture Properties (QC/QA) 1 full 6" by 12" cylinder mold for QA
25 kg (55 lb.) for 2360 Mixture Properties (QC/QA) 2 full 6" by 12" cylinder molds for QA
50 kg (110 lb.) for TSR (QC/QA)
40 kg (90 lb.) for Aggregate Specific Gravity (QC/QA)
1 L (1 qt) for Asphalt Binder (QA)
2 L (½ gal) for Asphalt Emulsion (QA)

****

1. Plant Mix Aggregate Gradation Testing (QC/QA, Verification*)

QC Testing
1 per 900 metric tons (1000 tons) at start of production
1 per 1,800 metric tons (2,000 tons) or portion thereof per mix blend as required by 2350.5C3a(6)(a)(b) or 2360.4E6a
1 per 900 metric tons (1000 tons) when operating under corrective action.
Companion samples taken for agency.
REMARKS: See Note #2 & Note #3

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

****

2. Aggregate Percent Crushing (QC/QA, Verification*)

QC Testing
Testing rates as required by 2350.5C3b, 2360.4E7 CAA, 2360.4E8 FAA. Two tests per day (CAA, FAA) for first two days. If CAA results exceed the specification minimum by 8% of the requirement; sample daily, test minimum one per week. If FAA results exceed the specification minimum by 5% of the requirement; sample daily, test minimum one per week.
REMARKS: See Note #3

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

****

3. Asphalt Content, % (QC/QA)

QC Testing
1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced
Divide planned production by 1,000; round up to determine testing rate.

(a) Meter Method (Virgin only) ..... Mn/DOT Bituminous Manual
(b) Incinerator Oven ..... Mn/DOT Lab Manual Method 1853
(c) Extraction ..... Mn/DOT Lab Manual Method 1851 or 1852
(d) Spot Check (Virgin only) ..... Mn/DOT Bituminous Manual 5-693.848

REMARKS: The verification companion sample must use Method (b) or (c) only.
When more than one Mn/DOT approved test procedure is available, the Contractor shall select one method at the beginning of the project (when material is submitted for Trial Mix Review) and use that method for the entire project. The Contractor and Engineer may agree to change test procedures during the construction of the Project.
REMARKS: See Note #3
If a member of a monitoring team observes the Contractor test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking, sampling and testing procedures.
3.) Discussing QC problem with Contractor.
4.) Obtaining verification samples.

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part B, Cont'd)
(All bituminous mixtures are from Certified Plants)

****

4. Mixture Properties (QC/QA, Verification*)
(Maximum Gravity, Marshall Bulk Gravity - 3 Specimen Average, Gyratory Bulk Gravity - 2 Specimen Average)

QC Testing

1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced.
Divide planned production by 1,000; round up to determine testing rate.
Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day.

REMARKS: See Note #2 & Note #3
Calibration factors shall be established regarding reheated samples.

QA Testing

Companion samples to QC samples set aside for 7 working days and tested as needed.
The agency representative shall observe QC testing as needed.

*Verification Testing

Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day. Verification testing to include the following Mixture Properties; Maximum Gravity, Marshall Bulk Gravity - 3 Specimen Average or Gyratory Bulk Gravity - 2 Specimen Average, air voids, VMA, % crushing, AC content, and gradation. The verification companion shall also be tested for CAA and FAA at a rate of 1 test per week if the CAA and FAA exceed the requirements by 8% and 5% respectively otherwise test daily.

An Agency representative will take 1 verification sample per mixture blend per day for Mn/DOT laboratory testing. A verification companion sample will be given to contractor for QC testing.

****

5. Core Density and Thickness

QC Testing Production/lot testing rate requirements.

Daily Production		Lots
Metric Ton	English (ton)	
270* – 545	(300* – 600)	1
546 – 910	(601 – 1000)	2
911 – 1455	(1001 – 1600)	3
1456 – 3275	(1601 – 3600)	4
3276 – 4545	(3601 – 5000)	5
4546 +	(5001 +)	6

***When mix production is less that 270 metric tons (300 tons), establish 1st lot when accumulative tonnage exceeds 270 metric tons (300 tons).**

Core locations determined and marked by Agency. The Contractor shall schedule the approximate time of testing during normal project work hours so that the Agency may observe and record the saturated surface dry and immersed weight of the cores.

REMARKS: Sawing of cores into separate lifts is required. Contractor is required to have a saw capable of separating the core lifts without damaging the material.

QA Testing

1 companion core per lot. Core locations determined and marked by Agency. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported and tested at the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat. A completed coring log shall be submitted to the Laboratory (Agency field or District/Division).

****

6. Aggregate Specific Gravity (QC/QA)

QC Sampling
1 per 10,000 metric tons (11,000 tons). Tested by Contractor, if requested by Project Engineer.

QA Testing
Companion sample to QC sample shall be submitted to the District/Division Materials Lab and tested as needed.

****

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part B, Cont'd) (All bituminous mixtures are from Certified Plants)

****

7. Tensile Strength Ratio (T.S.R.) (QC/QA)

QC Sampling

1 in the first 5,000 tons or by the second day of production, whichever comes first, then 1 per 20,000 metric tons (22,000 tons). If the Material s Engineer requires the samples to be tested, both the Contractor and the Department will be required to test these samples within 72 hours after they are sampled.

QA Testing

Companion sample to QC sample shall be submitted to the District/Division Materials Lab and tested as needed.

****

8. Bituminous Materials including Asphalt Emulsion: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

QC Testing ONLY BITUMINOUS MATERIAL FROM CERTIFIED SOURCES ARE ALLOWED FOR USE.

QC testing is the responsibility of the bituminous material supplier. The Chemical Laboratory arranges random sampling.

QA Testing: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

Asphalt Binder: Sample first shipment of each grade of material at the start of a plant's production each year or after set-up of a portable plant. Thereafter, submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton)

Asphalt Emulsion: Tack material only sample when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 ((50,000 gal.) (approx. 200 ton)

REMARKS: State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

****

9. Moisture Content in Mixture (QC only)

QC Testing

Sampling and testing shall be conducted by the Contractor on a daily basis unless exempted by the Engineer and tested according to the procedures in the Bituminous Manual (5-693.950). Moisture content above 0.3% are not allowed.

Note #1. Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 2415 or Form 2403 in Project File.

Note #2. All QA test samples shall be from split samples.
If a member of the monitoring team observes the Contractor Test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking sampling and testing procedures.
3.) Discussing QC problems with the Contractor.
4.) Obtaining Verification Samples.
5.) When additional testing is necessary, collect QA samples which have been acquired and retained by the Contractor and/or additional verification samples.

Note #3.
For process control testing, acceptance will be based on Contractor's test results as verified by Mn/DOT test results.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1)

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2331

Contractor Trial Mix Design and Verification	35 kg (75 lb.) for each aggregate type retained on 4.75mm (#4) sieve; for quality testing, and percent crushing. 2 kg (4 lb.) for each aggregate type passing the 4.75 mm (#4) sieve; for quality testing.

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
1. Trial Mix for Bituminous Content Recommendations	2331 3139	None	None	The Contractor will submit a representative sample from each source	135kg (300 lb.) of total blend with a minimum 45kg (100 lb.) of each component
				-or-	
				Contractor's Mix Design	15 kg (35 lb.) of mix
					Defined for Aggregate Preproduction (listed above)

REMARKS: Contractor's mix design sample at optimum asphalt content plus 3 Marshall specimens with Trial Mix data for approval

B. BITUMINOUS PRODUCTION for Specification 2331

1. Aggregate (Gradation) A. Plant Mix Aggregate	2331 Type 31 Type 41 Type 47 Type 61 3139	1 per 900 metric tons (1,000 tons) per mix blend No field tests required for quantity less than 272 metric tons (300 tons) per mix type when from previously accepted source. Use form 2415 or 2403.	TP 24449	1 per 9,000 metric tons (10,000 tons) If Field samples are tested in District Laboratory, separate laboratory testing at 1 per 9,000 metric tons (10,000 tons) is not required.	10 kg (25 lb.)

REMARKS:

No routine laboratory samples required for quantities less than 900 metric tons (1,000 tons) mix.
Quantities shown for laboratory samples refer to total tons of bituminous mixtures on project.
All laboratory samples shall have field companions.
If test results do not comply with Job Mix Formula gradation values, two samples shall be taken and tested on the succeeding day.

B. Mineral Filler	3145	None	None	1 per shipment of 45 metric tons (50 tons) or less unless previously inspected.	1 kg (2 lb.)
C. Seal Coat	3127	1 per 400 m^3 (500 CuYd)	TP 2429	1 per 1,500 m^3 (2,000 CuYd)	10 kg (25 lb.)

REMARKS:

First sample within first 800 m^3 (1,000 CuYd) production. No routine laboratory samples required for quantity less than 800 m^3 (1000 CuYd)

2. Aggregate (% Crushing)	2331 Type 41 Type 42 Type 47 Type 48 3139	1 per 1,350 metric tons (1,500 ton) per mix blend with a minimum of 1 per day	TP 7119-02		

REMARKS:

None required when tonnage/course is less than 1,350 metric tons (1,500 tons).
If test results do not comply with Specifications; 2 samples shall be taken and tested on the succeeding day.
For Type 42, tests will be run on non-asphaltic aggregate only.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1) (Part B, Cont'd)

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
3. Aggregate (Quality Tests)	2331 3139	When spall content is near upper limits, take additional field tests.		TP 2429 1 sample of each non-asphaltic aggregate type or class per source per year. When aggregate qualities approach specification limits or when material variation is observed take additional field tests.	35 kg (Note A.) (75 lb.) 2 kg (Note B.) (4 lb.)

Note A.- Sample of aggregate retained on 4.75mm (#4) sieve
Note B. - Sample of aggregate passing the 4.75mm (#4) sieve

4. Bituminous Materials (Including Asphalt 2356 Emulsion)	2331 2357 2358 3151	None	None	CERTIFIED SOURCE: Asphalt Cement Only Sample first shipment of each type of material, then submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton) CERTIFIED SOURCE: Asphalt Emulsion Only TACK MATERIALS: Sample only when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 (50,000 gal) (Approx. 200 ton)	1 L (1 quart) 2 L (½ gal)

REMARKS: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html. State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

5. Bituminous mixtures (Plant Mixed)

A. Asphalt Content by Spot Check method	2331	As often as required to control 1 per day minimum	TP 24448-01	None
B. Density (Specified Density)	2331	Marshall Density: Daily, Minimum 1 per 900 metric tons (1,000 tons) per course. Core Density: Daily, Minimum 1 per 900 metric tons (1,000 tons) per course	TP 24447-02	None

REMARKS: Samples shall be taken from each day's production at the direction of the Engineer, prior to placement of the next course thereon and not later than the next working day following the date of placement.

C. Density (Control Strip)	2331	(1) Each Control Strip: 10 Random Tests. (2) Each Lot for Quality Control 5 Random Tests.	TP 24342 TP 24446-01	None
D. Extraction and Gradation *Recycled Mixtures Only Under Spec 2331*	Type 32 Type 42 Type 48 and all mixes measured by square yard inch	None		2 per mixture blend on first day of production. 1 per mixture blend per day thereafter.

REMARKS: Sample shall be taken from mixture property test(s). If test results do not comply with Job Mix Formula gradation values, a minimum of 2 samples each succeeding day until test results comply with Job Mix Formula gradation values.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1) (Part B, Cont'd)

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
5. Bituminous Mixtures (Cont'd) (Plant Mixed)					
E. Mixture Properties	2331	None		1 per 450 metric tons (500 tons) per mix blend for first 1800 metric tons (2,000 tons) of mix produced then 1 test per mix per day. FOR SQUARE YARD INCH PROJECTS 2 per mixture blend on first day 1 per mixture blend per day thereafter.	10 kg (25 lb.)

REMARKS:

If testing rate for first 1,800 metric tons (2,000 tons) of production has been satisfied on previous project and continuous production of the mix type has been established, then 1 test per mix per day.

Samples should be taken from behind paver.

If test results do not comply with mix design air voids criteria, additional samples shall be taken and tested at the rate of 1 per 450 metric tons (500 tons) each succeeding day until test results comply with mix design criteria. The samples shall weigh approximately 10 kg (25 lb.) (Small sample bag or concrete cylinder mold).

If the appearance of the mixture changes, additional samples should be taken.

6. Additives	3161	None		1 L (1 qt) sample of blended bituminous material and additive. Sample first shipment of each type of material, then submit one sample per 1,000,000 L (250,000 gal.) (approx. 1,000 ton)	
7. Moisture content in Mixture	2331 Bituminous	When conditions are such (rainy weather and/or saturated stockpiles) that the Engineer suspects that the mixture as sampled from behind the paver may have a moisture content exceeding 0.5%, a sample should be taken for each individual course and, at the discretion of the Engineer, tested according to the procedures in the Manual (5-693.950) Moisture contents above 0.5% are not allowed.			

Note #1: Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Document on Form 2403 or Form 2415 and retain in project file.

SCHEDULE OF MATERIALS CONTROL

V. SEALCOAT CONSTRUCTION ITEMS SPECIFICATION 2356

****

A. (2356) SEAL COAT – MACRO-SURFACING
Refer to Special Provisions for QC/QA sampling and testing rates.

B. (2356) SEAL COAT – HIGH VOLUME AND LOW VOLUME
Refer to Special Provisions for QC/QA sampling and testing rates.

C. (2356) MICRO-SURFACING
Refer to Special Provisions for QC/QA sampling and testing rates.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (www.mrr.dot.state.mn.us/pavement/concrete/concrete.asp)
(All Ready Mix is from Certified Plants)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample. If QA only, sampling and testing by Agency only.	Contractor	Contractor	Agency
Verification (Audit)	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification (Audit) Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results are required to be used as part of the QC program	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

PAVING PLANT - Central Batching Plant dedicated to a concrete paving project delivering concrete other than by Ready-Mix trucks.

****

A. CONCRETE AGGREGATE TESTING (All Concrete) Specification 3126, 3128 and 3137.

SAMPLE SIZE: 10 - 15 kg (25 lb.) for +19 mm (3/4" Plus) Coarse Aggregate
5 - 7 kg (10-15 lb.) for -19 mm (3/4" Minus) Coarse Aggregate
5 kg (10 lb.) for CA-70 and Sand

****

1. Certified Ready Mix Concrete

****

a. Gradation Testing (QC/QA): **Form No.**

(1) QC Testing — 2449 Weekly Concrete Aggregate Report

When over 20 m³ (CuYd) of agency concrete produced per day
Coarse: 1 per 100 m³ (CuYd) of concrete*
Fine: 1 per 200 m³ (CuYd) of concrete*
NOTE: **The Producer shall complete the initial aggregate gradations prior to the start of concrete production each day. The Producer may perform testing on representative material the prior evening.**

(2) QA Testing — 24143 Weekly Certified Report

Based on Verification (Audit) Sample testing only unless altered by the Project Engineer*
Coarse and Fine: 1 per day or 1 per 500m³ (500 CuYd) whichever results in the lowest sampling rate with a

minimum of 1 per week. A minimum of 2 Verification (Audit) samples per week is required when Certified production is 3 or more days per week. Take more Verification (Audit) samples when production problems exist.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Part A, Cont'd)
(All Ready Mix is from Certified Plants)

1. Certified Ready Mix Concrete (1a(2). Cont'd): **Form No.**

QA Coarse Aggregate testing on -75μm (#200) material as directed by the District/Division Materials Engineer.

*Split samples are tested by the Agency as needed at the direction of the Project Engineer. These results shall be included in the QA program.

NOTE: **As a check on field testing equipment when QA testing is performed in the field, send one split gradation sample per month to District Lab for comparison testing.**

b. Moisture Testing (QC/QA): **Form No.**

(1) QC Testing
When over 20 m³ (CuYd) of agency concrete produced per day
Coarse and Fine: 1 per 200 m³ (CuYd) of concrete
NOTE: **The Producer shall complete the initial moisture content and adjust the batch water prior to the start of concrete production each day. If weather conditions allow, the Producer may perform moisture testing on representative material the prior evening.**

2152 Concrete Batching Report

(2) QA Testing
None Required. Testing rate at the discretion of the Project Engineer

c. Quality Testing (QC/QA): **Form No.**

(1) QC Testing
At Contractor's discretion

(2) QA Testing
Sampled for acceptance (QA) at the rate of 1 per month. Testing rate may be adjusted by contacting the Concrete Engineering Unit.

2410 Sample ID Card

2. Paving Concrete

See Special Provisions for QC/QA testing schedule on projects with a dedicated Contractor paving plant; otherwise, the testing rate for Certified Ready Mix Concrete applies.

NOTE: **When work requires that a Certified Ready Mix Concrete Plant be dedicated to a paving project, a full-time plant monitor and daily Verification (Audit) samples are recommended. The Contractor sampling and testing rate may be reduced with the approval of the Concrete Engineering Unit.**

3. Low Slump Concrete for Bridge Deck Overlay and Concrete Pavement Repair

a. Gradation Testing (QA): **Form No.**

(1) QA Testing
1 per fraction prior to commencing operations and each time aggregate is delivered to site.
Quality testing as directed by the Project Engineer

21412 Weekly Report of "Low Slump Concrete"

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Part B)
(All Ready Mix is from Certified Plants)

B. STRUCTURAL CONCRETE CONTROL TESTS

1. Certified Ready Mix Concrete – (See below for Paving Concrete from Ready-Mix Plants)

a. Air Content and Slump (QA Only) — **Form No.**

(1) QA Testing Only
Test first load each day per mix. 1 test per 100 m³ (CuYd) — 2448 Weekly Concrete Report

b. Strength (QA Only) — **Form No.**

(1) QA Testing Only
Strength (See NOTES #1 and #2)
1 per 100 m³ (CuYd)
1 per day minimum if production is more than 20 m³ (CuYd) — 2409 ID Card Concrete Test Cylinder

NOTE #1: For concrete mixtures containing aggregate with a maximum size of 31.5 mm (1 1/4 in), 100 mm x 200 mm (4 in x 8 in) cylinders may be substituted for 150 mm x 300 mm (6 in x 12 in) cylinders.
NOTE #2: Additional Control Cylinders as necessary.

2. Paving Concrete

a. Air Content and Slump (QA Only) — **Form No.**

See Special Provisions for QC/QA testing schedule on projects with a dedicated Contractor paving plant; otherwise, the Testing rate for Certified Ready Mix Concrete applies. — 2448 Weekly Concrete Report

NOTE #1: When work requires that a Certified Ready Mix Concrete Plant be dedicated to a paving project, a full-time Plant monitor and daily Verification (Audit) samples are recommended. The Contractor sampling and testing rate may be reduced with the approval of the Concrete Engineering Unit.

NOTE #2: Only one slump test per day is required on slipform paving.

b. Strength (QA Only) — **Form No.**

(1) QA Testing Only
1 set of two beams per 2,000 m³ (2,500 Cu Yd). See NOTE. — 2162 Concrete Test Beam Data

REMARKS: If less than 2,000 m³ (2,500 Cu Yd) of paving, a set of 2 cylinders per day may be substituted for the beam requirements.
NOTE: Additional Control Beams as necessary.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

(All Ready Mix is from Certified Plants)

c. Thickness — **Form No.**

CORES FOR VERIFICATION: (See specification 2301.3P2 for procedure.)
The cores are taken at locations determined by the Agency using Random Numbers. The Contractor takes one random core per 1,000 ft/traffic lane/5,000 ft (300 m/traffic lane/1,500 m). The Agency initials pavement at core locations and re-initials the sides of specimens after coring to clearly verify their authenticity. — 24327 Field Core Report

d. Surface Smoothness and Ride Quality (QC/QA Testing) — **Form No.**

(1) QC Testing
CONTRACTOR PROVIDES CALIFORNIA'S PROFILOGRAPH OR INERTIAL PROFILER RESULTS
Refer to Mn/DOT Specification 2301.3P1b for surface smoothness and Specification 2301.3P1c for ride quality requirements.

(2) QA Testing
If the Contractor's test results are in question, the Project Engineer may request that the entire project be retested by an Independent Source.

3. Low Slump Concrete for Bridge Deck Overlay and Concrete Pavement Repair

a. Air Content and Slump (QA Only) — **Form No.**

(1) QA Testing Only
Test at beginning of pour each day. 1 per 15 m³ (Cu Yd) — 21412 Weekly Report of "Low Slump Concrete"

REMARKS: **For low-slump concrete from concrete mobile, allow mix to hydrate 4 to 5 minutes before slump test to assure all cement is saturated.**

b. Strength (QA Only) — **Form No.**

(1) QA Testing Only
1 per 30 m³ (Cu Yd). 1 minimum per project. — 2409 ID Card Concrete Test Card

C. CEMENTITIOUS MATERIALS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
1. Standard Portland High Early Portland Air Entraining Portland Air Entraining High-Early Portland	3101		Certified Source* See REMARKS	2 kg (5 lb.)	24300 ID Card Cement Samples

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
2. Portland Pozzolan Blended Cement Ground Granulated Blast Furnace Slag (GGBFS)	3102, 3103		Certified Source* See REMARKS	2 kg (5 lb.)	24300 ID Card Cement Samples
3. Fly Ash	3115		Certified Source* See REMARKS	2 kg (5 lb.)	24308 ID Card Fly Ash Samples

REMARKS: **All certified products must so state on the Bill of Lading. Certified source list at http://www.mrr.dot.state.mn.us/pavement/concrete/products.asp**

1. **All Cement, Fly Ash and GGBFS must be approved by the Lab before use.**
2. **Minimum sampling rates for:**
   a. **CONCRETE PAVING PROJECTS**
      1 Sample per 7,500 m^3 (10,000 CuYd) of Concrete (Minimum of 1 per project)
   b. **OTHER CONCRETE**
      1 Sample every 2 to 4 weeks per plant as production warrants.
3. **Additional Sampling as District Materials Engineer directs.**

D. CURING MATERIALS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
1. Burlap	3751	Visual Inspection	1 per shipment	1 m^2 (1 yd^2)	2410 Sample ID Card
2. Membrane Compound	3754 3754 AMS 3755		See NOTE	1 L (1 qt.)	2410 Sample ID Card

NOTE: **Sampling rates for**

a. **CONCRETE PAVING PROJECTS**
   1 sample for each shipment or if shipment contains more than 1 lot, sample each lot. See REMARKS
b. **OTHER CONCRETE**
   Call (651) 779-5556 before sampling.

REMARKS: **Only Curing Materials from APPROVED sources are allowed for use. The most current approved list can be found at http://mrr.dot.state.mn.us/pavement/concrete/products/Approvedcuringcompounds.pdf.** Material must be thoroughly stirred or agitated immediately prior to taking sample. Cover sample immediately.

3. Paper or Plastic	3752 3756	Visual Inspection	1 per shipment	0.25 m^2 (2 Sq Ft)	2410 Sample ID Card

NOTE: **Must be white opaque.**

E. JOINT MATERIALS

1. Hot Poured Elastic Type	3723 3725		1 per lot	5 kg **(10 lb.)**	2410 **Sample** ID Card

REMARKS: **Only joint materials from CERTIFIED sources are allowed for use. The most current list of certified can be found at http://www.mrr.dot.state.mn.us/materials/AppProddisclaimer.asp Samples shall be taken from application wand.**

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
2. Silicone Joint Sealer	3722		1 per lot	0.5 L (1 pt.) in Steel Container	2410 Sample ID Card
REMARKS: Only joint materials from APPROVED sources are allowed for use. The most current list of approved sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products/jointsealants.pdf					
3. Preformed Elastomeric Type	3721	Visual Inspection	1 per 1,000 m (3,000 LF) for each lot or sub-lot or fraction	2 m (6 ft)	2415* or 2403
*Field Inspection Report (Lot Numbers Only)					
4. Preformed	3702	Visual Inspection	1 per shipment of each type and thickness	0.25 m² (2 Sq Ft)	2410 Sample ID Card
REMARKS: Will carry "Inspected" tag if approved prior to shipment.					

F. ADMIXTURES FOR CONCRETE

					Form No.
1. Accelerating, Retarding, Water Reducing, Air Entraining, etc.	3113		See NOTE	0.25 L (½ pt.) in Plastic Container	2410 Sample ID Card

NOTE: Minimum sampling rates for:

a. CONCRETE PAVING PROJECTS
1 Sample per shipment for each type, brand and concentration. (Minimum of 1 per project)

b. OTHER CONCRETE
1 Sample once per month per plant or as production warrants.

REMARKS: Only admixtures from APPROVED sources are allowed for use. The most current list of approved sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products.asp Samples shall be taken from the dispensing tubes.

G. CONCRETE TREATING OIL

					Form No.
	3917	Visual Inspection	1 per shipment	0.5 L (1pt.) in Steel Container	2410 Sample ID Card

H. WATER

					Form No.
	3906	Visual Inspection	1 sample from any questionable source. Use clean glass or plastic containers.	3.5 L (1 gal)	2410 Sample ID Card

I. EPOXIES

					Form No.
		Visual Inspection	1 sample of each component from each lot in each shipment for quantities over 1 gallon	0.25 L (½ pt.) of each component in Steel Container	

REMARKS: Must be approved prior to use. Only epoxies from APPROVED sources are allowed for use. The most current list of approved sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products/approvedepoxies.pdf

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

There are certain items of concrete that are acceptable under a modified small quantity acceptance plan from a known and reliable source. The Project Engineer should document small quantities on Form 2403 or 2415 and retain in project file.

FIELD TESTING (No Plant Inspection):

1 air (if required), 1 slump and 1 cylinder test per day:
- 1 - 20 m^3 (CuYd) of general concrete work (pavement, curb and gutter, bridge footings, bridge concrete constructed above footings, median barrier, etc.)
- 1 - 100 m^3 (CuYd) of concrete of a non-critical nature (all Grade C concrete, C. I. P. pile filling, fence post footings, etc.)

PLANT TESTING (No Field Inspection):

1 Delivery truckload for all types of work may be accepted without field tests if all plant tests are performed, including batching and mixing inspection.

Should unique circumstances arise on a project which makes the above quantities or rates of testing for concrete shown elsewhere impractical, they may be revised prior to performing the work by contacting the Concrete Engineering Unit and obtaining their approval.

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Plant Stock and Landscape Materials	3861 and 2571.2A1	Field Inspection at Job Site. submit itemized report for each shipment.*	2415 or 2403		

*Utilize "Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects" to determine and measure minimum and maximum criteria thresholds. The following documentation must be provided as a condition for delivery and approval:

1. A Mn/DOT Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment
2. A valid copy of a nursery stock (dealer or grower) certificate registered with the MN. Dept. of Agriculture and/or a current nursery certificate/license from a state or provincial Dept. of Agriculture for each plant stock supplier.
3. A copy of the most recent Certificate of Nursery Inspection for each plant stock supplier.
4. Plant material shipped from out-of-state nursery vendors subject to quarantines (Gypsy Moth and Japanese Beetle) must be accompanied by documentation certifying all plants shipped are free of regulated pests.
5. Bills of lading (shipping documents) for all materials delivered.
6. Invoices (billing statements) for all materials to be used.
7. Each bundle, bale, or individual plant must be legibly and securely labeled with the name and size of each species or variety.

REMARKS: Preliminary inspection will not be done at the source. Material must be in accordance with the Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects.

2. Wildflower and Wetland Seedlings	3861	Field inspection at Job Site. Submit itemized report for each shipment. Include Mn/DOT Certificate of Compliance for seedlings, labels, and invoices	2415 or 2403	None	

REMARKS: Certified sources only. A certificate of Compliance must be furnished by the supplier to the Engineer.

3. Fertilizer	3881	Visual Inspection		None	

REMARKS:
BAGGED: Inspected on the basis of guaranteed analysis.
BULK: Inspector to obtain copy of invoice of blended material stating analysis. Check if Slow Release Fertilizer is specified.

4. Agricultural Lime		3879 One gradation test for each 180 Metric Ton (200 ton)	2415 or 2403	One sample per source for quantities of 90 metric ton (100 ton) or less	4.5 kg (10 lb.)

REMARKS: Submit form 2415 or 2403. Small Quantity is 90 metric ton (100 ton) or less.

5. Topsoil Borrow and Select Topsoil Borrow Premium Topsoil Borrow	3877.2	None.		From each source: One composite sample for the first 765 m³ (1,000 CuYd) or less. One composite sample for each additional 2,300 m³ (3,000 CuYd) or fraction thereof.	10 kg (20 lb.)

REMARKS: Testing takes about three weeks after delivery of the sample to the Department Laboratory. Sampling shall be done prior to the time the topsoil is delivered to the project.

Small Quantity - 230 m³ (300 CuYd)

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS (Cont'd)

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
7. Seeds	3876				
A. Certified Vendors only		Check for guaranteed analysis labels. Check for variety and county of origin for native seeds.	2415 or 2403	Sampling need only be done for seed that is not planted within nine months after germination test, or if quantity used is more than 450 kg (1,000 lb.)	.5 L (1 pint)
REMARKS: Seed guaranteed as meeting the requirements is identified by official guaranteed analysis labels affixed to each container of seed in addition to the customary seed tag. Submit copy of seed tag per shipment to Office of Environmental Services. Indicate quantity used and contractor. Any moldy or insect contaminated seed must be rejected.					
B. Non-Certified Vendors	3876		2415 or 2403	MUST BE SAMPLED. For 25 bags or less, combine from five bags into one sample. For larger quantities; sample each 5th bag combine samples into groups of 5 and select a test sample from each composite.	.5 L (1 pint)
REMARKS: Submit samples six weeks before seeding to allow for testing. May be sampled at source by Office of Environmental Services upon proper notification. Seed may be sampled by Office of Environmental Services at the project site upon proper notification. Small Quantity - 90 kg (100 lb.)					
C. Wildflower Seed	3876	Check if from Certified Vendor or Approved Source	None		.25L 1 cup (8 oz)
REMARKS: Send sample and copy of seed tag to Office of Environmental Services.					
8. Erosion Control Blanket	3885	Visual Inspection	None.	Random - See Remarks	1 m^2 (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality. Check approved products list					
9. Erosion Control Netting	3883	Visual Inspection	None.	Random - See Remarks	1 m^2 (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality. Check approved products list					
10. Peat Moss	3880	Final Inspection at Job Site	None.	For material furnished in bulk; one sample for 100 m^3 (100 CuYd) or less. An additional sample for each 200 m^3 or less, thereafter.	2-1/4 kg (5 lb.)
REMARKS: SUBMIT SAMPLES IN MOISTURE PROOF BAGS. Materials furnished in packaged form may be accepted on the basis of guaranteed analysis.					
11. Sod	3878	Final Visual Inspection at site. No form 2415 required.	2415 or 2403	To accept Mineral Sod, furnish sample of soil from sod prior to installation.	
REMARKS: A Certificate of Compliance must be furnished by the producer to the Engineer for the type of sod supplied showing correct grass varieties.					
12. Silt Fence	3886	Visual Inspection Check Product Label	2415 or 2403	For amounts (61m)200 ft or greater.	1 m (1Yd)
REMARKS: Samples sent 21 days prior to use. Check Approved Products List of accepted geotextiles.					

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS (Cont'd)

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate Laboratory Testing	Sample Size
13. Flotation Silt Curtain	3887	Visual Inspection	None.	Random - See Remarks	1 m (1 Yd)
REMARKS: Accepted, based on manufacturers' guaranteed results, with periodic sampling to verify quality.					
14. Compost	3890	Visual Inspection Form 2415 or Form 2403 is required	2415 or 2403		12 kg (25 lb.)
A. Certified Source				Random - See Remarks	
REMARKS: Accepted on the basis of certified test reports furnished to the Engineer by the supplier. Periodic sampling to verify quality.					
B. Non-Certified Source				MUST BE SAMPLED - One Sample per 300 m^3 (500 CuYd)	
REMARKS: Submit samples six weeks before use. Small quantity 75 m^3 (100 CuYd) or less.					
15. Erosion Stabilization Mat	3888	Visual Inspection	None	Random - See Remarks	1 m^2 (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality. Check Approved Products List					
16. Sediment Mat	3894	Visual Inspection	None	Random - See Remarks	1 m^2 (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality. Check Approved Products List					
17. Fiber Log	3895	Visual Inspection	None	Random - See Remarks	1 m (1 Yd)
REMARKS: Periodic Tests from approved sources to verify quality.					
18. Inlets	3891	Visual Inspection	None	For assurance of geotextile type	1m (1 Yd)
REMARKS: Visual inspection on inlets using a geotextile, geotextile needs to have monofilament fibers running both directions					
19. Hydraulic Soil Stabilizer	3884	Slump Test forType 8	None	None	
REMARKS: Tests done prior to placement of material by installer.					

SCHEDULE OF MATERIALS CONTROL

VIII. CHEMICAL ITEMS

Material	Minimum Required Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Sampling Rate for Laboratory Testing	Sample Size
1. Asphalt Plank	3204	Visual Inspection		1 sample per 1,000 plank or less of each thickness in each shipment	3 PCS 1 m long (1 Yd) each from different plank
REMARKS: CALL CHEMICAL LABORATORY (651) 779-5548					
2. Calcium Chloride	3911			Liquid: 1 per 40,000 L (1 per 10,000 gal) Dry: 1 per shipment	0.5 L (1 pint) 0.5 kg (1 lb.) in Plastic Container
3. Water Proofing Materials		Visual Inspection			
A. Asphalt Primer Waterproofing Asphalt	3165 3166			1 sample from each shipment of each material	1 L (1 qt)
REMARKS: Containers will be stamped if approved prior to shipment. CALL CHEMICAL LABORATORY (651) 779-5548					
B. Fabric	3201			1 per shipment	1 m^2 (1 Sq Yd)
C. Membrane	2481			1 per shipment (Membrane Only)	0.1 m^2 (1 Sq Ft)
4. Paints A. Non-Striping Paints	3500 Series	Visual Inspection	2415 or 2403	For pre-approved paints submit form 2415 listing batch number.	0.5 L (1 pint)
REMARKS: See Special Provisions For Approved Products List. Call Chemical Laboratory at (651) 779-5550					
B. Traffic Marking Paints	Special Provisions			None unless Suspect material	0.5 L (1 pint)
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Laboratory at (651) 779-5550					
C. Epoxy Paints (Traffic Marking)	Special Provisions			None unless Suspect Material	0.5 L (1 pint) each Component
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Chemical Laboratory at (651) 779-5550.					
5. Glass Beads (Drop On)	Special Provisions			None unless Material suspect	One L (1 qt)
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Chemical Laboratory at (651) 779-5548.					
6. Reflectorized Marking Tape	3353 3354 3355			1 clean sample of each color	1 m (1 yd)
7. Sign and Markers	3352	Visual Inspection	2415 or 2403	None unless material suspect	

REMARKS: ONLY SIGN AND MARKER MATERIAL FROM CERTIFIED SOURCES IS ALLOWED FOR USE. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND AT http://mrr.dot.state.mn.us/materials/apprprod2.asp

SCHEDULE OF MATERIALS CONTROL

IX. METALLIC MATERIALS AND METAL PRODUCTS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Guard Rail					
A. Fittings - Splicers, Bolts, etc.	3381	Visual Inspection	2415 or 2403 for small quantity	Bolts: 2 Post bolts and 4 splice bolts with nuts for each 1,000 units or less.	
B. Cable	3381	Visual Inspection	Same	1 sample from each spool	1.2 m (4 ft)
C. Structural Plate Beam	3382	Visual Inspection	Same	One .025x.25 m (1inx10in) from one edge of one of each 200 RAIL SECTIONS or One of each 100 TERMINAL SECTIONS	

REMARKS:

To be approved before use.

Pre-tested or Inspected will carry "Inspected" tag.

Not Pre-tested:
Submit laboratory samples at required laboratory rate.

For small quantities, lab samples not required, but document on Form 2415 or 2403 and maintain in project file.

SMALL QUANTITIES:
Rail Sections - 20 or less
Terminals - 10 or less
Post Bolts - 100 or less
Splice Bolts - 100 or less

2. Steel Posts					
A. Sign Posts	3401	Visual Inspection	2415 or 2403 for small quantity	Two posts per shipment of each MASS per UNIT LENGTH	Submit shortest length of each weight
B. Fence Posts, Top Rails and others	3403* 3406* 3379 3408	Visual Inspection	Same	One sample per 500 pieces or less, but not less than two samples per shipment. Cut 0.3 m (1 ft) from each end of pipe. One each of fittings or hardware items.	

REMARKS:

* For 3403, submit certified mill analysis with sample.

* For 3406, submit Certificate of Compliance and certified mill analysis with sample.

SCHEDULE OF MATERIALS CONTROL

IX. METALLIC MATERIALS AND METAL PRODUCTS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
3. Fence Wire					
A. Barbed	3376	Visual Inspection	2415 or 2403	One sample per 50 spools or fraction thereof	1 m (3 ft)
B. Woven	3376	Visual Inspection	Same	One full height sample per 50 rolls	1 m (3 ft)
C. Chain Link Fabric	3376	Visual Inspection	Same	One sample for each 1,500 m (5,000 ft) of fencing.	0.3 m (1 ft)
4. Water Pipe and other Piping Materials	3364, 3365, 3366 & Special Provisions		2415 or 2403		
REMARKS: To be identified and tested if necessary prior to use. Retain Form 2415 or 2403 in project files. SEE SPECIAL PROVISIONS.					
5. Reinforcing Steel					
A. Bars					
1. Uncoated	3301	Visual Check for Size and Grade Marking	2415 or 2403	NO FIELD SAMPLE NECESSARY	
2. Epoxy Coated		Visual Check for Size and Grade Marking and "Inspected" tag (See Remarks)	Same	One sample (1 bar) of each size bar for each day's coating production	1 m (3 ft)
REMARKS: For Uncoated bars - Retain Certificate of Compliance and Certified Mill Analysis in Project File. For Epoxy Coated bars - Shipping paperwork will include Mn/DOT Lab #'s or steel will be tagged "Inspected" when it has been sampled and tested prior to shipment. Will be tagged "Sampled" when testing has not been completed prior to shipment. Submit samples and Certificate of Compliance if not tagged "Sampled" or "Inspected".					
B. Steel Fabric	3303	Visual Inspection		NO FIELD SAMPLE NECESSARY	
REMARKS: Retain Certificate of Compliance in project file.					
C. Dowel Bars	3302			One Dowel Bar from each shipment	Full Size Dowel Bars
REMARKS: Same as Epoxy Coated Reinforcing Steel					
D. Prestressing Strand	3348			One sample (2 strands) from each heat	1.5 m (5 ft)
REMARKS: Submit one copy of mill certificate and one copy of the stress-strain curve representative of the lot with the samples.					
E. Spirals	3305			One per shipment	0.6 m (2 ft)
REMARKS: Will be tagged with "Inspected" tag when tested prior to shipment.					
6. Drainage Castings	3321 2471	Visual Inspection*	2415 or 2403	ALL CASTINGS Two tensile bars to be cast with each heat at Foundry and submitted to the Laboratory BY AN APPROVED FOUNDRY*	

** Call Maplewood Laboratory at 651-779-5540 for list of approved foundries*

REMARKS: Inspect in the field and retain Form 2415 or 2403 in project file, showing NAME OF FOUNDRY AND QUANTITY

SCHEDULE OF MATERIALS CONTROL

X. MISCELLANEOUS MATERIALS

Material	Spec. No.	Minimum Required Acceptance Testing Field Testing Rate	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Timber, Lumber Piling and Posts	3412 to 3471 and 3491	Visual Inspection	2415 or 2403		

REMARKS:

Untreated materials shall be inspected in the field and the results reported on Form 2415 or 2403.

Treated materials shall be Certified on the Invoice or Shipping Ticket.

Material is inspected and stamped by an Independent Agency as per Specification 3491. Contact Laboratory for additional information.

2. Miscellaneous pieces and Hardware (Galvanized)	3392 3394		2515 or 2403	One sample of each item per shipment. Sample critical items only. (CRITICAL ITEMS ARE LOAD LOAD BEARING, STRUCTURALLY NECESSARY ITEMS.)	

REMARKS:

Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected".

3. Insulation Board	3760	Visual Inspection	2415 or 2403	None	
4. Elastomeric Bearing Pads	3741 and Special Provisions	Check dimensions Check repair of tested pad		One sample , with one or more internal plates annually from each manufacturer.	Full size pad

REMARKS:

Submit copy of Certificate of Compliance with pad.

DO NOT USE ANY PADS THAT ARE NOT CERTIFIED

SCHEDULE OF MATERIALS CONTROL

XI. GEOSYNTHETICS, PIPE, TILE, AND PRECAST/PRESTRESSED CONCRETE

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Corrugated Metal Products					
A. Culvert Pipe Underdrains Erosion control Structures	3225 thru 3229, 3351, and 3399	Visual Inspection: Check for good construction, workmanship, finish requirements and shipping	2415 or 2403		
REMARKS: Make certain pipe is Certified on Invoice					
B. Structural Plate	3231	Visual Inspection: Invoice shall include notation that material described is in accordance with fabricator's Certificate and Guarantee	2415 or 2403		
C. Aluminum Structural Plate	3233				
REMARKS: The Fabricator's Certificate and Guarantee shall be on file in the Mn/DOT Central Laboratory.					
2. Clay Pipe	3251	No samples required for less than 100 pieces	2415 or 2403	1 sample per 200 pieces of each size.	Full Size Pipe
REMARKS: To be sampled and inspected in the field.					
3. Concrete Pipe	3236	Field Inspection: Check for damage and defects. Check dimensions as required. Check for signature on the certification document.			
A. Reinforced Pipe and Arches Precast Cattle Pass Units Sectional Manhole Units					
B. Non-Reinforced Concrete Pipe	3253			2 samples of each size from each source unless inspected and stamped at source.	Full Size Pipe
REMARKS: Pipe will be certified or inspected, tested and stamped at source. Make certain the invoice or certification document is signed and the pipe has the required markings.					
4. Precast/Prestressed Concrete Structures					
A. Reinforced Precast Box Culvert	3238	Tests by Producers 1 Air test per day (1st load) 2 cylinders per pour for positive slump concrete. (1 for records, 1 for shipping)	2415 or 2403	Tests by Mn/DOT	
B. Precast/Prestressed Concrete Structures (beams, posts, etc.).	2405				
	3126 (Fine Aggregate)	Gradation: 1 per 150 m³ (200 CuYd) or fraction thereof. 1 per day of production or 3 per week, whichever is less.	2449 2153	Gradation: 1 per month per plant Quality (Litho): 1 per month per plant	10 kg (25 lb.)
	3137 (Coarse Aggregate)	Gradation: 1 per 75 m³ (100 CuYd) or 115 metric Ton (125 Ton) or fraction thereof. 1 per day of production or 3 per week, whichever is less.		Gradation: 1 per month per plant Quality (Litho): 1 per month per plant	10 kg (25 lb.)

REMARKS: Precast/prestressed structures including boxes will be inspected and stamped at source. Only spot checks for dimensions are performed.

SCHEDULE OF MATERIALS CONTROL

XI. GEOSYNTHETICS, PIPE, TILE, AND PRECAST/PRESTRESSED CONCRETE (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
5. Manholes and Catch Basins (Construction)	2506 3622	Field Inspection: Check for damage and defects. Check dimensions as required.	2415 or 2403		

REMARKS:
Maintain Form 2415 or 2403 in project records, showing source of materials and type and quantity of materials used. (Bricks, blocks precast or combination)

6. Drain Tile (Clay or Concrete)	3276	Visual Inspection		2 samples of each size from each source	
7. Thermoplastic (TP) Pipe ABS and PVC	3245	Obtain Certificate of Compliance. Check for approved marking printed on pipe. Field Inspect for damage or defects.	2415 or 2403		

REMARKS:
See Spec. 2345 for specific AASHTO or ASTM Pipe types are approved under this specification. If perforated, holes should be 5mm - 10 mm (3/16 - 3/8 inch) diameter, two rows for 4", and four rows for 6" diameter; approximately 75 mm (3 inches) on center.

8. Corrugated Polyethylene Pipe - PVC and ABS	3278	Check for markings (AASHTO M 252) Certificate of Compliance Field Inspect for damage or defects..	2415 or 2403	No Laboratory tests required	
9. Sewer Joint Sealing Compound	3724			One per shipment	0.5 L (l pt.)
10. Preformed Plastic Sealer for Pipe	3726 Type b			One from each source	0.3 m (1 ft)
11. Bituminous Mastic Joint Sealer for Pipe	3728	Visual Inspection		Sample, if questionable	
12. Geotextile Fabric	3733 and Special Provisions	Visual Inspection for damage and uniformity of texture. Rolls of both geotextile and geotextile wrapped PE Tubing must be wrapped in UV protective plastic. (Usually Black)		(a) 1/15,000 m (50,000 LF) or fraction thereof for pipe wrap or trench lining for Permeable base designs. (b) 1/10 rolls or fraction thereof of each type fabric for all other uses. (c) Sewn seam, if required, 1/project minimum, additional as appropriate	(a) 3m (10 LF) (b) 3m² (4SqYd)* (c) 3m (10 LF)

REMARKS:
Submit Certificate of Compliance with fabric identification (Typar 3341, Supac 8NP, Mirafi 500X, etc.) and roll number.
Contact Geology Unit for small quantity testing and questions.

* Do not sample first 1 m (3 ft) of rolled Geotextile. Cut 1 m (3ft) wide strip across width of roll [Usually 3 - 4 m (12 - 14 ft)]

13. Silt Fence	3886	Visual Inspection Check Product Label	2415 or 2403	For amounts (61m)200 ft or greater.	1 m (1Yd)

REMARKS: Samples sent 21 days prior to use. Check Approved Products List of accepted geotextiles.

SCHEDULE OF MATERIALS CONTROL

XII. BRICK, STONE, AND MASONRY UNITS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Brick					
A. Sewer and Masonry	3612 to 3615	Visual Inspection		One sample per 50,000 brick or fraction thereof	5 whole brick
B. Concrete Sewer*	3616	Visual Inspection		One sample per 50,000 brick or fraction thereof	5 whole brick
Air entrainment required. Obtain air content statement from supplier.					
2. Concrete Masonry Units					
A. For Sewer Construction	3621	Visual Inspection		One sample per shipment	5 whole units
Air entrainment required. Obtain air content statement from supplier.					
B. For Modular Block Retaining Walls	Special Provisions	Visual Inspection		One sample per 10,000 units or fraction thereof, with a minimum of one sample per product (block) type per contract.*	5 whole units
* Wall units and cap units are considered separate block types.					
3. Reinforced Concrete Cribbing	3661	Concrete control tests Air Tests Visual Inspection if previously tested	2415 or 2403	One cylinder per 100 units, but not less than 5 cylinders for a given contract. Other materials as required herein.	150x300 mm (6 x 12 in) Cylinders
REMARKS: Will be stamped when inspected prior to shipment.					
4. Stone for Masonry or Rip-Rap	3601 and Special Provisions	Visual Inspection Submit Form 2415 unless special testing is specified	2415 or 2403		
REMARKS: Each source shall be approved by Project Engineer or Supervisor for quality prior to use. For questions on quality, contact District Materials or Geology Unit					

SCHEDULE OF MATERIALS CONTROL

XIII. ELECTRICAL AND SIGNAL EQUIPMENT ITEMS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Lighting Standards (Aluminum or Steel)	3811	Visual Inspection			
REMARKS: The Fabricator will submit "Certificate of Compliance", on a per project basis, to the Structural Metals Engineer.					
2. Hand Holes and Pull Boxes (Precast) (PVC)	2545 2550 2565		2415 or 2403		
REMARKS: Will be inspected at source by laboratory upon notification. For cast iron frame and cover: see VIII.6, Drainage Castings					
3. Foundation	2545	Slump as needed		1 cylinder per 20 m³ (25 CuYd)	
4. Conduit and Fittings					
A. Metallic	3801 3802 3803	Visual Inspection	2415 or 2403	None	
REMARKS: Conduit will bear UL labels. Retain Form 2415 or 2403 in Project File					
B. Non-Metallic		Visual Inspection	2415 or 2403	Submit samples if not approved by brand	
REMARKS: Conduit will bear UL labels. Retain Form 2415 or 2403 in Project File					
5. Anchor bolts	3811.2B(5)	Visual Inspection		1 per 100 Units (per Type per Lot Number per Project)	
REMARKS: The Fabricator will submit test specimens (in quantities sufficient to meet the noted test frequency) to the Maplewood Lab. A copy of the test report will be forwarded to the Structural Metals Engineer.					
6. Miscellaneous Hardware		Visual Inspection		Sample critical items only. One of each item per shipment. (Critical Items are load bearing, structurally necessary items.)	
REMARKS: Will carry "Inspected tag if sampled and tested prior to shipment. No sample necessary if "Inspected". Do Not use if not tested. Field sample at sampling rate for laboratory testing.					
7. Cable and Conductors					
A. Single Electrical Conductors (No Jacket)	3815.2B1 3815.2B2(a)	Visual Inspection	2415 or 2403	None	
REMARKS: Make certain the conductors are the type specified. Submit Field Inspection report showing type and quantities used. Shall bear UL label and type where applicable.					
B. Electrical Cables and Single Conductors with Jacket	3815.2B2(b) 3815.2B3 3815.2B4 3815.2C1 3815.2C3 3815.2C4 3815.2C5 3815.2C6 3815.2C7 3815.2C8	Visual Inspection	2415 or 2403	1 sample per size per lot	1 m (1 Yd)
C. Fiber Optic Cables	3815.2C13	Visual Inspection	2415 or 2403	1 sample per size per lot	1 m (1 Yd)
REMARKS: Usually inspected (B&C) at source and spools stamped. If spools are not stamped, submit sample and material certification from manufacturer.					

SCHEDULE OF MATERIALS CONTROL

XIII. ELECTRICAL AND SIGNAL EQUIPMENT ITEMS (Cont'd)

Materials	Spec. No.	Minimum Required Acceptance Tasting (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
8. Ground Rods	2545	Visual Inspection	2415 or 2403	None.	

REMARKS:
Retain Form 2415 or 2403 in project file.

9. Luminaires and Lamps	2545		2415 or 2403		

REMARKS:
Approved by Brand Name.

The conductors shall bear UL label and type, where applicable.

10. Electrical Systems.
To be reported as a "System" using the LIGHTING, SIGNAL AND TRAFFIC RECORDER INSPECTION REPORT

To be certified by the Project Engineer

11. Traffic Signal Systems.
To be reported as a "System" using the LIGHTING, SIGNAL AND TRAFFIC RECORDER INSPECTION REPORT

To be certified by the Project Engineer

(2360) PLANT MIXED ASPHALT PAVEMENT

Combined 2360/2350 (Gyratory/Marshall Design) Specification
For 2003 Construction Season

This Specification requires the Contractor to provide a mix that complies with all of the design, production, and placement requirements of the specification. The Department does not make any guaranty or warranty, either express or implied, that compliance with one part of this specification guarantees that the Contractor will meet the other aspects of the specification.

All Sections titled 2360 also apply to 2350.

2360.1 DESCRIPTION

This work consists of the construction of one or more pavement courses of hot plant mixed asphalt-aggregate mixture on the approved prepared foundation, base course or existing surface in accordance with the specifications and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer. Mixture design will be either 2360 or 2350 (gyratory or Marshall) as described in the Special Provisions through the mixture designation.

A Mixture Designations

Mixture designations for asphalt mixtures contain the following information:

(1) The first two letters indicate the mixture design type:
SP = Gyratory Mixture Design
LV = Marshall Mixture Design – Low Volume, 50 blow
MV = Marshall Mixture Design – Medium Volume, 50 blow
SM = Gyratory Mixture Design for Stone Matrix Asphalt (SMA)

(2) The third and fourth letters indicate the course:
WE = Wearing and Shoulder Wearing Course
NW = Non-Wearing Course

(3) The fifth letter or number indicates the maximum aggregate size*:
A or 4 = 12.5mm [**1/2 inch**], 9.5 mm [**3/8 inch**] nominal size
B or 3 = 19.0mm [**3/4 inch**], 12.5 mm [**1/2 inch**] nominal size
C or 2 = 25.0mm [**1 inch**], 19.0 mm [**3/4 inch**] nominal size
5 = 9.5mm [**3/8 inch**], 4.75 mm [**#4**] nominal size (Marshall design only)
E = See provision for SMA design
* Letter is used in gyratory designation; number is used in Marshall designation

(4) **For Gyratory Design:**
The sixth digit indicates the Traffic Level (ESAL's x 10^6)
The requirements for gyratory mixtures in this specification are based on the 20-year design traffic level of the Project expressed in Equivalent Single Axle Loads (ESAL's). The five traffic levels are shown below in Table 2360.1-A.

Table 2360.1-A
Traffic Levels

Traffic Level	20 Year Design ESAL's (1 x 10^6 ESAL's)
2[1]	< 1
3[2]	1 to < 3
4	3 to < 10
5	10 to ≤ 30
6	SMA

1 -- (AADT ≤ 2300)
2 -- (2300< AADT <6000)

For Marshall Design:
The sixth and seventh digit indicate the Marshall design blows:
50 blow design for both LV and MV mixtures

(5) The last two digits indicate the air void requirement:
40 = 4.0% for SP and SM Wear mixtures
35 = 3.5% for MV Wear and Non-Wear
30 = 3.0% for LV Wear and Non-Wear and SP Non-Wear and Shoulder

(6) The letter at the end of the mixture designation identifies the asphalt binder grade:
A = PG 52-34
B = PG 58-28
C = PG 58-34
D = PG 58-40
E = PG 64-28
F = PG 64-34
G = PG 64-40
H = PG 70-28
I = PG 70-34
L = PG 64-22

Ex: Gyratory Mixture Designation -- SPWEB540E (Design Type, Lift, Agg Size, Traffic Level, Voids, Binder)
Ex: Marshall Mixture Designation – LVWE35030B (Mix Type, Lift, Agg Size, Marshall blows, Voids, Binder)
Ex: SMA Mixture Designation -- SMWEE640H (Design Type, Lift, Agg Size, Traffic Level, Voids, Binder)

B **Minimum Lift thickness**
Minimum paving lift thickness will be based on maximum aggregate size:

Aggregate Size A, 4*; B, 3*:	Minimum Lift thickness = 40 mm [**1 ½ inch**]
Aggregate Size 5*:	Minimum Lift thickness = 20 mm [**3/4 inch**]
Aggregate Size C, 2* (for non-wear only):	Minimum Lift thickness = 65 mm [**2 ½ inch**]

* Marshall designation

2360.2 MATERIALS

A Aggregate

A1 General

The aggregate shall consist of sound, durable particles of gravel and sand, crushed stone and sand, or combinations thereof. It shall be free of objectionable matter such as metal, glass, wood, plastic, brick, rubber, and any other material having similar characteristics. Coarse aggregate shall be free from coatings of clay and silt to the satisfaction of the Engineer.

The Contractor shall not compensate for the lack of fines by adding soil materials such as clay, loam, or silt. Overburden shall not be blended into the asphalt aggregate.

Each different material (source, class, kind, or size) shall be fed at a uniform rate from its storage unit. An individual source, class, type, or size of material shall not be stockpile blended with another source, class, type or size of material.

A2 Classification

The aggregate shall conform to one of the following classifications. The class of aggregate to be used shall be the Contractor's option unless otherwise specified in the Contract.

A2a Class A

Class A aggregate shall consist of crushed igneous bedrock (specifically; basalt, gabbro, granite, rhyolite, diorite and andosite) and rock from the Sioux Quartzite Formation. Other igneous or metamorphic rock may be used with specific approval of the Engineer. Class A materials may contain no more than 4.0% non-Class A aggregate. This recognizes the fact that some quarries may contain small pockets of non-Class A material within that source. Intentional blending or addition of non-Class A material is strictly prohibited!

A2b Class B

Class B aggregate shall consist of crushed rock from all other bedrock sources such as carbonate and metamorphic rocks. (gneiss or schist)

A2c Class C

Class C aggregate shall consist of natural or partly crushed natural gravel obtained from a natural gravel deposit.

A2d Class D

Class D aggregate shall consist of 100 percent crushed natural gravel. The crushed gravel shall be produced from material retained on a square mesh sieve having an opening at least twice as large as the Specification permits for the maximum size of the aggregate in the composite asphalt mixture. The amount of carryover (material finer than) the selected screen shall not exceed ten percent.

A2e Class E

Class E aggregate shall consist of a mixture of any two or more of the above classes of approved aggregate (A, B, and D). The use of Class E aggregate, as well as the relative proportions of the different constituent aggregates, shall be subject to the approval of the Engineer. The relative proportions of the constituent aggregates shall be accurately controlled either by the use of a blending belt approved by the Engineer prior to production or by separately weighing each aggregate during batching operations.

A2f Steel Slag

Steel slag may not exceed 25 percent of the mass of the total aggregate. Stockpiles will be accepted for use if the total expansion, determined by ASTM D4792, is less than 0.50%.

A2g Taconite Tailings (TT)

Taconite tailings shall be obtained from ore that is mined westerly of a north-south line located east of Biwabik, Mn (R15W-R16W); except that taconite tailings from ore mined in southwestern Wisconsin will also be permitted for use.

Approved taconite tailing sources are on file with the Department Bituminous Engineer.

A2h Scrap Asphalt Shingles

Scrap asphalt shingles may be included in both wear and non-wear courses to a maximum of 5 percent of the total weight of mixture. Only scrap asphalt shingles from manufacturing waste are suitable. The percentage of scrap shingles used will be considered part of the maximum allowable RAP percentage. Refer to Section 2360.2 G1 to select a virgin asphalt binder grade (use requirements for > 20% RAP, regardless of total RAP/shingle percentage). Scrap Shingle Specifications are on file in the Bituminous Office.

A2i Crushed Concrete and Salvaged Aggregate

Crushed concrete is allowed as an aggregate source for up to 50 percent of the aggregate in non-wear mixtures. Crushed concrete is not allowed in wearing courses.

Salvaged aggregate is allowed as an aggregate source for up to 100 percent of the aggregate in wear and non-wear mixtures. All salvaged aggregate shall be stockpiled uniformly to limit variation in mixture properties. Salvaged aggregates shall meet quality and crushing requirements as specified herein.

A3 Recycled Asphaltic Pavement Materials (RAP)

The combined RAP and virgin aggregate shall meet the composite fine aggregate angularity or calculated crushed requirements (both coarse and fine aggregate) for the mixture being produced (calculated crushed allowed for Marshall design only). RAP containing any objectionable material, i.e., road tar, metal, glass, wood, plastic, brick, fabric, or any other objectionable material having similar characteristics will not be permitted for use in the asphalt pavement mixture.

Asphalt binder content in the RAP shall be determined according to Mn/DOT Lab Manual Method 1851 or 1852.

B Manufactured Crushed Fines (-4 material)

All Class A, B, D, and E material that passes the 4.75 mm [#4] screen will be considered as crushed fines.

Manufactured Crushed Fines (-4 material) from Class C Aggregate. Produce manufactured crushed fines (-4 material) from a gravel source by passing the gravel over a selected screen, 9.5 mm [**3/8 inch**] or larger, prior to mechanical crushing. The material which passes the 9.5 mm [**3/8 inch**] screen shall not be incorporated into the manufactured crushed fines but may be used as it qualifies for natural sand. The amount of carryover (material finer than) the selected screen shall not exceed ten percent.

The material retained on the 9.5 mm [**3/8 inch**] screen shall be crushed. The material that passes the 4.75 mm [#4] screen, after crushing, will be considered as 100% crushed fines. Material retained on the 4.75 mm [#4] screen after crushing will not be counted as +4 crushing until tested.

C Quality Requirements

C1 Los Angeles Rattler Test .....AASHTO T96

The Los Angeles Rattler loss on the coarse aggregate fraction (material retained on the 4.75 mm [#4] sieve shall not exceed 40 percent for any individual source used within the mix. An aggregate proportion which passes the 4.75 mm [#4] sieve and exceeds 40 percent LAR loss on the coarse aggregate fraction is prohibited from use in the mixture.

C2 Soundness (Magnesium Sulfate)..... AASHTO T104

The magnesium sulfate soundness loss at 5 cycles on the coarse aggregate fraction (material retained on the 4.75 mm [#4]) shall not exceed the following for any individual source used within the mix: *

a) No more than 14 % loss on the 19 mm [**3/4 inch**] to 12.5 mm [**1/2 inch**] and larger fractions.
b) No more than 18% loss on the 12.5 mm [**1/2 inch**] to 9.5 mm [**3/8 inch**] fraction.
c) No more than 23% loss on the 9.5 mm [**3/8 inch**] to 4.75 mm [**#4**] fraction.
d) No more than 18% for the composite loss. (Applies only if all three size fractions are tested).

* 1) If the composite requirement is met but one or more individual components do not, the source may be accepted if no individual component is more than 110% of the requirement for that component.

2) If each individual component requirement is met but the composite does not, the source may be accepted if the composite is no greater than 110% of the requirement.

An aggregate proportion which passes the 4.75 mm [#4] sieve and exceeds the requirements listed above on the coarse aggregate fraction is prohibited from use in the mixture.

C3 Spall Materials and Lumps ..... Mn/DOT Laboratory Manual

Spall is defined as shale, iron oxide, unsound cherts, pyrite, highly weathered and/or soft phyllite and argillite (may be scratched with a brass pencil), and other materials having similar characteristics.

Lumps are defined as loosely bonded aggregations and clayey masses. If the percent of lumps measured in the stockpile or cold feed exceed the values listed below, asphalt production shall cease and compliance shall be determined by dry batching. This procedure may be repeated at any time at the discretion of the Engineer.

Maximum limits for Spall and lumps, expressed as percentages by mass, are listed in Table 2360.3-B2a.

C4 Insoluble Residue Test.....Mn/DOT Laboratory Manual

If Class B carbonate material is used in the mix, the minus 0.075 mm [**#200**] sieve size portion of the insoluble residue shall not exceed 10 percent.

D Aggregate Restrictions

Class B carbonate aggregate restrictions are specified in Table 2360.3-B2a.

E Gradation Requirement

The coarse and fine aggregate shall be combined in such proportions to produce an asphalt mixture meeting all of the requirements defined in this specification and shall conform to the gradation as defined in Table 2360.2-E. Gradation testing shall be conducted in accordance with AASHTO T-11 (-0.075 mm [**-#200**] wash) and T-27.

Table 2360.2-E
Aggregate Gradation Broad Bands
(% passing of total washed gradation)

Sieve Size (mm [**inch**])	A or 4*	B or 3*	C or 2*	5*	E (SMA)
25.0 [**1 inch**]			100		See SMA Provisions
19.0 [**3/4 inch**]		100	85-100		
12.5 [**1/2 inch**]	100	85-100	45-90		
9.5 [**3/8 inch**]	85-100	35-90	-	100	
4.75 [**#4**]	25-90	20-80	20-75	65-95	
2.36 [**#8**]	20-70	15-65	15-60	45-80	
0.075 [**#200**]	2.0-7.0	2.0-7.0	2.0-7.0	2.0-7.0	

*Marshall Designation

F Additives

An additive is any material added to an asphalt mixture or material, such as mineral filler, hydrated lime, asphalt additives, anti-strip, and similar products that do not have a specific pay item. When a Contract requires additives, compensation is included with the pay items for the appropriate mixture. If the Engineer directs the Contractor to incorporate additives, the compensation will be as Extra Work, at the unit price specified in the proposal. The Department will not compensate the Contractor for additives incorporated at the Contractor's option.

Additives will not be incorporated into the mixture without approval of the Department Bituminous Engineer. Anti-foaming agents shall be added to asphalt cement at the manufacturer's recommended dosage rate. Mineral filler and hydrated lime may be added in a quantity not to exceed 5 percent and 2 percent, respectively, of the total mass of the aggregate. The combination of mineral filler and hydrated lime shall not exceed 5 percent of the total mass of aggregate. The Engineer will approve or disapprove methods for addition of additives.

F1 Mineral Filler 3145
F2 Hydrated Lime 3145

Hydrated lime used in asphalt mixtures shall meet the requirements of ASTM C977 and have a maximum of eight percent unhydrated oxides (as received basis). The method of introducing and mixing the hydrated lime and aggregate shall be subject to approval by the Engineer prior to beginning mixture production.

F3 Liquid Anti-Stripping Additive

When a liquid anti-strip additive is added to the asphalt binder, blending shall be completed before the asphalt binder is mixed with the aggregate. Liquid anti-strip additives that modify the asphalt binder, such that it fails to meet the Performance Grade (PG) requirements, shall not be used. No paving will be allowed until the asphalt binder/additive blend has been tested and the results meet the criteria in Section 2360.2G. The company/supplier adding the additive shall be responsible for testing the binder/additive blend to ensure compliance with the AASHTO MP-1, Standard Specification for Performance Graded Asphalt Binder. The testing shall be done in accordance with a Mn/DOT approved Asphalt Binder QC Plan. Requirements for the Asphalt Binder QC Plan are on file in the Bituminous Office.

F4 Coating and Anti-Stripping Additive 3161

G Asphalt Binder Material ..... AASHTO MP-1

Asphalt binder material shall meet the requirements of PG asphalt binder testing tolerances, sampling rates, testing procedures, and acceptance criteria based on the most current Mn/DOT Technical Memorandum, titled "Inspection, Sampling, and Acceptance of Bituminous Materials." The PG asphalt binder

cannot be modified with air blowing procedures unless the Department Bituminous Engineer approves it. The Contractor shall not use petroleum distillates such as fuel oil, diesel fuel or other fuels in the asphalt tanks. A statement shall be provided by the supplier for recommended laboratory mixing and compaction temperatures and field maximum mixing and compaction temperatures.

G1 Asphalt Binder Selection Criteria for All Mixtures with RAP

Overlay	Specified PG Asphalt Binder Grade	Virgin Asphalt Binder Grade to be used with RAP	
		≤ 20% RAP	> 20% RAP
	64-22	64-22	64-28
	Other PG Grades	No grade adjustment	No grade adjustment

New Construction (1)	Specified PG Asphalt Binder Grade	Virgin Asphalt Binder Grade to be used with RAP	
		≤ 20% RAP	> 20% RAP
	52-34	52-34	Not allowed *
	58-28	58-28	58-28
	58-34	58-34	Not allowed *
	64-28	64-28	64-28
	64-34	64-34	Not allowed *
	Other PG Grades	No grade adjustment	Not allowed *

* When approved by the Engineer, the virgin asphalt binder grade can be selected by using the blending chart procedure on file in the Bituminous Office. Mn/DOT may take production samples for information/verification of compliance with a specified asphalt binder grade.

(1) Includes cold inplace recycle, reclaiming, and reconstruction.

2360.3 MIXTURE DESIGN

A Mixture Design General

The asphalt mix may be designed using one of the following two Contractor trial mix design options. Review of mixture designs will be performed in the District Materials Laboratory lab where the Project is located. The addition of aggregates and materials not included in the original mixture submittal is prohibited.

It is the Contractor's responsibility to design a Marshall mixture in accordance with the most current AASHTO T-245, the Asphalt Institute's Mix Design Methods for Asphalt Concrete MS-2, and the Mn/DOT Laboratory Manual such that it meets the requirements of this specification.

For Marshall design, the design air void content of the mixture is dependent on the mixture type, regardless of the location in the pavement structure. Design air void content for LV and MV mixtures is 3.0% and 3.5%, respectively.

It is the Contractor's responsibility to design a gyratory mixture in accordance with the most current AASHTO T-312, the Asphalt Institute's Superpave Mix Design Manual SP-2 (2-hour short term aging period is used for volumetric), and the Mn/DOT Laboratory Manual such that it meets the requirements of this specification.

For gyratory design, the design air void content of the mixture at design shall be 4.0% at the design number of gyrations (N_{design}) for mixtures placed in the upper 100 mm [**4 inches**] of the finished surface. The design air void content of the mixture at design shall be 3.0% at the design number of gyrations (N_{design}) for mixtures placed at depths more than 100 mm [**4 inches**] from the surface and on all (wear and nonwear) shoulders that do not carry traffic. If less than 25% of a layer is within 100 mm [**4 inches**] of the surface, the layer may be considered to be below 100 mm [**4 inches**] for mix design purposes.

B Laboratory Mixture Design (Option 1)

Test results and documentation as described in Section 2360.3C shall be submitted with the materials described below for consideration by the Department Bituminous Engineer or District Materials Engineer to verify compliance with these specifications and to issue a Mixture Design Report.

B1 Aggregate sample

At least 15 working days prior to the start of asphalt production, the Contractor shall submit to the Department Bituminous Engineer or the District Materials Engineer a 35 kg [**80 pound**] sample of representative aggregate retained on the 4.75 mm sieve [#4] and a 15 kg [**35 pound**] sample of material passing the 4.75 mm sieve [#4] for quality testing. The Contractor shall provide 24 hour notice of intent to sample aggregates. These samples will be tested for quality of each source, class, type, and size of virgin and non-asphaltic salvage aggregate source used in the mix design. The Contractor shall retain a companion sample of equal size until a Mixture Design Report is issued. Quality requirements are defined in Section 2360.2C.

Aggregates that require the magnesium sulfate soundness test shall be submitted to the Department Bituminous Engineer or District Materials Engineer at least 30 calendar days prior to the start of asphalt production. Dispute resolution procedures for aggregate qualities are on file in the Bituminous Office.

B2 Mixture sample

At least 7 working days prior to the start of asphalt production, the Contractor shall submit in writing a proposed Job Mix Formula (JMF) for each combination of aggregates to the Department Bituminous Engineer or District Materials Engineer for review. A Level II Quality Management mix designer must sign the proposed JMF. For each JMF submitted, the Contractor shall include test data to demonstrate conformance to mixture properties as specified in Table's 2360.3-B2b and 2360.3-B2c. The proposed JMF shall be submitted on forms approved by the Department. In addition, the Contractor shall submit an uncompacted mixture sample plus briquettes compacted at the optimum asphalt content and required compactive effort conforming to the JMF for laboratory examination and evaluation. Mixture sample size and number of compacted briquettes are as follows:

Table 2360.3-B2
Mixture Sample Requirements

Item	Gyratory Design	Marshall Design
Un-compacted Mixture Sample Size	30 Kg [**75 pounds**]	18 Kg [**40 pounds**]
Number of compacted briquettes	2	3

B2a Mixture Aggregate Requirements

The aggregate fractions shall be sized, graded, and combined in such proportions that the resulting mixture will meet the requirements listed in Section 2360.2-E and Table 2360.3-B2a shown below.

Table 2360.3-B2a
Mixture Aggregate Requirements

Aggregate Blend Property	Traffic Level 2& LV	Traffic Level 3 & MV	Traffic Level 4	Traffic Level 5	SMA T. Level 6
20 year Design ESAL's	<1 million	1 - 3 million	3 - 10 million	10 – 30 million	See SMA Provisions
Coarse Aggregate Angularity (ASTM D5821) (one face / two face), %- Wear (one face / two face), %- NonWear	 30/- 30/-	 55 / - 55 / -	 85 / 80 60/ -	 95 / 90 80 / 75	-
Fine Aggregate Angularity (FAA) (AASHTO T304, Method A) %- Wear %-Non-Wear	40(2) 40(2)	42(1) 40(1)	44 40	45 40	-
Flat and Elongated Particles, max(2) % by weight, (ASTM D 4791)	-	10 (3:1 ratio)	10 (3:1 ratio)	10 (3:1 ratio)	-
Clay Content(2) (AASHTO T 176)	-	-	45	45	-
Total Spall in fraction retained on the 4.75mm [#4] sieve	5.0	2.5	1.0	1.0	-
Maximum Spall Content in Total Sample	5.0	5.0	1.0	1.0	-
Maximum Percent Lumps in fraction retained on the 4.75mm [#4] sieve	0.5	0.5	0.5	0.5	-
Class B Carbonate Restrictions					
Maximum% -4.75mm [-#4] Final Lift/All other Lifts	100/100	100/100	80/80	50/80	-
Maximum% +4.75mm [+#4] Final Lift/All other Lifts	100/100	100/100	50/100	0/100	-
Gyratory Max. allowable RAP percentage Wear / Non Wear	30/40	30	30	30	
Marshall Max. allowable RAP percentage Wear / Non Wear	30/40	30/30			

(1) For Marshall design, the Contractor may determine –4 crushing by either FAA of uncompacted voids or calculation of crush from the composite blend. The choice must be made prior to start of production. Manufactured crushed fines requirement is 25%. RAP sand will be considered 50% crushed if the angularity index equals or exceeds 40, and 100% crushed if the angularity index equals or exceeds 45.

(2) Not applicable under Marshall design.

B2b Mixture Requirements

Mixture evaluation will be based on the trial mix tests and the corresponding requirements listed in Table 2360.3-B2b and Table 2360.3-B2c.

Table 2360.3-B2b
Mixture Requirements

	Traffic Level 2	Traffic Level 3	Traffic Level 4	Traffic Level 5	SMA T. Level 6
20 year Design ESAL's	< 1 million	1 - 3 million	3 - 10 million	10 – 30 million	See SMA Provisions
Gyratory Mixture Requirements					
Gyrations for $N_{initial}$	6	7	8	8	-
Gyrations for N_{design}	40	60	90	100	-
Gyrations for $N_{maximum}$	60	90	140	160	-
Air Voids, % -- Wear Air Voids, % -- Non-Wear	4.0 3.0	4.0 3.0	4.0 3.0	4.0 3.0	-
% G_{mm} at $N_{initial}$ – Wear % G_{mm} at $N_{initial}$ – Non-Wear	- -	≤ 91.5 ≤ 92.5	≤ 90.5 ≤ 91.5	≤ 90.0 ≤ 91.0	
% G_{mm} at $N_{maximum}$ – Wear % G_{mm} at $N_{maximum}$ – NonWear	≤ 98.0 ≤ 99.0	≤ 98.0 ≤ 99.0	≤ 98.0 ≤ 99.0	≤ 98.0 ≤ 99.0	- -
Tensile Strength Ratio [1], min%	75[2]	75[2]	80[3]	80[3]	-
Fines/Effective Asphalt	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2	0.6 – 1.2	-
VFA, % -- Wear NonWear	65 - 78 70 – 83	65 - 78 70 - 83	65 - 76 70 - 82	65 - 76 70 - 82	
Marshall Mixture Requirements	LV	MV			
Marshall Blows	50	50	-	-	-
Air Voids, %	3.0	3.5	-	-	-
Tensile Strength Ratio [1], min%	70[4]	70[4]			
Stability, minimum N [**lb f**]	5000 [**1125**]	6000 [**1350**]			
Fines/Effective Asphalt Wear Non-Wear	0.6 - 1.30 0.6-1.40	0.6 - 1.30 0.6-1.40	-	-	-

(1) See Section 2360.4 E9. Use 150mm [**6 inch**] specimens for gyratory and 100mm [**4 inch**] specimens for Marshall design.

(2) Mn/DOT Min = 65, [3] Mn/DOT Min = 70, [4] Mn/DOT Min = 60

B2c VMA Criteria

The voids in mineral aggregate (VMA) of the mixture at design and during production shall meet the minimum criteria as shown in Table 2360.3-B2c at the specified compaction level. VMA shall be calculated according to the procedures outlined in Asphalt Institutes SP-2 or MS-2 manual. VMA is a design and acceptance/process control requirement.

Table 2360.3-B2c
Voids in Mineral Aggregate (VMA) Mixture Requirements

Gradation	Fine Mixture % Pass 2.36 mm [#8]	VMA Minimum	Coarse Mixture % Pass 2.36 mm [#8]	VMA Minimum
A or 4*	> 47	15.0**	≤ 47	14.5*
B or 3*	> 39	14.0	≤ 39	13.5
C or 2*	> 35	13.0	≤ 35	12.5
5*	-----	15.0**	-----	-----
E	See SMA Provisions			

*Marshall designation.
**For LV 4 and LV 5 mixes lower VMA requirements by 0.5%

B3 Tensile Strength Ratio sample

Mixture or briquettes that represent the mixture at optimum asphalt content, shall be submitted at least 7 days prior to actual production for verification of moisture sensitivity retained tensile strength ratio (TSR). Material submitted for TSR verification may be tested for maximum specific gravity G_{mm} compliance in addition to TSR results. Failure to meet the G_{mm} tolerance will result in rejection of the submitted mix design. A new mix design submittal will be required and will be subject to provisions described in Section 2360.3C. One of the following options may be used to verify that the tensile strength ratio (TSR) meets the requirements in Table 2360.3-B2b.

Option A) The Contractor will batch material at the design proportions including optimum asphalt. Immediately (before curing) split the sample and allow samples to cool to room temperature. Submit 35 kg [**77 pounds**] of mixture to the District Materials Laboratory for curing and test verification. Both groups will use a two (2) hour cure time (± 15 minutes) at 144°C [**290°F**] and follow procedures in ASTM D 4867-92, Mn/DOT modified as defined in the Mn/DOT Laboratory Manual.

Option B) The Contractor batches, cures (as indicated in option A), compacts, and submits briquettes and uncompacted mixture as specified below.

Table 2360.3-B3
Option B Mixture Requirements

Item	Gyratory Design	Marshall Design
Un-compacted Mixture Sample Size	8,200 g	8,200 g
Number of compacted briquettes[(1)]	6	9
Compacted briquette air void content	6.5 – 7.5%	6.0 – 8.0%

[(1)] 150mm [**6 inch**] specimens for gyratory design
100mm [**4 inch**] specimens for Marshall design

B4 Aggregate Specific Gravity .....AASHTO T84 and T85, Mn/DOT Modified

The Contractor shall determine the specific gravity of all aggregate used in the mixture.

C Documentation

Each proposed JMF submitted for review under Section 2360.3B and 2360.3D shall include the following documentation and test results.

(1) The name(s) of the individual(s) responsible for the Quality Control of the mixture during production.
(2) The low projects number on which the mixture will be used.
(3) The percentage in units of 1 percent (except the 0.075 mm sieve [**#200**] in units of 0.1 percent) of aggregate passing each of the specified sieves for each aggregate to be incorporated into the mixture. The gradation of aggregate from salvaged asphaltic material shall be derived from the material after the residual asphalt has been extracted.
(4) The source and description of the materials to be used. The aggregate pit or quarry source number. The proportion of each material (in percent of total aggregate).
(5) The composite gradation based on (3) and (4) above. Note: Include virgin composite gradation based on (4) and (5) above for mixtures containing RAP.
(6) The bulk (dry) and apparent specific gravities and water absorption (by % weight of dry aggregate) of both coarse and fine aggregate, for each product used in the mixture (including RAP). Use AASHTO T-84 and T-85 Mn/DOT modified as defined in the Mn/DOT Laboratory Manual. The tolerance allowed between the Contractor's and the Department's specific gravities are G_{sb} (individual) = 0.040 [+4 AND -4] and G_{sb} (combined) = 0.020.
(7) The composite gradation plotted on a FHWA 0.45 power chart. (Federal form PR-1115)
(8) For mixtures containing RAP include extracted asphalt binder content of the RAP with no retention factor included.

(9) The percentage (in units of 0.1 percent) and PG grade of asphalt binder material to be added, based upon the total mass of the mixture.

(10) When using laboratory mixture design Option 1 (2360.3B) or Option 2 (2360.3D), include the following:

(a) A minimum of three different asphalt binder contents (minimum 0.4 percent between each point), with at least one point at, one above and one below the optimum asphalt binder percentage.

(b) The maximum specific gravity at each asphalt binder content. The theoretical maximum specific gravity used for percent air voids determination shall be calculated based on the average of the effective specific gravities measured by a minimum of two maximum specific gravity tests at the asphalt contents above and below the expected optimum asphalt binder content.

(c) The test results for the individual and average bulk specific gravity, density, and heights, of at least two specimens at each asphalt binder content. For Marshall design include the test results for the individual and average bulk specific gravity, density, height, stability, and flow of at least three specimens at each asphalt binder content.

(d) The percent air voids in the mixture at each asphalt binder content.

(e) The percent Voids in Mineral Aggregate (VMA) at each asphalt binder content.

(f) The fines to Effective Asphalt (F/A) ratio calculated to the nearest 0.1 percent.

(g) Graphs showing air voids, voids in the mineral aggregate, Gmb, Gmm and unit weight vs. percent asphalt binder content for each of the three asphalt binder contents submitted with trial mix.

(11) Optional Add-Rock/Add-Sand Provisions

If the Contractor chooses to use the add-material option to augment the submitted JMF, the Contractor shall provide samples of the aggregate for quality analysis in accordance with Section 2360.3B1. The Contractor shall provide mix design data for two additional design points per add-material. One point shall show a proportional adjustment to the submitted JMF that includes 5 percent, by mass, add-material at the JMF optimum asphalt percent. The second point shall show a proportional adjustment to the submitted JMF that includes 10 percent, by mass, add-material at the JMF optimum asphalt percent. The following information will be reported for each of these two points:

(a) The maximum specific gravity (average of two tests).

(b) The test results for the individual and average bulk specific gravity, density, and height of at least two specimens at the optimum asphalt binder content. For Marshall design include the test results for the individual and average bulk specific gravity, density, height, stability, and flow of at least three specimens at the optimum asphalt binder content.

(c) The percent air voids in the mixture for each point.

(d) The Fines to Effective Asphalt ratio calculated to the nearest 0.1 of a percent.

(e) Coarse and Fine Aggregate crushing counts

Up to two add-materials will be allowed per mix design submittal. Aggregate quality and mix characteristics are required for each proposed add-material and shall be submitted at the time of the original trial mix submittal. No mixture sample or briquettes are required for these two additional points.

Additional Documentation For:

Gyratory Design

(G1) The test results from the composite aggregate blend at the proposed JMF proportions indicating compliance with Coarse Aggregate Angularity and Fine Aggregate Angularity as shown in Table 2360.3-B2a.

(G2) The design traffic level and the initial, design, and maximum number of gyrations $N_{initial}$, N_{design}, and $N_{maximum}$.

(G3) The temperature ranges the mixture is intended to be discharged from the plant and compacted at the roadway shall be provided by the asphalt binder supplier. Temperatures to be included are, laboratory mixing and compaction temperature ranges and maximum field mixing and compaction temperatures.

(G4) Evidence that the completed mixture will conform to all specified physical requirements as follows:
Design air Voids (V_a), VMA, VFA, TSR, F/A_e (Fines to effective asphalt ratio), Densification $\%G_{mm}$ at $N_{initial}$, N_{design}, and $N_{Maximum}$.

(G5) Labeled gyratory densification tables and curves, generated from the gyratory compactor, for all points used in the mixture submittal.

Marshall Design

(M1) The test results from the composite aggregate blend at the proposed JMF proportions indicating compliance with fine aggregate angularity uncompacted voids as shown in Table 2360.3-B2a. Or calculated -4.75 mm [-#4] crushing from the composite blend of the proposed JMF. Selection of either FAA or -4.75 mm [-#4] crushing shall be made at the time of mix design submittal. This selection will dictate the choice of method used for determination of compliance and acceptance for the duration of time the Mixture Design Report is in force. RAP sand will be considered 50% crushed if the angularity index equals or exceeds 40, and 100% crushed if the angularity index equals or exceeds 45.

D Modified Mixture Design (Option 2)

Test results and documentation as described in Section 2360.3C shall be submitted to the Department Bituminous Engineer or the District Materials Engineer to verify compliance with mix design requirements and issue a Mix Design Report. Mixture submittal is not required. The Contractor may use this option if **all** of the following conditions are met:

a) The aggregates in the proposed Mix Design Report have been used, in part, in other Mix Design Reports. Additionally, the aggregates must have been previously tested for and meet all applicable quality requirements in the current construction season.

b) The Level II mix designer submitting the mixture design must have a minimum of 2 years experience in mixture design.

c) The Contractor and his representatives cannot have violated the requirements of 1512 Unacceptable and Unauthorized Work relating to mixture design or mixture production within the last 12 month period.

D1 Mixture sample

At least 2 working days prior to the start of asphalt production, the Contractor shall submit in writing a proposed Job Mix Formula (JMF) for each combination of aggregates to the Department Bituminous Engineer or District Materials Engineer for review. A Level II Quality Management mix designer must sign this proposed JMF. For each JMF submitted, the Contractor shall include documentation as outlined in Section 2360.3C to demonstrate conformance to mixture properties as specified in Table 2360.3-B2b and 2360.3-B2c. The proposed JMF shall be submitted on forms approved by the Department.

D2 Initial Production Test Verification

At the start of production, the testing frequency for the first 1,800 metric tons [**2,000 tons**] of each mix type shall be as specified in Table 2360.4-D.

All mixture placed on Mn/DOT projects shall meet the specified quality indicators and required field density. Failure to do so will result in reduced payment or removal and replacement with acceptable material.

The Department shall take a mix verification sample within the first four samples at the start of production of each mix type.

D3 Tensile Strength Ratio sample

See Section 2360.4E9

D4 Marshall Stability (Marshall Design Only)

Mn/DOT will evaluate Marshall stability on the first days' verification sample for each mix type. The Contractor is not required to test stability on production mixture.

Failure to meet the minimum stability requirements listed in Table 2360.3-B2c will void the Mix Design Report and production shall stop immediately. The Contractor will be required to submit a revised mix design, with bituminous mixture at optimum asphalt content, to the District Materials Laboratory. If the mixture meets the minimum stability requirement the Mix Design Report will be reactivated and production may continue.

If the stability fails the second time, the Mix Design Report will be revoked. The Contractor will then be required to submit a new mix design according to Laboratory Mixture Design 2360.3B, Option 1. A new Mix Design Report will be issued upon successful verification of the new mixture design submittal. On the first day of production for each mix type and at the same time the verification sample is obtained, an additional sample shall be obtained for Department evaluation of Marshall stability. This sample may be tested at the discretion of the District Materials Engineer.

E Mixture Design Report

A Mixture Design Report consists of the JMF (Job Mix Formula). The JMF includes composite gradation, aggregate component proportions, asphalt binder content of the mixture, design air voids, Voids in Mineral Aggregate, and aggregate bulk specific gravity values. JMF limits will be shown for gradation control sieves, percent asphalt binder content, air voids, and VMA. Issuance of a Mixture Design Report confirms the mixture has been reviewed for and meets volumetric properties only. No guaranty or warranty, either express or implied, is made regarding placement and compaction of the mixture

A Department reviewed Mixture Design Report is required for all paving except for small quantities of material provided under Section 2360.5H. All submitted materials must meet aggregate and mixture design requirements before a Mixture Design Report is issued. The Department will review two trial mix designs per mix type designated in the plan, per Contract at no cost to the Contractor. Additional mix designs will be verified at a cost of $2000 per design, payable to the Commissioner of Transportation.

For city, county, and other agency projects, the Contractor shall provide to the District Materials Laboratory a complete Project proposal including addenda, supplemental agreements, change orders, and any Plan sheets (including typical sections) that affect the mix design. The Department will not start the verification process without this information.

2360.4 MIXTURE QUALITY MANAGEMENT (Quality Control/Quality Assurance)

A Quality Control (QC)

The Contractor shall provide and maintain a quality control program for HMA production. A quality control program is defined as all activities, including mix design, process control inspection, sampling and

testing, and necessary adjustments in the process that are related to the production of a hot mix asphalt (HMA) pavement which meets the requirements of the specifications.

A1 Contractor Certified Plant HMA

A1a Certification Procedure

The Contractor shall:

(1) Complete application form and request for plant inspection.

(2) Provide a site map of stockpile locations.

(3) Pass plant and testing facility inspection by having the Plant Inspector and Bituminous Plant Authorized Agent complete and sign the Asphalt Plant Inspection Report (TP 02142-02, TP 02143-02). By signing the Asphalt Plant Inspection Report, the HMA plant authorized agent agrees to calibrate and maintain all plant and laboratory equipment within allowable tolerances set forth in these specifications and the Mn/DOT Bituminous Manual.

(4) Obtain a Mixture Design Report prior to production.

A1b Maintaining Certification

To maintain certification, the plant must produce, test, and document all certified plant asphalt mixtures in accordance with the above requirements on a continuous basis. Continuous basis means all asphalt mixtures supplied from a certified plant to any Department project with 2360 asphalt mixtures must be sampled and tested in accordance with 2360 requirements and the Schedule of Materials Control.

The Contractor shall assure the plant certification procedure is performed annually after winter suspension and before producing material for a Project. In addition, a first-day sampling and testing frequency rate as stated in Table 2360.4-D shall be followed.

The Contractor shall recertify a plant when it is moved to a new location or a previously occupied location.

A1c Revocation of Plant Certification

The Department Construction Engineer may revoke certification of an asphalt plant when requirements are not being met or records are falsified. The Department may revoke the Technician Certification for the individual involved.

The Department Bituminous Engineer and Department Contract Administrator will maintain a list of companies who have had their asphalt plant certification revoked.

B Quality Assurance (QA)

The Department will perform QA testing as part of the acceptance process. The Engineer is responsible for QA testing, records, and acceptance. The Engineer will accomplish the QA process by:

(1) Conducting Quality assurance and verification sampling and testing.
(2) Observing sampling and tests performed by the QC personnel.
(3) Taking additional samples at any time and any location during production.
(4) Monitoring the required QC summary sheets and control charts.
(5) Verifying calibration of laboratory testing equipment.
(6) Communicating Mn/DOT test results to the Contractor's QC personnel in a timely manner.
(7) Ensuring Independent Assurance Sampling and testing requirements are met.

C Contractor's Quality Control

C1 Personnel Requirements

Along with the proposed mix design data, the Contractor shall submit to the Engineer an organizational chart listing the names and phone numbers of individuals and alternates responsible for mix design, process control administration, and inspection. The Contractor shall also post a current organizational chart and if required by the Engineer, post a daily roster of individuals performing QC testing in the Contractor's test facility.

The Contractor's quality control organization or private testing firm shall have Certified Technicians who have met the requirements on file with the Department's Technical Certification program. Individuals performing process control testing must be certified as a Level I Bituminous Quality Management (QM) Tester. Individuals performing mix design calculations or mix design adjustments must be certified as Level II Bituminous QM Mix Designer. The Contractor shall have a Certified Level II Bituminous QM Mix Designer available to make any necessary process adjustments. The Contractor shall have a minimum of one person per paving operation certified as a Level II Bituminous Street Inspector.

C2 Laboratory Requirements:

The Contractor shall furnish and maintain a laboratory at the plant site or other site as approved by the Engineer. The laboratory shall be furnished with the necessary equipment and supplies for performing Contractor quality control testing. The laboratory equipment shall meet the requirements listed in Section 400 of the Mn/DOT Bituminous Manual and these specifications, including having extraction capabilities. The laboratory shall be calibrated, and operational prior to the beginning of production. In addition to the requirements listed above, the laboratory shall be equipped with a telephone for use by the Contractor or the Engineer. A fax machine and copy machine shall be available for use by the Contractor or the Engineer at the laboratory site. The laboratory shall also include a computer and printer. The computer must be capable of running Microsoft Excel 97 or newer version. The printer must be able to print control charts.

The Engineer shall be allowed to inspect measuring and testing devices to confirm both calibration and condition. The Contractor shall calibrate and correlate all testing equipment in accordance with the latest version of the Mn/DOT Bituminous Manual.

D Sampling and Testing

The Contractor shall ensure that all QC samples are taken at random locations. Random number generation and determination of random sample location shall be consistent with the Mn/DOT Bituminous Manual Section 5-693.7 Table A or Section 5 of ASTM D3665. The Engineer may approve alternate methods of random number generation.

The tests for mixture properties shall be conducted on representative portions of the mix, quartered from a larger sample of mixture taken from behind the paver, or when approved by the Engineer, an alternate sampling location. The procedure for truck box sampling, an alternate sampling location, is on file in the Bituminous Office. When an alternate sampling location is approved and used by the Contractor, the daily verification sample must still be taken from behind the paver.

The Contractor shall obtain a sample of at least 25 kg [**55 pounds**]. This sample may be either split in the field or transported to the test facility by a method to retain heat to facilitate sample quartering procedures. The Contractor shall store and retain mixture bulk samples and companion samples for the Department for a period of 7 working days. The Contractor shall maintain these split samples in containers labeled with companion numbers. The Contractor shall perform QC sampling and testing according to the following schedule.

Determine the planned tonnage for each mixture to be produced during the production day. Divide the planned production by 1000. Round the number to the next higher whole number. This number will be the number of production tests required for that mixture. Required production tests are listed in Table 2360.4-E.

Split the planned production into even increments and select sample locations as described above. If actual tonnage exceeds planned tonnage additional tests may be required. During production, mixture volumetric property tests will not be required when mix production is less than 270 metric tons [**300 tons**]. However, production tests will be required when the accumulative tonnage on successive days exceeds 270 metric tons [**300 tons**].

At the start of production, the testing frequency for the first 1800 metric tons [**2,000 tons**] of each mix type shall be as follows:

Table 2360.4-D
Production Start-Up Testing Rates

Production Test	Testing Rates	Test Reference	Section
Bulk Specific Gravity	1 test per 450 metric tons [**500 tons**]	AASHTO T312,T166 Mn/DOT modified	2360.4E2
Maximum Specific Gravity	1 test per 450 metric tons [**500 tons**]	AASHTO T209 Mn/DOT modified	2360.4E3
Air Voids (calculated)	1 test per 450 metric tons [**500 tons**]	AASHTO T269, T312	2360.4E4
Asphalt Content	1 test per 450 metric tons [**500 tons**]	Bit & Lab Manual	2360.4E1
VMA (Calculated)	1 test per 450 metric tons [**500 tons**]	AI MS 2 & SP 2	2360.4E5
Gradation	1 test per 900 metric tons [**1000 tons**]	AASHTO T11 & T27	2360.4E6
Coarse Aggregate Angularity	1 test per 900 metric tons [**1000 tons**]	ASTM D5821	2360.4E7
Fine Aggregate Angularity (FAA)[1]	1 test per 900 metric tons [**1000 tons**]	AASHTO T304, Method A	2360.4E8

(1) Marshall design allows -4.75mm [-#4] manufactured crushed fines calculation per Mn/DOT Bituminous Manual

E Production Tests

When more than one Mn/DOT approved test procedure is available, the Contractor shall select, with the approval of the Engineer, one method at the beginning of the Project and use that method for the entire Project. The Contractor and Engineer may agree to change test procedures during the construction of the Project.

Table 2360.4-E
Production Sampling and Testing Rates

Production Test	Sampling/Testing Rates	Test Reference	Section
Bulk Specific Gravity	Divide the planned production by 1000. Round the number to the next higher whole number.	AASHTO T312, T245 T166 Mn/DOT mod	2360.4E2
Maximum Specific Gravity	"	AASHTO T209 Mn/DOT modified	2360.4E3
Air Voids (calculated)	"	AASHTO T269, T312	2360.4E4
Asphalt Content	"	Bit & Lab Manual	2360.4E1
VMA (Calculated)	"	AI MS 2 & SP 2	2360.4E5
Gradation	1 gradation per 1,800 metric tons [**2,000 tons**], or portion thereof (minimum of one per day)	AASHTO T11 & T27	2360.4E6
Coarse Aggregate Angularity	2 tests/day for a minimum of 2 days, then 1 per day if CAA is met. If CAA >8% of requirement, 1 sample/day but test 1/week.	ASTM D5821	2360.4E7
Fine Aggregate Angularity (FAA)[1]	2 tests/day for a minimum of 2 days, then 1 per day if FAA is met. If FAA >5% of requirement, 1 sample/day but test 1/week.	AASHTO T304, Method A	2360.4E8
TSR	1st sample at 5,000 tons or by second day of production, then sample at every 18,000 metric tons [**20,000 tons**]	ASTM D4867 Mn/DOT modified	2360.4E9
Aggregate Specific Gravity	1 per 9,000 metric tons [**10,000 tons**]	AASHTO T84 & T85, Mn/DOT modified	2360.4E10
Mixture Moisture Content	Daily unless exempted by Engineer	Mn/DOT 5-693.950	2360.4E11
Asphalt Binder	Sample 1st load (each grade) then 1 per 1,000,000 liter [**250,000 gallon-sample size 1 quart.**]	Mn/DOT 5-693.920	2360.4E12

(1) Marshall design allows -4.75mm [-#4] manufactured crushed fines calculation per Mn/DOT Bituminous Manual

E1 **Asphalt Binder Content**

(a) Spot Check (Virgin only).....Mn/DOT Bituminous Manual
(b) Incinerator Oven [(1)] ..... Mn/DOT Laboratory Manual Method 1853
(c) Chemical Extraction .....Mn/DOT Laboratory Manual Method 1851 or 1852
(d) Meter Method (Virgin only) .....Mn/DOT Bituminous Manual

(1) Incinerator Oven may not be used when the percentage of Class B material exceeds 50% within the composite blend, unless a correction factor is determined by the Contractor and approved by the District Materials Engineer.

E2 **Marshall Bulk Specific Gravity, G_{mb} (3 specimens)....AASHTO T166, Mn/DOT Modified, or**
E2a **Gyratory Bulk Specific Gravity, G_{mb} (2 specimens) .....AASHTO T312, T166, Mn/DOT Modified**

E3 **Maximum Specific Gravity, G_{mm}.....AASHTO T209, Mn/DOT Modified**

E4 **Air Voids - Individual and Isolated (calculation).....AASHTO T269, T312**

Isolated air voids are calculated using the maximum mixture specific gravity and the corresponding bulk specific gravity from a single test. Individual air voids are calculated from the maximum specific gravity moving average and the bulk specific gravity from that single test.

For gyratory design, compaction shall be conducted to $N_{maximum}$ and calculations for $\%G_{mm}$ at $N_{initial}$ and N_{design} shall be determined by applying the calculated correction factor as described in the Asphalt Institute SP 2 manual.

Production control for $\% G_{mm}$ at $N_{initial}$ and $N_{maximum}$ shall not exceed the limit shown in Table 2360.3-B2b by more than 1.0 %. Mixture produced beyond these limits, as measured by the moving average of four tests, may result in a cancellation of the Mix Design Report. A new mix design and submittal that satisfies these specification criteria may be required.

E5 **Voids Mineral Aggregate (VMA) (calculation) ..... Asphalt Institute MS-2, SP-2**

E6 **Gradation - Blended Aggregate.....AASHTO T-11 & T-27**

Testing to determine the blended aggregate gradation shall be determined every 1800 metric tons **[2,000 tons]**, or portion thereof (minimum of one per day), on samples taken at the same time as the required mixture sample for a given increment.

All gradations require a - 0.075 mm [-**#200**] wash.

(a) Virgin Aggregate Mixtures - Drum or Screenless Plants
Belt Samples or extracted production samples.
(b) All Other Mixtures:
1. Hot Bins - Drybatch (Optional)
2. Incinerator Oven Mn/DOT Laboratory Manual Method 1853 (Optional) except samples that contain over 50% class B. [(1)]
3. Extraction Mn/DOT Laboratory Manual Method 1851 or 1852 (Optional)

(1) Incinerator Oven may not be used when the percentage of Class B material exceeds 50% within the composite blend, unless a correction factor is determined by the Contractor and approved by the District Materials Engineer.

E7 Coarse Aggregate Angularity ..... ASTM D5821

CAA test results shall meet the minimum percent fractured faces as shown in Table 2360.3-B2a. ASTM D-5821 shall be used to determine coarse aggregate angularity on the composite blend from aggregates used in production of hot mix asphalt. Mixtures that contain virgin aggregates may be tested from composite belt samples. Mixtures that contain RAP must be tested from extracted aggregates taken from standard production samples. The percentage of fractured faces of the composite aggregate blend less than 100% shall be tested at the following rates:

(1) Perform two tests per day for each mixture blend for a minimum of two days and then one per day if the test samples meet CAA requirements.
(2) If CAA crushing test results exceed 8 percent of the requirement, take one sample per day and perform one test per week.

CAA results must be reported on the test summary sheet. Mixture placed and represented by results below the minimum requirement, as shown in Table 2360.3-B2a, will be subject to reduced payment as outlined in Table 2360.4-L3. Tonnage subjected to reduced payment shall be calculated as the tons placed from the sample point of the failing test until the sampling point when the test result is back within specifications.

E8 Fine Aggregate Angularity ..... ASTM C1252 Method A

E8a - 4.75 mm [-#4] Manufactured Crushed Fines ..... (calculation) Mn/DOT Bituminous Manual

FAA test results shall meet the minimum criteria shown in Table 2360.3-B2a. ASTM C1252 Method A shall be used to determine fine aggregate angularity on the composite blend from aggregates used in production of HMA. Mixtures that contain virgin aggregates may be tested from composite belt samples. Mixtures that contain RAP must be tested from extracted aggregates taken from standard production samples. The percentage of uncompacted voids from the composite aggregate blend shall be tested at the following rates.

(1) Perform two tests per day for each mixture blend for a minimum of two days and then one per day if the test samples meet FAA requirements.
(2) If FAA test results exceed 5 percent of the requirement, take one sample per day and perform one test per week.

FAA results must be reported on the test summary sheet. Mixture placed and represented by results below the minimums, as shown in Table 2360.3-B2a, will be subject to reduced payment as outlined in Table 2360.4-L3. Tonnage is subjected to reduced payment shall be calculated as the tons placed from the sample point of the failing test until the sampling point when the test result is back within specifications.

Under Marshall design, when the -4.75 mm [-#4] crushing is calculated, adjustments in target values from the composite blend must be made at the end of each days paving. If the target quantity (percent of -4.75 mm [-#4] to be crushed) changes due to mixture proportion or composite gradation change, a new target shall be established for the next days paving.

E9 Field Tensile Strength Ratio (TSR) ..... ASTM D4867 Mn/DOT Modified

A TSR sample shall be obtained within the first 4,500 metric tons [**5,000 tons**] of HMA produced or by the second day of production, whichever comes first, to verify tensile strength ratio (TSR). These samples may be tested at the discretion of the District Materials Engineer. If the Materials Engineer requires the samples to be tested, both the Contractor and the Department will be required to test these samples within 72 hours after it is sampled. Sample size shall be 50 kg [**110 pound**] minimum and split in half to provide a sample for the Department and the Contractor. The Department companion of this split shall be labeled with the date, time, Project number and approximate cumulative tonnage to date. The Department companion shall be given to the Department Street Inspector or Plant Monitor immediately or delivered to the District Materials Engineer within 24 hours of sampling, as specified by the Engineer. Mixture samples shall be taken from behind the paver unless the Engineer approves an

alternate sampling location. Specimen size shall be 100 mm [**4 inch**] for Marshall mix design and 150 mm [**6 inch**] for gyratory design The Contractor may test the sample at a permanent lab site or a field lab site.

Additional HMA mixture samples for TSR evaluation shall be sampled at a rate of 1 per 18,000 metric tons [**20,000 tons**] increments for all mixtures produced on the Project. These samples may be tested at the discretion of the District Materials Engineer. If the Materials Engineer requires the samples to be tested, both the Contractor and the Department will be required to test these samples.

Minimum acceptable TSR values for design and production are shown in Table 2360.4-E9. The Contractor shall stop production immediately if minimum TSR requirements are not met. The Contractor will not be allowed to resume production until anti-strip has been added to the asphalt binder. Determination of who is responsible for the cost of the anti-strip is outlined in Tables 2360.4E9A, 2360.4E9B, and 2360.4E9C. When Mn/DOT is responsible for the cost of the anti-strip, payment will be made only for the cost of the anti-strip for mixtures placed on that project. Mn/DOT will not reimburse the Contractor for any delay costs associated with making changes related to this testing.

Table 2360.4-E9

Mixture Type- - Minimum TSR					
LV and MV		Gyratory Traffic Level 2-3		Traffic Level 4-5	
Contractor	Mn/DOT	Contractor	Mn/DOT	Contractor	Mn/DOT
70%	60%	75%	65%	80%	70%

Table 2360.4-E9A

LV and MV Mixtures		**Contractor**	
		≥70	<70
Mn/DOT	≥60	NA	Mn/DOT
	<60	Contractor	Contractor

Table 2360.4-E9B

Gyratory Level 2-3		**Contractor**	
		≥75	<75
Mn/DOT	≥65	NA	Mn/DOT
	<65	Contractor	Contractor

Table 2360.4-E9C

Gyratory Level 4-5		**Contractor**	
		≥80	<80
Mn/DOT	≥70	NA	Mn/DOT
	<70	Contractor	Contractor

Another sample shall be taken and tested within the first 450 metric tons [**500 tons**] after production resumes. If the re-test fails to meet the minimum specified value the Contractor shall stop production immediately. Production cannot resume until the Contractor has discussed, with the Engineer, a proposal for resolving the problem. The Contractor shall not operate below the specified minimum TSR on a continuing basis. A continuing basis shall be defined as 2 or more successive tests failing the TSR requirements.

The following conditions will automatically require a sample to be taken and tested:

1. A proportion change of more than 10 percent (from the currently produced mixture) for a single stockpile aggregate.
2. The discretion of the Engineer.

Dispute resolution procedures for TSR are on file in the Bituminous Office.

E10 Aggregate Specific Gravity (Gsb)..... AASHTO T84 and T85, Mn/DOT modified

Samples of all aggregate stockpiles shall be collected on each aggregate used in the production mixture, at a rate of one sample per 9,000 metric tons [**10,000 tons**] mixture produced. These samples shall be taken at random as directed by the Engineer. These representative stockpile samples shall be 40 kg [**90 pounds**] of each aggregate component. Each sample shall be split in half to provide a sample for the Department and the Contractor. The Department companion shall be labeled with date, time, Project number and approximate cumulative tonnage to date.

The Department companion shall be given to the Department Street Inspector or Plant Monitor immediately or delivered to the District Materials Engineer within 48 hours of sampling, as specified by the Engineer. These samples may be tested. Tested samples will be compared to the Contractor's values on the Mix Design Report. If the results deviate beyond the tolerance specified in Table 2360.4-M, the dispute resolution procedure on file in the Bituminous Office will be utilized. Any mixture placed following notification of new specific gravity values will be based upon Department results unless proven incorrect. The Contractor shall be notified when new specific gravity values become available and what impact this will have on the calculated VMA.

E11 Moisture Content..... Mn/DOT 5-693.950

Provide a mixture with a moisture content not greater than 0.3 percent. The moisture content in the mixture shall be measured behind the paver or alternate approved sampling method on file in the Bituminous Office. Sampling and testing shall be conducted by the Contractor on a daily basis unless exempted by the Engineer. Sampling and testing is suggested when rain on stockpiles exceed more than 5 mm [**0.2 inch**] in a 24 hour period. The sample shall be stored in an airtight container. Microwave testing is prohibited.

HMA that exceeds 0.3% moisture content is unacceptable. The Contractor shall take appropriate action to remove excess water from the mixture. This action may include reducing the production rate, mixing stockpile aggregates prior to placement into the feed bins, and use of covered stockpiles.

E12 Asphalt Binder Samples

The Contractor shall sample the first shipment of each type of asphalt binder, then sample at a rate of one per 1,000,000 liters [**250,000 gallons**]; sample size shall be 1.0L [**1 quart**]. All samples shall be taken in accordance with the Mn/DOT Bituminous Manual 5-693.920. Sampling shall be conducted by Contractor and monitored by the Inspector. Promptly submit the sample to the Department Materials Laboratory in Maplewood. The Contractor shall record sample information on Asphalt Sample Identification Card.

F Documentation (Records)

The Contractor shall maintain documentation, including test summary sheets and control charts, on an ongoing basis. The Contractor shall also maintain a file of gyratory specimen heights for all gyratory compacted samples and test worksheets. Reports, records, and diaries developed during the progress of construction activities for the Project, shall be filed as directed by the Engineer and will become the property of the Department. The Contractor shall:

(1) Number test results in accordance with standard Department procedures and record on forms approved/supplied by the Department.

(2) Facsimile all production test results on test summary sheets to the District Materials Laboratory and to other sites as requested by the Engineer, by 11 AM of the day following production.

(2a) Include the following production test results and mixture information on the Department approved test summary sheet.

1. Percent passing on sieves listed in Table 2360.2-E
2. Coarse and fine aggregate crushing.
3. Maximum specific gravity ($G_{mm.}$).
4. Bulk specific gravity (G_{mb}).
5. Percent asphalt binder content (P_b).
6. Calculated production air voids (V_a). Gyratory design shall also include $\%G_{mm}$ at $N_{initial}$, $\%G_{mm}$ at N_{design}, and % G_{mm} at $N_{maximum}$
7. Calculated voids in mineral aggregate (VMA).
8. Composite aggregate specific gravity (G_{sb}) reflecting current proportions.
9. Aggregate proportions in use at the time of sampling.
10. Tons where sampled.
11. Cumulative tons.

11a. Tons Represented by Test.

12. Fines to effective asphalt ratio (F/A_e).
13. Signature Line for Mn/DOT and Contractor Representative.
14. Mixture Moisture Content.
15. Mn/DOT verification sample test result.

(2b) Submit copies of all failing test results to the Engineer on a daily basis.

(3) Provide the Engineer with asphalt manifests of BOL's on a daily basis.

(4) Provide a daily plant diary to include a description of QC actions taken (adjustment of cold feed percentages, changes in JMFs, etc.) include all changes or adjustments on the test summary sheets.

(5) Provide weekly truck scale spot checks.

(6) Provide a Department approved accounting system for all mixes and provide a daily and final Project summary of material quantities and types.

(6a) Provide a final hardcopy summary of all quality control test summary sheets and control charts at completion of bituminous operations on the Project to the Engineer. Because Certified Plant test data often represents test data for multiple projects, it may be necessary to make duplicate copies of the data for each project. The Contract shall also submit a diskette of the quality control summary sheets, control charts and density worksheets to the Bituminous Engineer.

(7) Furnish an automated weigh scale and computer generated weigh ticket. The ticket shall indicate project number, mix designation (including binder grade), Mixture Design Report#, truck identification and tare, net mass, date and time of loading. Any deviations from the minimum information to be provided on the computer generated weigh ticket must be approved by the Engineer in writing.

(8) Charts and records for a mixture produced at one plant site shall be continued from contract to contract.

G Documentation (Control Charts)

The following data shall be recorded on the standardized control charts, all control charts and summary sheets shall be computer generated using software approved by the Engineer. Software is available from the Mn/DOT Bituminous Office at www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp.

(1) Blended aggregate gradation, include sieves shown in Table 2360.2-E for specified mixture.
(2) Percent asphalt binder content (P_b)
(3) Maximum specific gravity ($G_{mm.}$)
(4) Production air voids (V_a)
(5) VMA

Individual test results shall be plotted for each test point. A solid line shall connect individual points. The moving average for each test variable shall be plotted starting with the fourth test. A dashed line shall connect the moving average points. The Department's quality assurance and verification test results shall be plotted with asterisks. Specification JMF limits shall be indicated on the control charts using a dotted line. The Engineer may waive the plotting of control charts.

H JMF Limits

The production air voids and VMA are based upon the minimum specified requirements as shown in Tables 2360.3-B2b and 2360.3B2c. Gradations and asphalt binder content limits are based upon the current Department reviewed Mixture Design Report. Gradation control sieves include each sieve shown in Table 2360.2-E. The mixture production targets are listed on the Mixture Design Report. JMF limits are the target plus or minus the limits shown in Table 2360.4-H. JMF limits are used as the criteria for acceptance of materials based on the moving average. A moving average is the average of the last four test results.

Table 2360.4-H
JMF Limits (N=4)

Item	JMF Limits
VMA, %	- 0.3
Production Air Voids, %	± 1.0
Asphalt Binder Content, %	- 0.4
Sieve - % Passing*	
25, 19, 12.5, 9.5, 4.75 mm [**1 inch, 3/4 inch, 1/2 inch, 3/8 inch, #4**]	± 7
2.36 mm [**#8**]	± 6
0.075 mm [**#200**]	± 2.0

*JMF limits are not allowed outside the broadband requirements in Table 2360.2-E.

I JMF Bands

JMF Bands are defined as the area between the target, as identified on the Mixture Design Report, and the JMF limits.

J JMF Adjustment

The Contractor shall begin mixture production with the materials (gradation, asphalt content, and aggregate proportions) closely conforming to the reviewed Mixture Design Report. Closely conforming shall be defined as aggregate proportions within 5 percent of the design proportions and other mixture parameters within the JMF limits in Table 2360.4-H. This requirement may be waived if the Contractor provides the District Materials Laboratory with prior documented production data showing how production affects the mixture properties or if the Contractor provides the District Materials Laboratory with a written justification or explanation of material changes since the original mixture submittal.

If, during production, the Contractor determines from results of QC tests that adjustments to the mix design are necessary to achieve the specified properties, the following provisions shall apply.

The Contractor may make a request for a JMF adjustment to the Department Bituminous Engineer or District Materials Engineer. The requested change will be reviewed for the Department by a Certified Level II Bituminous QM Mix Designer. If the request meets the design requirements in Tables 2360.3-B2a and 2360.3-B2b, a revised Mixture Design Report shall be issued. Each trial mixture design submittal as described in Section 2360.3A may have three JMF adjustments per mixture per project without charge. Additional JMF adjustments requested must be accompanied with a $500 fee per each additional JMF adjustment, payable to the Commissioner of Transportation.

If a JMF change is requested for the 0.075 mm [**#200**] sieve, the Fines to Effective Asphalt Ratio shall be determined on the moving average from the previous four gradation tests conducted during actual production. The adjusted JMF shall be within the mixture specification gradation design broadbands shown in Section 2360.2E. Should a redesign of the mixture become necessary, a new JMF shall be submitted. The JMF asphalt content may only be reduced if the production VMA meets or exceeds the minimum VMA requirement for the mixture being produced.

Adjustments will be made as a result of an interactive process between the Contractor, Engineer, and District Materials Engineer. Consecutive requests for JMF adjustments, without production data, are not allowed. The calculation of the moving average shall continue after the JMF has been approved.

J1 JMF Adjustment for Proportion Change > 10%

If a JMF adjustment is requested for a proportion change exceeding 10% (from the currently produced mixture) for a single stockpile aggregate, supporting production test data from a minimum of four tests run at an accelerated testing rate of 1 test per 450 metric tons [**500 tons**] must be included with the request for adjustment. In addition to the requirements listed above, acceptable verification and approval of the requested JMF will be based on individual and moving average test results. Individual test results must be within twice the requested JMF limits for percent asphalt binder, production air voids, and VMA. Individual gradation must be within twice the requested JMF bands. The moving average values must be within the control limits of Table 2360.4-H . The calculation of the moving average shall continue after the change in proportions.

If the mixture meets the specified quality indicators, the request for JMF adjustment will be signed by the District Materials Laboratory and considered effective from the point the proportion change was made. Failure to meet the quality indicators will result in reduced payment or removal and replacement with acceptable material. Consecutive requests for JMF adjustments without production data is not allowed.

K Corrective Action – Percent Asphalt Binder Content, VMA, and Gradation and Production Air Voids

When the moving average values trend toward the JMF limits, the Contractor shall take corrective action. The corrective action taken shall be documented on summary sheets and, if applicable, a request for JMF adjustment shall be submitted to the District Materials Engineer for review and approval. All tests shall be part of the project files and shall be included in the moving average calculations. The Contractor shall notify the Engineer whenever the moving average values exceed the JMF limits.

L Failing Materials

The determination of price adjustments for failing materials will be based on the criteria outlined in this Section. Material acceptance is based on individual and moving average test results. Isolated test results are used for acceptance of air voids at the start of mixture production. Generally, individual test results which are more than twice the JMF bands are considered failing. Moving average test results are considered failing when they exceed the JMF limits.

If the moving average values exceed the JMF limits, the Contractor shall stop production and make adjustments. The Contractor shall restart production only after notifying the Engineer of the adjustments that have been made. Testing shall resume at the accelerated rates and for the tests listed in Table 2360.4-D for the next 1800 metric tons [**2,000 tons**] of mixture produced. The calculation of the moving average shall continue after the stop in production.

Mixture produced where the moving average of four exceeds the JMF limits shall be considered unsatisfactory and subject to requirements of Section 2360.4L2, L2a, L2b, and L2c. Individual test failures are discussed in Section 2360.4L1, L1a, and L1b.

When the total production of a mixture type for the entire project requires less than four tests, a moving average will be established based on the tests taken. Acceptance of material will be consistent with the

criteria outlined in Section 2360.4L and will be based on the following modifications to the JMF limits: For two tests, establish the new JMF limits by multiplying the JMF limits listed in Table 2360.4-H by 1.41; for three tests, establish the new JMF limits by multiplying the JMF limits listed in Table 2360.4-H by 1.15. For moving average gradation, the modified JMF limit cannot exceed the broadband requirements in Table 2360.2-E.

When the Contractor's testing data fails to meet specified tolerances as listed in Table 2360.4-M, quality assurance/verification data shall be used in place of the Contractor's data to determine the appropriate payment factor.

L1 Isolated Failures at Mixture Start-Up – Production Air Voids

At the start-up of mixture production, before a moving average of four can be established the first three (3) isolated test results for production air voids will be used for acceptance. Isolated production air voids are calculated by using the maximum mixture specific gravity and the corresponding bulk specific gravity from that single test. After four (4) samples have been tested and a moving average of four can be established, acceptance will be based on individual and moving average production air voids.

If, at the start of production, any of the first three (3) isolated test results for production air voids exceeds twice the JMF bands from the target listed on the Mixture Design Report, the material is considered unsatisfactory or unacceptable. Reduced payment as outlined in Table 2360.4-L1b shall apply to all tonnage placed from the sample point of the failing test until the sample point when the isolated test result is back within twice the JMF bands. When the failure occurs at the first test, after the start of production, the tonnage subjected to reduce payment shall be calculated as described above and shall include the tonnage from the start of production.

When isolated air voids are less than 1.0% or greater than 7.0% the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. To better define the area to be removed and replaced the Engineer may require the Contractor to test inplace mixture. This may include testing mixture placed prior to the failing test result. Reduced payment will be 50 percent of the Contract bid price.

L1a Individual Failure at Mixture Start-Up – VMA

At the start-up of mixture production, before a moving average of four can be established, the first three (3) individual test results for VMA will be used for acceptance. After 4 samples have been tested and a moving average of four can be established, acceptance will be based on individual and moving average VMA.

If, at the start of production, any of the first three (3) individual VMA test results exceeds twice the JMF bands from the target listed on the Mixture Design Report, the material is considered unsatisfactory or unacceptable. Reduced payment as outlined in Table 2360.4-L1b shall apply to all tonnage placed from the sample point of the failing test until the sample point when the test results are back within twice the JMF limits. When the failure occurs at the first test, after the start of production, the tonnage subjected to reduce payment shall be calculated as described above and shall include the tonnage from the start of production.

L1b Individual Failure - Gradation, Percent Asphalt Binder, Production Air Voids, and VMA

Table 2360.4- L1b
Reduced Payment Schedule for Individual Test Results

Item	Pay Factor [1]
Gradation	95 %
Coarse and Fine Aggregate Crushing	90 %
VMA	85 %
Asphalt Binder Content	85 %
Production Air Voids (individual [2] and isolated [3])	70 %

(1) Lowest Pay Factor applies when there are multiple reductions on a single test.
(2) Individual air voids are calculated using the moving average maximum specific gravity and the bulk specific gravity from that single test.
(3) Isolated air voids are calculated from the maximum specific gravity and the bulk specific gravity from that single test. Isolated void test results are used for acceptance only for the first 3 tests after mixture production start-up.

If the individual gradation test exceeds twice the JMF bands from the target listed on the Mixture Design Report the material is considered unsatisfactory or unacceptable. Reduced payment as outlined in Table 2360.4-L1b shall apply to all tonnage represented by the individual test.

If the individual tests for percent asphalt binder content, production air voids, or VMA exceeds twice the JMF bands from the target listed on the Mix Design Report the material is considered unsatisfactory or unacceptable. Reduced payment as outlined in Table 2360.4-L1b shall apply to all tonnage placed from the sample point of the failing test until the sample point when the test result is back within twice the JMF limits. When the failure occurs at the first test after the start of daily production, tonnage subjected to reduced payment shall be calculated as described above and shall include the tonnage from the start of production.

When individual air voids are less than 1.0% or greater than 7.0% the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. To better define the area to be removed and replaced the Engineer may require the Contractor to test inplace mixture. This may include testing mixture placed prior to the failing test result. Reduced payment will be 50 percent of the Contract bid price.

L2 Moving Average Failure at Mixture Start-Up - Production Air Voids

When a moving average failure occurs within any of the first 3 moving average results after mixture start-up (tests 4, 5, 6), the mixture will be considered acceptable if the individual air void, corresponding to the moving average failure is within the JMF limits. If the individual air void is not within the JMF limit, the mixture will be considered unacceptable and the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. The Engineer may waive the penalty if the isolated air void corresponding to the individual air void is within the JMF limit. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. Reduced payment will be 50 percent of the Contract bid price. Tonnage subjected to replacement or reduced payment shall be calculated as the tons placed from the sample point of the failing moving average result and corresponding individual air void beyond the JMF limit to the sampling point when the individual test result is back within the JMF limit.

L2a Moving Average Failure at Mixture Start-Up - VMA

When a moving average failure occurs within any of the first 3 moving average results after mixture start-up (tests 4, 5, 6), the mixture will be considered acceptable if the individual VMA, corresponding to the moving average failure is within the JMF limits. If the individual VMA is not within the JMF limit, the mixture will be considered unacceptable and the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. Reduced payment will be 75 percent of the Contract bid price. Tonnage subjected to replacement or reduced payment shall be calculated as the tons placed from the sample point of the failing moving average result and corresponding individual VMA beyond the JMF limit to the sampling point when the individual test result is back within the JMF limit.

L2b Moving Average Failure - Production Air Voids

A moving average production air void failure occurs when the individual production air void moving average of four exceeds the JMF limit. This mixture is considered unacceptable and the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. Reduced payment will be 50 percent of the Contract bid price. Tonnage subjected to replacement or reduced payment shall be calculated as the tons placed

from the sample point of all individual test results beyond the JMF limits which contributed to the moving average value that exceeded the JMF limit to the sampling point when the individual test result is back within the JMF limits.

Table 2360.4-L2b
Reduced Payment Schedule for Moving Average Test Results

Item	Pay Factor [1]
Gradation	75 %
Coarse and Fine Aggregate Crushing	See Individual Failure
VMA[2]	75 %
Asphalt Binder Content	75 %
Production Air Voids[2]	50 %

(1) Lowest Pay Factor applies when there are multiple reductions on a single test.
(2) See criteria for mixture production start-up

L2c Moving Average Failure - Percent Asphalt Binder Content, VMA, and Gradation

For mixture properties including asphalt binder content, VMA, and gradation, where the moving average of four exceeds the JMF limits, the mixture is considered unacceptable and the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. If the mixture is to be removed and replaced, the Contractor at his expense will perform the work. Reduced payment will be 75 percent of the Contract bid price. Tonnage subjected to replacement or reduced payment shall be calculated as the tons placed from the sample point of all individual test results beyond the JMF limits which contributed to the moving average value that exceeded the JMF limit, to the sampling point when the individual test result is back within the JMF limits.

L3 Coarse and Fine Aggregate Crushing Failure

If any test result for Coarse Aggregate Angularity, Fine Aggregate Angularity or -4.75mm [- #4] calculated crushing fail to meet minimum requirements in Table 2360.3-B2a, all material placed is subject to reduced payment as outlined in Table 2360.4-L1b. Tonnage subjected to reduced payment shall be calculated as the tons placed from the sample point of the failing test until the sampling point when the test result is back within specifications.

M Quality Assurance

The Engineer will periodically witness the sampling and testing being performed by the Contractor. If the Engineer observes that the sampling and quality control tests are not being performed in accordance with the applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will notify the Contractor of observed deficiencies promptly, both verbally and in writing.

The Engineer may obtain additional samples, at any time, to determine quality levels. These additional samples or verification samples are described in Section 2360.4N. For mixture, the Contractor shall test their portion immediately.

All testing and data analysis shall be performed by the Certified Level I Bituminous Quality Management (QM) Technician. Certification shall be in accordance with the Mn/DOT Technical Certification Program. The Department shall post a chart giving the names and telephone numbers for the personnel responsible for the Quality assurance program.

The Engineer shall calibrate and correlate all laboratory testing equipment in accordance with the latest version of the Mn/DOT Bituminous Manual.

Table 2360.4-M
Allowable Differences (Tolerances) Between Contractor and Mn/DOT Test Results*

Item	Allowable Difference
Mixture Bulk Specific Gravity (G_{mb})	0.030
Mixture Maximum Specific Gravity (G_{mm})	0.019
VMA (Calculated)	1.2
Fine Aggregate Angularity, uncompacted voids (U) %	1
Coarse Aggregate Angularity, % fractured faces (%P)	15
Aggregate Individual Bulk Specific Gravity (+4.75mm [+ #4])	0.040
Aggregate Individual Bulk Specific Gravity (-4.75mm [- #4])	0.040
Aggregate combined blend Specific Gravity (G_{sb})	0.020
Tensile Strength Ratio (TSR) %	See Table 2360.3-B2b
Asphalt Binder Content	
Meter Method, %	0.2
Spot Check Method, %	0.2
Chemical Extraction Methods, %	0.4
Incinerator Oven, %	0.3
Chemical vs. Meter, Spot Check, or Incinerator methods	0.4
Incinerator Oven vs. Spot Check	0.4
Gradation Sieve % passing	
25.0, 19.0, 12.5 9.5 mm [**1 inch, 3/4 inch, 1/2 inch, 3/8 inch**]	6
4.75 mm [**#4**]	5
2.36 mm [**#8**]	4
0.075 mm [**#200**]	2.0

*Test tolerances listed are for single test comparisons.

N Verification Testing

A verification sample is a sample, which is sampled and tested by Mn/DOT to assure compliance of the Contractor's Quality Control program. A verification companion is a companion sample, to Mn/DOT's verification sample, provided to the Contractor. The Contractor is required to test and use this verification companion sample as part of the QC program. The verification companion sample will replace the next scheduled QC sample. It is recommended enough material be sampled to accommodate retesting should the samples fail to meet requirements as described below.

Verification testing shall be performed on at least one set of production tests Section 2360.4E, excluding sections E9, E10, E11, and E12, on a daily basis per mix type. The verification companion sample will be used to verify the requirements of Tables 2360.2-E, 2360.3-B2a, 2360.3-B2b, and 2360.3-B2c and will be compared to the Verification sample for compliance with allowable tolerances as specified in Table 2360.4-M. These include the mixture properties of G_{mm} (mixture max gravity), G_{mb} (mixture bulk gravity), asphalt binder content, VMA (calculated), Coarse and Fine Aggregate crushing, and gradation. For Coarse and Fine Aggregate crushing that meets the requirements of Section 2360.4E7 and 2360.4E8 the one test per week shall be performed on a verification companion. These do not include the aggregate bulk specific gravity G_{sb}, fines to effective asphalt, or the tensile strength ratio (TSR). Asphalt binder content and gradation must be determined by either extraction method 2360.4E1b or 2360.4E1c. Asphalt content from the verification test result must be used to determine VMA.

The Department's verification test results will be available to the Contractor within 2 working days from the time the sample is delivered to the District Laboratory for Gmm mixture max gravity, Gmb mixture bulk gravity, air voids (calculated), asphalt binder content, VMA (calculated). Gradation and crushing results will be provided to the Contractor within 3 Mn/DOT working days. Once the verification test results are available, they will be included on the test summary sheet. These results and those from the Contractor's verification companion will be compared for allowable tolerances as specified in Table 2360.4-M. If the tolerances are met, the verification process is complete.

If the tolerances between Department and Contractor are not met, retests of the material shall be conducted by the Department. If the retests fail to meet tolerances, the Department's verification test results will be substituted for the Contractor's results in the QC program and used for acceptance. Only those parameters out of tolerance will be substituted and, if applicable, volumetric properties will be recalculated (1).

When tolerances from the verification sample retests are not met, an investigation will begin immediately to determine the cause of the difference. Testing equipment, procedures, worksheets, gyratory specimen height sheets, and personnel will be reviewed to determine the source of the problem. The District Materials Engineer may also require a hot-cold comparison of mixture properties be performed. The procedure for hot-cold comparisons is as follows:

> The hot-cold comparison sample will be split into three representative portions. The Engineer will observe the Contractor testing the sample. One part shall be compacted immediately while still hot (additional heating maybe required to raise the temperature of the sample to compaction temperature). The second and third part will be allowed to cool to air temperature. The Contractor will retain the second part and the third part will be transported to the District Materials Laboratory. On the same day and at approximately the same time the Contractor and the District Materials Laboratory will heat their samples to compaction temperature and compact them. From this information a calibration factor will be developed to compare the specific gravity of the hot compacted samples to reheated compacted samples. Each test will involve a minimum of three Marshall specimens or two gyratory specimens. This test may be repeated at the discretion of the Contractor or the District Materials Engineer.

Note: Care must be taken when reheating samples for mixture properties analysis tests. Mix samples should be reheated to 70°C [**160°F**] to allow splitting of the sample into representative fractions for the various tests. Overheating of the mixture portions to be tested for maximum specific gravity (Rice Test) may result in additional asphalt being absorbed in the aggregate.

The Department will test the previously collected QA samples until they meet the tolerances or the remaining samples are all tested. Once these samples are tested, the department will test QA samples subsequent to the verification sample until tolerances are met. Acceptance will be based on QC data with substitution of Department test results for those parameters out of tolerance (1). If reestablishment of test result tolerances is not achieved within 48 hours, the Contractor shall cease mixture production and placement until the problem is resolved.

(1) If, through analysis of data, it is determined there is a bias in the test results, the Engineer will determine which results are appropriate and shall govern.

2360.5 CONSTRUCTION REQUIREMENTS

A General

The following construction requirements provide for the construction of all courses. When construction is under traffic, the requirements of Mn/DOT 2221.3D will apply.

B Restrictions

In general, no work within the roadway will be permitted in the spring until seasonal load restrictions on roads in the vicinity have been removed. However, work within the roadbed may be permitted before that time if, in the opinion of the Engineer, it can be done without damage to the subgrade. HMA shall not be placed when, in the opinion of the Engineer, the weather or roadbed conditions are unfavorable.

No asphalt pavement wearing course (final wearing course if multiple wearing courses) shall be placed after October 15th in that part of the state north of an east-west line between Browns Valley and Holyoke, nor after November 1st south of that line. The Engineer may waive these restrictions when:

(1) The asphalt mixture is not being placed on the traveled portion of the roadway, or

(2) The roadway involved will not be open to traffic during the following winter, or

(3) The Engineer directs in writing the mixture be placed.

The Contractor shall not use petroleum distillates such as kerosene and fuel oil to prevent adhesion of asphalt mixtures in pavement hoppers, truck beds, or on the contact surfaces of the compaction equipment. Anti-adhesive agent must meet the criteria for "Effect on Asphalt" as described in the most recent Asphalt Release Agent Report on file in Mn/DOT's Office of Environmental Services and the Bituminous Office.

C Equipment

C1 Asphalt Mixing Plants

C1a Requirement for All Plants

The Contractor shall test and calibrate all scales according to Mn/DOT 1901, except as otherwise designated by the Contract.

C1a(1) Equipment for the Preparation of the Aggregate

Add mineral filler to the mixture using a storage silo equipped with a device to ensure a constant and uniform feed.

C1a(2) Equipment for the Preparation of Asphalt Material

Tanks for storage of asphalt material at the plant shall be equipped to heat the material and maintain the material at the required temperatures. The discharge end of the circulating line shall be below the surface of the asphalt material. Provide agitation for modified asphalt, when used, if recommended by the supplier.

An outage table or chart and measuring stick shall be provided for each storage or working tank. Tanks shall be equipped with provisions for taking of asphalt binder material samples. After delivery of asphalt binder material to the Project, the Contractor shall not heat the material above 175°C [**350°F**]. For modified asphalt, the maximum storage temperature shall not exceed the recommendation of the asphalt supplier.

C1a(3) Asphalt Binder Control

When asphalt binder material is proportioned by volume, the plant shall be equipped with either a working tank or a metering system for determining asphalt binder content of the mixture.

The working tank shall have a capacity between 3,800 L [**1,000 gallons**] and 7,600 L [**2,000 gallons**]. The working tank shall be calibrated and supplied with a calibrated measuring stick. The tank may be connected to a mixing unit and used only during spot check operations, but it shall be available at all times. Any feedback shall be returned to the working tank during spot check operations.

The metering system shall consist of at least one approved asphalt binder flow meter in addition to the asphalt binder pump. The flow meter shall be connected to the asphalt binder supply to measure and display only the asphalt binder being fed to the mixer unit. The meter readout shall be positioned for convenient observation. Means shall be provided for comparing the flow meter readout with the calculated output of the asphalt binder pump. In addition, the system shall display in liters [gallons] or to the nearest 0.001 metric tons [**0.001 tons**], the accumulated asphalt binder quantity being delivered to the mixer unit. The system shall be calibrated and adjusted to maintain an accuracy of $\pm$ one percent error. This calibration shall be required for each plant set-up prior to production of mixture.

C1a(4) Dryer: The aggregate shall be free of unburned fuel.

C1a(5) Thermometric Equipment:

The plant shall be equipped with a sufficient number of thermometric instruments to ensure temperature control of the aggregate and the asphalt binder material.

C1a(6) Pollution Controls

C1a(6)(a) Pollution.....1717

C1a(7) Surge and Storage Bins

The plant may include facilities to store hot asphalt mixture for coordinating the rate of production with the paving operations. Storage of the hot mixture will be permitted for a period not to exceed 18 hours, provided the following requirements are met:

(a) Hot mix storage facilities shall be designed and operated to prevent segregation of the mix, drainage of the asphalt from the mix, and to prevent excessive cooling or overheating of the mixture.

(b) The temperature of the mixture at time of discharge from the storage facility shall be within a tolerance of 5°C [9°F] of the temperature when discharged from the silo or mixer.

C2 Placement and Hauling Equipment

All equipment shall be serviced away from the paving site to prevent contamination of the mixture. Units that drip fuel, oil, or grease shall be removed from the paved surface until such leakage is corrected.

C2a Asphalt Pavers

Asphalt pavers shall be self-contained, power-propelled units, with an operational vibratory screed, capable of spreading and finishing courses of asphalt plant mix material in widths applicable to the specified typical sections and thicknesses, indicated in the Contract.

The screed or strike-off assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging. For mainline paving, screed extensions and auger extensions are required if the paving width on either side of the paver is greater than the basic screed unless otherwise directed by the Engineer. Strike-off only extension assemblies are not allowed for mainline wearing course paving, unless directed by the Engineer.

Automatic screed control by means of an erected string line shall only be required when stated in the Contract.

All pavers shall be equipped with an approved automatic screed control. The automatic controls shall include a system of sensor-operated devices, which follow reference lines, or surfaces on one or both sides of the paver as required. The speed of the paver shall be adjusted to produce the best results.

All mixtures shall be spread without segregation to the cross sections shown in the plans. In general, leveling layers shall be spread by the method producing the best results as approved by the Engineer. The objective is to secure a smooth base of uniform grade and cross section so that subsequent courses will be uniform in thickness. The leveling layer may be spread with a properly equipped paver or, when approved by the Engineer, a motor grader equipped with a leveling device, or with other means for controlling the surface elevation of the leveling layer.

All mixtures shall be spread, to the fullest extent practicable, by an asphalt paver. When approved by the Engineer, mixtures may be spread by a motor grader in areas that are inaccessible to a paver such as on driveway entrances, irregular areas, short isolated areas or when the quantity of mixture makes it impractical to place with a paver.

On shoulder surfacing and uniform width widening, when the placement width is too narrow for a paver, the mixture in each course shall be spread with an approved mechanical device.

The placement of each course shall be completed over the full width of the section under construction on each day's run unless otherwise directed by the Engineer.

C2b Trucks

Trucks for hauling asphalt mixtures shall have tight, clean, and smooth beds. Mixture shall not be allowed to adhere to the truck beds. Adherence may be prevented by spraying the truck bed with an anti-adhesive agent in accordance with Section 2360.5B. Each truck shall be equipped with a cover of canvas or other suitable material to protect the mixture from weather. The cover shall extend at least 300 mm [**1 foot**] over the sides and be attached to tie-downs unless the truck is furnished with a mechanical or automated covering system, which prevents airflow underneath by stretching the cover tightly on the top of or inside the sideboards. The cover shall be used when directed by the Engineer.

C2c Motor Graders

Motor graders shall be self-propelled and have pneumatic-tires with a tread depth of 13 mm [**1/2 inch**] or less. They shall be equipped with a blade not less than 3 m [**10 feet**] in length and shall have a wheelbase of not less than 4.5 m [**15 feet**].

D Treatment of the Surface

D1 Tack Coat

An asphalt tack coat shall be applied to existing asphalt and concrete surfaces, and to the surface of each course or lift constructed, except for the final course or lift, according to Mn/DOT 2357. Emulsified asphalt tack coats shall be allowed to break, as indicated by a color change from brown to black, before a subsequent lift is placed.

The contact surfaces of all fixed structures and the edge of the in-place mixture in all courses at transverse joints and longitudinal joints shall be given a uniform but not excessive coating of liquid asphalt or emulsified asphalt before placing the adjoining mixture.

E Compaction Operations

After being spread, each course shall be compacted to the required density. The rollers shall, as practicable, be operated continuously so all areas are thoroughly compacted to the required density. When not operating, the rollers shall not stand on the uncompacted mixture or newly rolled pavement having a surface temperature exceeding 60°C [**140°F**]. Rolling with steel-wheeled rollers shall be discontinued if it produces excessive crushing or pulverizing of the aggregate or displacement of the mixture.

To prevent adhesion of the mixture to the steel roller wheels, the contact surfaces of the wheels shall be kept properly moistened using water or a water solution containing small quantities of a detergent or other approved material.

To secure a true surface, variations such as depressions or high areas, which may develop during rolling operations, and lean, fat or segregated areas shall be corrected by removing and replacing the material in the defective area. All such corrections shall be accomplished as directed by the Engineer at no expense to the Department.

When mixtures are spread by a motor grader, pneumatic-tired rollers shall compact the mixture simultaneously with the spreading operation.

F Construction Joints

Joints shall be thoroughly compacted to produce a neat, tightly bonded joint that meets surface tolerances. Both transverse and longitudinal joints are subject to density requirements as outlined in Section 2360.6 Pavement Density.

F1 Transverse Joints

A transverse joint (full paver width at right angles to the centerline) shall be constructed when mixture placement operations are suspended. The forward end of the freshly laid strip shall be thoroughly compacted by rolling before the mixture has cooled. When work is resumed, the end shall be cut vertically for the full depth of the layer unless a formed edge is constructed as approved by the Engineer.

F2 Longitudinal Joints

Longitudinal joints between strips shall be parallel to the centerline. In multiple lift construction, the longitudinal joints between strips in each lift shall be constructed not less than 150 mm [**6 inches**] measured transversely from the longitudinal joints in the previously placed lift. When the wearing course is constructed in an even number of strips, one longitudinal joint shall be on the centerline of the road. When it is constructed in an odd number of strips, the centerline of one strip shall be on the centerline of the road, provided that no joint is located in the wheel path area of a traffic lane. Longitudinal joints in multiple lift construction over Portland cement concrete pavements may be aligned directly over the concrete pavement longitudinal joints at the discretion of the Engineer.

At longitudinal joints formed by placing multiple strips, the adjoining surface being laid shall, after final compacting, be slightly higher (but not to exceed 3 mm [**1/8 inch**]) than the previously placed strip. When constructing a strip adjoining a previously placed strip or a concrete pavement, any fresh mixture that overlaps a previously placed strip or pavement shall be removed (to the longitudinal joint line) before any rolling is done.

G Asphalt Mixture Production (FOB Department Trucks)

For asphalt mixture production, the Contractor shall, in addition to the asphalt mixture required on the Project, produce and deliver asphalt mixture to the Department. The mixture shall be the mixture being produced and shall be loaded on Department furnished trucks at the mixing plant at a time agreed on by the Engineer and Contractor. The Engineer will notify the Contractor of the total quantity of mixture desired not less than 2 weeks prior to completion of the wearing course construction. The Engineer will not accept the asphalt mixture if it is inappropriate for the Department's intended use.

H Small Quantity HMA Paving

Unless otherwise indicated in the Special Provisions, the following provision for a small quantity of asphalt mixture shall apply.

A Mixture Design Report is not required for planned project quantities less than 191,200 m^2 mm [**9,000 square yard inches [4,500 square yards per 2 inch thickness, etc**]) or 450 metric tons [**500 tons**]. However, the Contractor shall verify in writing the asphalt mixture delivered to the project meets the requirements of Table 2360.3-B2a and Table 2360.3B2b. The Department will obtain samples, as determined by the Engineer, to verify percent design air voids and gradation. These results will be used for material acceptance. Air voids will be subject to the requirements of Section 2360.4L1b for isolated air voids and a gradation falling outside the requirements of Table 2360.2-E will be subject to payment as indicated in Table 2360.4-L2b.

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.

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, Table 2360.6-B2, for the applicable mixture and course.

B1 Maximum Density Determination

The Density requirements listed in Table 2360.B2 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 D1188, Mn/DOT modified. ASTM D6752 Mn/DOT modified (Corelok) is also allowed for determination of bulk specific gravity of coarse graded mixtures. Selection of the test method to determine coarse graded mixture bulk specific gravity shall be agreed upon at the time of mix design submittal. 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 both gyratory (SP) and Marshall designed mixtures are listed in Table 2360.6-B2.

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, the lot tonnage placed on the shoulder shall be delineated in separate lots from the driving lanes for the day paving was conducted.

A narrow 0.6 to 1.2 meter [**2 to 4 foot**] wide shoulder that is paved in the same pass as a driving lane will normally 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 Density

	SP Wear and All MV and LV Mixtures (1)(2)	SP Nonwear (1)(2)	SP Shoulders (1)(2)	
Location from surface*	≤ 100 mm [4 **inch**]**	> 100 mm [4 **inch**]**	Designed at 3% voids	Designed at 4% voids
% Gmm	92.0	93.0	93.0	92.0

* SP Mixtures only
** If less than 25% of a layer is within 100 mm [**4 inches**] of the surface, the layer may be considered to be below 100 mm [**4 inches**] for mix design purposes.

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).

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
33,276 – 4,54	[**5,601 – 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**].

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 three cores in each lot. Two cores will be taken from random locations selected by the Engineer. The third core, a companion core, shall be taken within 0.3 meters [**1 foot**] longitudinally from either of the first two cores. The 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. Both transverse and longitudinal joints are subject to maximum density requirements. If the random core location falls on an unsupported joint, at the time of compaction, (the edge of the mat being placed does not butt up against another mat, pavement surface, etc.) cut the core with the outer edge of the core barrel 0.3 meters [**1 foot**] away (laterally) from the edge of the top of the mat

(joint). If the random core location falls on a confined joint (edge of the mat being placed butts up against another mat, pavement surface, curb and gutter, or fixed face), cut with the outer edge of the core barrel 150 mm ± 12.5 mm [**6 inches ± 0.5 inch**] from the edge of the top of the mat (ex. center of 100 mm [**4 inch**] core barrel 200 mm ± 12.5 mm [**8 ± 0.5 inches**] from the edge of the top of the mat). Cores will not be taken within 300 mm [**1 foot**] of any unsupported edge The Contractor 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.

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

If the Department companion core test result for bulk specific gravity (G_{mb}) deviates beyond the allowable tolerance of 0.030, substitute Department companion result for Contractor's core result and then average the Department result with the non-companion result for the lot density acceptance. If, through analysis of data, it is determined there is a bias in the test results, the Engineer will determine which results are appropriate and shall govern.

If the G_{mb} tolerance fails in more than 2 lots in a day of either consistently high or low differences between the companion cores then an investigation to determine the source of errors shall be conducted. Companion cores samples shall be increased to two per lot and tested until investigation is complete and tolerances are met.

The Engineer may allow recoring 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.

B5 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 if the determined bulk specific gravity G_{mb} from AASHTO T-166, Mn/DOT modified or ASTM D1188 is within $\pm$ 0.030 of the state companion G_{mb} value. Payment for lot densities of compacted mixture shall be determined from Table 2360.6-B5 or 2360.6-B5A. Incentive and disincentive payments are for both wearing and non-wearing courses.

When the first lift 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-B5A. 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-B5, 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. 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-B5, 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-B5
Payment Schedule for Maximum Density

Percent of Max Specific Gravity [2] SP Wear (≤100 mm [4 **inches**] from Surface) All MV & LV , SP Shld (4% Void)	Percent of Max Specific Gravity [2] SP Non-Wear (>100 mm [4 **inches**] from Surface) SP Shoulders (3% Void)	Percent Payment
93.6 and above	94.6 and above	104 [3]
93.1 - 93.5	94.1 - 94.5	102 [3]
92.0 - 93.0	93.0 - 94.0	100
91.0 - 91.9	92.0- 92.9	98
90.5 - 90.9	91.5 - 91.9	95
90.0 - 90.4	91.0 - 91.4	91
89.5 - 89.9	90.5 - 90.9	85
89.0 - 89.4	90.0 - 90.4	70
Less than 89.0 [4]	Less than 90.0	[4]

Table 2360.6-B5A [1]
1% Reduced Table

Percent of Max Specific Gravity [2] SP Wear (≤100 mm [4 **inches**] from Surface) All MV & LV , SP Shld (4% Void)	Percent of Max Specific Gravity [2] SP Non-Wear (>100 mm [4 **inches**] from Surface) 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]

(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.

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

(3) The payment in this portion of the specification shall only apply if the individual production air voids, as determined from a mixture production test (2360.4E) that represents the tonnage placed at that specific core location, are within - 0.5 percent of the target value.

(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 material shall be removed and replaced by the Contractor at their expense with mixture that meets the density requirements; or the Engineer may permit the unacceptable material to remain inplace with a 50% pay factor. The limits of the area to be removed 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-B5 or 2360.6-B5a, whichever applies. There will be no payment for the material removed. The remainder of the original lot shall have a 70% pay factor.

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 [**1.5 inches**], thin lift leveling, wedging layers, patching layers, driveways, areas which cannot be compacted with standard highway construction equipment. This compaction method shall not be used on mainline, ramp, or loop paving, unless otherwise designated. 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. 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.

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.

2360.7 THICKNESS AND SURFACE SMOOTHNESS REQUIREMENTS

A Thickness

After compaction the thickness of each course shall be within a tolerance of 6 mm [**1/4 inch**] of the thickness shown in the Plans, except that, if automatic grade controls are used, this thickness requirement will not apply to the first course placed. This thickness requirement will not apply to a leveling course whether or not automatic grade controls are required. Any part of any course that is constructed to less than the minimum required thickness may be removed and replaced at the discretion of the Engineer.

On that portion of any course constructed to more than the maximum permissible thickness, the materials used in the excess mixture above that required to construct that portion of the course to the Plan thickness plus 6 mm [**1/4 inch**] will be excluded from the pay quantities and may require removal and replacement at the discretion of the Engineer.

Cores taken for density determination shall be measured for thickness also. Each core shall be measured 3 times for thickness prior to sawing. Report the average of these three measurements. Each lot's average core thickness shall be documented and submitted to the Engineer. If the average of the two Contractor cores exceed the specified tolerance, an additional two cores may be taken in the lot in question. The average of all core thickness measurements per course will be used to determine compliance with thickness specifications.

B Surface Requirements

After compaction, the finished surface of each course shall be reasonably free of segregated, open and torn sections, and shall be smooth and true to the grade and cross section shown on the Plans with the following tolerances:

(1) Where a leveling course is specified, it shall be constructed to within a tolerance of 15 mm [**1/2 inch**] of the elevations and grades established by the Engineer. This requirement shall also apply to the first course placed other than leveling when automatic controls are used.

(2) The surface of the Non-wear course and wearing course shall show no variation greater than 3 mm [**1/8 inch**] from the edge of a 3 m [**10 foot**] straightedge laid parallel to or at right angles to the centerline. Shoulder surfacing and surfacing on temporary connections and bypasses shall show no variations greater than 6 mm [**1/4 inch**] from the edge of a 3 m [**10 foot**] straightedge laid parallel to the centerline.

(3) After final compaction, all asphalt wearing course surfaces adjacent to concrete pavements shall be slightly higher (but not to exceed 6 mm [**1/4 inch**] than the concrete surface.

After final compaction, all asphalt surfaces adjacent to gutters, manholes, pavement headers, or other fixed structures shall be slightly higher (but not to exceed 6 mm [**1/4 inch**] than the surface of the structure.

(4) The transverse slope of the surface of each course, exclusive of the shoulder wearing course, shall not vary from the slope shown in the Plans by more than 0.4 percent.

(5) The distance between the edge of each course and the established centerline shall be no less than the Plan distance nor more than 75 mm [**3 inches**] greater than the Plan distance. In addition, the edge alignment of the wearing course on tangent sections and on curve sections of 3 degrees or less shall not deviate from the established alignment by more than 25 mm [**1 inch**] in any 7.5 m [**25 foot**] section.

(6) The finished surface of each course shall be reasonably free of segregated and open and torn sections.

Any material placed outside the above described limitations shall be removed and replaced after being cut or sawed at no expense to the Department or with the approval of the Engineer, allowed to remain inplace at a reduced cost calculated at $12 per square meter [**$10 per square yard**].

C Pavement Smoothness

C1 General

Pavement smoothness will be evaluated on the final mainline pavement surface. Projects will be evaluated utilizing a 5 mm [**0.2 inch**] blanking band. The following table shows pavement surfaces, which are excluded from profilograph testing, but subject to Section 2360.7B surface requirements.

Table 2360.7-C1
Profilograph Testing Exclusions

Pavement Surfaces Excluded From Profilograph Testing
Ramps, Loops, Climbing Lanes
Side Streets, Side Connections
Turn Lanes, Storage Lanes, Crossovers, Bypass Lanes
Shoulders
Acceleration, Deceleration Lanes
Intersections constructed under traffic – Begin and end the exclusion 30.5 m [**100 feet**] from the intersection radius
Sections less than 15.24 m [**50 feet**] in length
Projects less than 300 m [**1000 feet**] in length
Mainline paving where the normally posted regulatory speed is less than or equal to 70 km/hr [**45 miles per hour**] -- Begin the exclusion at the sign
Single lift overlays over bituminous with a PSR < 2.8
Single lift overlays over concrete.
Horizontal Curves with a radius less than 289.6 m [**950 feet**]. Horizontal Curves with a degree of curvature greater than or equal to 6°. Vertical Curves – Absolute value of grade change is 2 % or more and curve length is 91.4 m [**300 feet**] or less. Vertical Curves – Absolute value of grade change is 3 % or more and curve length is 121.9 m [**400 feet**] or less. Vertical Curves – Absolute value of grade change is 4 % or more and curve length is 182.8 m [**600 feet**] or less. Vertical Curves – Absolute value of grade change is 8 % or more and curve length is 213.4 m [**700 feet**] or less. Note: Begin and end the exclusion at the PC (PVC) and PT (PVT), respectively

C1 A Smoothness Requirements

Pavement smoothness requirements will be evaluated by Table 2360.7-C6A, 2360.7-C6B, or 2360.7-C6C. The pavement smoothness table will be identified in the Special Provisions of the proposal.

C2 Measurement

Smoothness will be measured with a 7.62 m [**25 foot**] California type profilograph or an Inertial Profiler (IP), which produces a profilogram (profile trace of the surface tested). Either type of device must be certified according to the procedure on file in the Bituminous Office. One pass will be made in each lane, 2.74 m [**9 feet**] from centerline. The profilograph or IP shall be in the direction the traffic will be moving. Each lane will be tested and evaluated separately. The Engineer will determine the length in kilometers [**miles**] for each mainline traffic lane. The profilograph will be operated at a speed no greater than a normal walk, no greater than 6 km/hr [**4 miles per hour**]. Motive power may be provided manually or by the use of a propulsion unit approved by the Engineer. The IP will be operated at the optimum speed as defined by the manufacturer.

C3 Profilograph testing

The Contractor will furnish a properly calibrated, documented, and certified 7.62 m [**25 foot**] California type profilograph or IP. The profilograph or IP shall be equipped with automatic data reduction capabilities unless otherwise authorized by the Engineer. Certification documentation shall be provided to the Engineer on the first day the profilograph or IP is used on the project. User selected profilograph or IP settings are on file in the Bituminous Office. The Contractor will furnish a competent operator, trained in the operation and evaluation of the 7.62 m [**25 foot**] California profilograph or IP.

All objects and foreign material on the pavement surface will be removed by the Contractor prior to testing. The pavement surface will be divided into sections which represent continuous placement. A section will terminate 7.62 m [**25 feet**] before a bridge approach panel, bridge surface, manhole or similar interruption. A day's work joint will be included in the trace with no special consideration. A section will be separated into segments of 0.1 km [**0.1 mile**]. A segment will be in only one traffic lane.

A profilogram will be made for each segment of 15.24 m [**50 feet**] or more. The profilogram will include the 7.62 m [**25 foot**] at the ends of the section only when the Contractor is responsible for the adjoining surface.

End of run areas not included in the profilograph trace and any sections of pavement less than 15.24 m [**50 feet**] in length shall be checked longitudinally with a 3.028 m [**10 foot**] straight edge and the surface shall not deviate from a straight line by more than 3 mm in 3.028 m [**1/8 inch in 10 feet**].

The profile trace and index for each segment of pavement must be furnished to the Engineer within 48 hours after each days run. Identification of all bumps and dips, with signature of the Operator shall be included with the submitted trace.

The Contractor will submit a final evaluation generated from approved software, to the Engineer within five days after all mainline pavement placement. Software is available from the Mn/DOT Bituminous Office at www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp. The evaluation submitted shall be in tabular form, with each 0.1 km [**0.1 mile**] segment occupying a row. Each row shall include the beginning and ending station for the segment, the length of the segment, the profile index for the segment, the profile index incentive/disincentive in dollars for the segment, and the deductions for bumps in dollars for the segment. Each continuous run will occupy a separate table and each table will have a header that includes the following: the project number, the roadway number or designation, the specified ride table, a lane designation, the mix type of the final lift, the PG binder of the final lift, the date of the profilograph run, and the beginning and ending station of the continuous run. Each table will have a summary at the bottom that includes the following: a subtotal for the profile index incentive/disincentive, a subtotal for the bump deductions, and a total for incentive/disincentive for both profile index and bumps.

The Contractor will be responsible for all traffic control associated with the smoothness testing.

Any portion of the project may be retested if the Engineer determines that the Contractor's test results are in question. If results are found to be inaccurate, the Contractor will be charged at a rate of $155.34 per lane km [**$250 per lane mile**] that is retested, with a minimum charge of $500.00. If the results are found to be accurate, the Department will be paying the Contractor at a rate of $155.34 per lane km [**$250 per lane mile**] that is retested, with a minimum charge of $500.00.

C4 Profile Index

The profilograph or IP shall be equipped with automatic data reduction capabilities for determining the profile index (PI) unless otherwise authorized by the Engineer. If manual reduction is allowed, the profilograph trace will be evaluated by the Contractor for the profile index (PI) in accordance with California Method 526 on file with the Department Bituminous Engineer. The original trace shall be provided to the Engineer

A profile index shall be calculated for each segment. If an IP is used the corresponding International Roughness Index (IRI) for each segment shall be submitted to the Bituminous Office. The index will be determined by summing the vertical deviations outside either a 5 mm [**0.2 inch**] blanking band or outside a zero blanking band depending on the number of lifts in the construction. The units of this index are mm per km [inch per mile]. When there is a segment of 76.2 m [**250 feet**] or less in length, the profilograph or IP measurements for that segment shall be added to and included in the evaluation of the adjacent section to that segment.

Bumps and dips equal to or exceeding 10.2 mm in a 7.62 m [**0.4 inch in a 25 foot**] span shall be identified separately. When the profile trace shows a successive, uninterrupted bump, dip; or dip, bump combination (up to a maximum of 3 alternating trace deviations that relate to one bump or dip on the roadway), identify and evaluate these occurrences as one event.

C5 Surface Correction

All areas represented by deviations of 28 mm [**1.1 inch**] or more, as measured by the 7.62 m [**25 foot**] profilograph, will be corrected by the Contractor.

The Contractor may elect to correct pavement segments having no more than two events or two individual bumps or dips with a vertical deviation of 10.2 to 25 mm [**0.4 to 1.0 inch**] in a 7.62 m [**25 foot**] span. Correction of segments with more than two events or two individual bumps or dips, as defined above, will be allowed only when approved by the Engineer. The Contractor will be assessed a penalty for dips or bumps of 10.2 to 25 mm [**0.4 to 1.0 inch**] that are not corrected. Bumps and dips not corrected will also be included in the evaluation for the segment smoothness. Corrected dips or bumps will be considered satisfactory when the profilogram shows the dips or bumps are less than 10.2 mm in a 7.62 m [**0.4 inch in a 25 foot**] span.

Bump, dip, and smoothness correction work shall be for the entire traffic lane width. Pavement cross slope shall be maintained through corrective areas.

All corrective work shall be made by diamond grinding or approved equivalent, overlaying the area, by replacing the area or by inlaying. Corrective methods shall be subject to the approval of the Engineer. The Contractor shall notify the Engineer prior to commencement of the corrective action. If the surface is corrected by grinding, all ground areas shall be treated with an emulsified asphalt fog seal conforming to Mn/DOT 2355. If the surface is corrected by overlay, inlay or replacement, the surface correction shall begin and end with a transverse saw cut.

If the smoothness evaluation indicates that corrective work is necessary for more than 50% of a segment, surface correction will be limited to mill and inlay (40 mm [**1.5 inch**] min).

All corrective work shall be subject to the approval of the Engineer. After all required correction work is completed, a final profile index shall be determined. Corrective work and re-evaluation will be at the Contractor's expense.

C6 Payment

The cost of certified smoothness testing and associated traffic control will be incidental to the cost of the Wear Course Mixture.

The Contractor may receive an incentive payment or be assessed a penalty based on the number of segments and the initial profile index. The total ride incentive shall not exceed 10% of the total mix price for pavement smoothness evaluated under Table 2360.7-C6A, 5% of the total mix price for pavement smoothness evaluated under Table 2360.7-C6B, or 5% of the total mix price for pavement smoothness evaluated under Table 2360.7-C6C. The maximum allowable net incentive (total incentive minus disincentive) payment shall be calculated by multiplying the total tons paved by the mixture price by the appropriate incentive cap. Pay adjustments for incentives will only be based on the initial Profile Index before any corrective work has been performed. Pavement that contains corrective action for profile or bumps is not eligible for incentive pay. These payments or assessments will be based on the following schedules.

The Contractor will not receive a net incentive payment for ride if more than 25% of all density lots for the project fail to meet minimum density requirements.

For each traffic lane, a penalty will be assessed for each bump or dip of 10.2 to 25 mm [**0.4 to 1.0 inch**] that is not corrected. Penalties, based on the table the profile index is evaluated under, are as follows:

Table 2360.7-C6A:	$900
Table 2360.7-C6B:	$675
Table 2360.7-C6C:	$450

Bumps or dips resulting from a construction joint will be assessed a $900 penalty, regardless of the table used for evaluation of pavement smoothness.

The Engineer may, at his discretion, assess a penalty in lieu of requiring the Contractor to take corrective action when the profile index for a segment indicates corrective action is necessary.

Penalties, based on the table the profile index is evaluated under, are as follows:

Table 2360.7-C6A: $560 per 0.1 km [**$900 per 0.1 mile**]
Table 2360.7-C6B: $420 per 0.1 km [**$675 per 0.1 mile**]
Table 2360.7-C6C: $280 per 0.1 km [**$450 per 0.1 mile**]

Table 2360.7-C6A *
Initial Profile Index for 5mm [0.2 inch] blanking band

mm per km per 0.1 km segment	[Inches per mile] [per 0.1 mile segment]	Dollars per Segment (Metric)	Dollars per Segment [English]
0- 13.4	[0.0 – 0.8]	210	[335]
13.5 – 25.3	[0.9 - 1.6]	145	[225]
25.4 – 38.7	[1.7 - 2.4]	80	[115]
38.8 – 78.9	[2.5 - 5.0]	0	[0]
79.0 – 92.3	[5.1 - 5.8]	(80)	[(115)]
92.4 - 105.7	[5.9 - 6.7]	(145)	[(225)]
105.8 - 118.3	[6.8 - 7.5]	(210)	[(335)]
Over 118.3	[Over 7.5]	Corrective Action	Corrective Action

* Typically, 3-lift minimum construction

Table 2360.7-C6B *
Initial Profile Index for 5mm [0.2 inch] blanking band

mm per km per 0.1 km segment	[Inches per mile] [per 0.1 mile segment]	Dollars per Segment (Metric)	Dollars per Segment [English]
0 - 15.8	[0.0 - 1.0]	145	[225]
15.9 - 31.6	[1.1 - 2.0]	100	[150]
31.7 - 47.3	[2.1 - 3.0]	55	[75]
47.4 - 110.5	[3.1 - 7.0]	0	[0]
110.6 - 126.3	[7.1 - 8.0]	(55)	[(75)]
126.4 - 142.0	[8.1 - 9.0]	(100)	[(150)]
142.1 - 157.8	[9.1- 10.0]	(145)	[(225)]
Over 157.8	[Over 10.0]	Corrective Action	Corrective Action

* Typically, 2-lift construction

Table 2360.7-C6C *
Initial Profile Index for 5mm [0.2 inch] blanking band

mm per km per 0.1 km segment	[Inches per mile] [per 0.1 mile segment]	Dollars per Segment (Metric)	Dollars per Segment [English]
0 - 31.6	[0.0 - 2.0]	95	[150]
31.7 - 47.4	[2.1 - 3.0]	65	[100]
47.5 - 79.0	[3.1 - 5.0]	35	[50]
79.1 - 158.0	[5.1 - 10.0]	0	[0]
158.1 - 189.6	[10.1 - 12.0]	(35)	[(50)]
189.7 - 221.2	[12.1 - 14.0]	(65)	[(100)]
221.3 - 252.8	[14.1-16.0]	(95)	[(150)]
Over (252.8)	[Over 16.0]	Corrective Action	Corrective Action

* Typically, single lift construction

2360.8 METHOD OF MEASUREMENT

A Asphalt Mixture

Asphalt mixture of each type will be measured separately by mass, based on the total quantity of material hauled from the mixing plant, with no deductions being made for the asphalt materials.

B Blank

C Asphalt Mixtures Measured by the Square Meter [Square Yard] per Specified (mm [inch]) and for Mixtures Measured by the [Square Yard inch]

Asphalt mixture of each type and for each specific lift will be measured separately by area and by thickness on the basis of actual final dimensions placed. The constructed thickness shall meet tolerances set forth in Sections 2360.7A.

EQUAL EMPLOYMENT OPPORTUNITY (EEO) SPECIAL PROVISIONS

This section of Special Provisions contains the Equal Employment Opportunity (EEO) rules and regulations for highway construction projects in Minnesota which are Federally or State funded.

The source of funding determines which EEO regulations and goals (Federal and/or State goals) apply to a specific project. When a project contains funding from both Federal and State sources, both sets of regulations apply, and the Minnesota Department of Transportation (Mn/DOT) monitors and reviews projects at both levels.

If the project contains any Federal funding, and has a total dollar value exceeding $10,000, Federal EEO regulations and goals apply (pages 2, 5, 6-7, 8-13, 14, 15-16, 23-24, 25-38). The Mn/DOT Office of EEO Contract Management monitors and reviews these projects on behalf of the Federal Highway Administration (FHWA), under Federal statutes (23 USC 140) and rules (23 CFR 230).

If the project contains any State funding, and has a total dollar value exceeding $100,000, State EEO regulations and goals apply (pages 2, 3, 4, 5, 8-13, 15-16, 21-22). Mn/DOT's Office of EEO Contract Management monitors and reviews these projects in conjunction with the Minnesota Department of Human Rights under Minnesota Statute 363.073 and its accompanying rules.

Mn/DOT has established a single review and monitoring process which meets both Federal and State requirements.

Please note that incentive payments are not available on S.A.P. projects, so Form EEO-14 is not applicable to those projects. Please note that Pages 23-37 of these Special Provisions may be omitted from projects with no Federal funding.

CONTENTS

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (23 USC 140, 23 CFR 230 and Minnesota Statute 363.073)

1. The offerer's or bidder's attention is called to the "Minnesota Affirmative Action Requirements" (EEO Page 3), the "Specific Federal Equal Employment opportunity Responsibilities" (EEO Pages 6-7), the "Standard Federal and State Equal Employment Opportunity Construction Contract Specifications" (EEO Pages 8-13), the "Equal Opportunity Clause" (EEO Pages 14) and "Required Contract Provisions - Federal-Aid Construction Contracts" (EEO Pages 25-38).

2. The goals and timetables for minority and women participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as shown on EEO Pages 15-16).

   These goals are applicable to all the Contractor's construction work (whether or not it is State or State assisted, or Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

   The Contractor's compliance with the regulations in 41 CFR Part 60-4, and/or Minnesota Statutes 363.073 and Minnesota Rules Part 5000.3520 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) for Federal or federally assisted projects, and Minnesota Statute 363.073, and Minnesota Rules Part 5000.3540 for State or State assisted projects, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and women employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority and women employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4 for Federal or federally-assisted projects and/or Minnesota Statute 363.073 and Minnesota Rules Part 5000.3520 for state or state-assisted projects. Compliance with the goals will be measured against the total work hours performed.

3. If the contract is federally funded, the Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. If the contract is state funded, the Contractor shall provide written notification to the Compliance Division, Minnesota Department of Human Rights, Army Corps of Engineers Centre, 190 E 5th Street, Suite 700, St. Paul, Minnesota 55101 within ten working days of award of any construction subcontract in excess of $100,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is the county or counties of the State of Minnesota where the work is to be performed.

MINNESOTA AFFIRMATIVE ACTION REQUIREMENTS

1. It is hereby agreed between the parties to this contract that Minnesota Statute, Section 363.073, and Minnesota Rules, Parts 5000.3400 to 5000.3600 are incorporated into any contract between these parties based upon this specification or any modification of it. A copy of Minnesota Statute, Section 363.073, and Minnesota Rules, Parts 5000.3400 to 5000.3600 is available upon request from the contracting agency. The Contractor hereby agrees to comply with the rules and relevant orders of the Minnesota Department of Human Rights issued pursuant to the Minnesota Human Rights Act.

2. It is hereby agreed between the parties to this contract that this agency requires that the Contractor meet affirmative action criteria as provided for by Minnesota Statute 363.073 and Minnesota Rules, Parts 5000.3400 to 5000.3600. It is the intent of the Minnesota Department of Transportation to fully carry out its responsibility for requiring affirmative action, and to implement sanctions for failure to meet these requirements. Failure by a contractor to implement an affirmative action plan, meet project employment goals for minority and women employment or make a good faith effort to do so, may result in revocation of his/her Certificate of Compliance or suspension or revocation of the contract (Minnesota Statute 363.073, subd. 2-3).

3. Under the affirmative action obligation imposed by the Human Rights Act, Minnesota Statutes, Section 363.073, contractors shall take affirmative action to employ and advance in employment minority, female, and qualified disabled individuals at all levels of employment. Affirmative action must apply to all employment practices, including but not limited to hiring, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor shall recruit, hire, train and promote persons in all job titles, without regard to race, color, creed, religion, sex, national origin, marital status, status with regard to public assistance, physical or mental disability, sexual orientation or age except where such status is a bona fide occupational qualification. These affirmative action requirements of the Minnesota Human Rights Act are consistent with but broader than the Federal requirements as covered in this contract.

4. Affirmative Action for disabled workers. The Contractor shall not discriminate against any employee or applicant for employment because of a physical or mental disability in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled individuals without discrimination based upon their physical or mental disability in all employment practices such as employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training (including apprenticeship). In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with Minnesota Statutes, section 363.073 and the rules and relevant orders of the Minnesota Department of Human Rights pursuant to the Minnesota Human Rights Act.

5. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the commissioner of the Minnesota Department of Human Rights. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment minority, women and qualified disabled employees and applicants for employment, and the rights of applicants and employees. **A poster entitled "Contractor Non-discrimination is the Law" may be obtained from: Compliance Unit, Minnesota Department of Human Rights, Army Corps of Engineers Centre, 190 E. 5th Street, Suite 700, St. Paul, Minnesota 55101.** (612) 296-5663, TTY 296-1283, Toll Free 1-800-657-3704.

6. The Contractor shall notify each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Minnesota Statutes, section 363.073 of the Minnesota Human Rights Act, and is committed to take affirmative action to employ and advance in employment minority, women and qualified physically and mentally disabled individuals.

APPROPRIATE WORK PLACE BEHAVIOR ON Mn/DOT CONSTRUCTION PROJECTS UTILIZING STATE FUNDS

It is the Minnesota Department of Transportation's (Mn/DOT's) policy to provide a workplace free from violence, threats of violence, harassment and discrimination. Mn/DOT has established a policy of zero tolerance for violence in the workplace. Contractors who perform work on Mn/DOT construction projects, or local government entities or public agencies utilizing state funds on highway construction projects, shall maintain a workplace free from violence, harassment and discrimination (See definitions, below).

Definitions:

1. Violence is the threatened or actual use of force which results in or has a high likelihood of causing fear, injury, suffering or death. Employees are prohibited from taking reprisal against anyone who reports a violent act or threat.

2. Harassment is the conduct of one employee (toward another employee) which has the purpose or effect of 1) unreasonably interfering with the employee's work performance, and/or 2) creating an intimidating, hostile or offensive work environment. Harassment is not legitimate job-related efforts of supervisor to direct/evaluate an employee or to have an employee improve work performance.

A. Unlawful discriminatory harassment is harassment which is based on these characteristics: race, color, creed, religion, national origin, sex, disability, age, marital status, status with regard to public assistance or sexual orientation. Managers, supervisors and employees shall not take disciplinary or retaliatory action against employees who make complaints of sexual harassment.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, or sexually motivated physical contact, or other verbal or physical conduct or communication of a sexual nature, when submission to that conduct or communication is 1) made a term or condition, either explicitly or implicitly, of obtaining employment; or 2) is used as a factor in decisions affecting an individual's employment; or 3) when that conduct or communication has the purpose or effect of substantially interfering with an individual's employment or creating an intimidating, hostile or offensive work environment, and the employer knows or should have known of the existence of the harassment and fails to take timely and appropriate action. Examples include but are not limited to insulting or degrading sexual remarks or conduct; threats, demands or suggestions that status is contingent upon toleration or acquiescence to sexual advances; displaying in the workplace sexually suggestive objects, publications or pictures, or retaliation against employees for complaining about the behavior cited above or similar behaviors.

B. General harassment is harassment which is not based on the above characteristics. Examples may include, but are not limited to: physically intimidating behavior and/or threats of violence; use of profanity (swearing), vulgarity; ridiculing, taunting, belittling or humiliating another person; inappropriate assignments of work or benefits; derogatory name calling.

3. Discrimination includes actions which cause a person, solely because of race, color, creed, religion, national origin, sex, disability, age, marital status, status with regard to public assistance or sexual orientation to be subject to unequal treatment.

Prime Contractors who work on Mn/DOT projects shall ensure that their managers, supervisors, foremen/women and employees are familiar with Mn/DOT's policy on appropriate work place behavior; and shall ensure that their subcontractors are familiar with this policy. Managers, supervisors and foremen/women will respond to, document, and take appropriate action in response to all reports of violence, threats of violence, harassment or discrimination. Failure to comply with this policy may result in cancellation, termination or suspension of contracts or subcontracts currently held and debarment from further such contracts or subcontracts as provided by statute. If you need additional information or training regarding this policy, please contact the EEO Contract Management Office at (612) 297-1376.

NOTICE TO ALL PRIME AND SUBCONTRACTORS REPORTING REQUIREMENTS

1. In order to monitor compliance with Federal Statutes 23 USC 140 and 23 CFR 230, and Minnesota Statute 363.073, all prime contractors and subcontractors are required to complete a Mn/DOT Employment Compliance Report in accordance with weekly payroll periods, and submit those forms each month for each project (Form EEO-13, sample copy at EEO Pages 19-20.) Prime contractors are also required to complete a Contractor Employment Data (Form EEO-12, sample copy at EEO Pages 17-18) upon award of their first Mn/DOT project, and only once per calendar year.

   The prime contractor of each project collects Employment Compliance Reports from each subcontractor who performed work during the month, and completes Employment Compliance Reports on its own work force. The prime contractor submits the EEO-13 forms to the Mn/DOT Project Engineer by the 15th of the subsequent month

   Failure to submit the required reports in the allowable time frame will be cause for the imposition of contract sanctions.

   It is the intent of Mn/DOT to implement monitoring measures on each project to ensure that each prime contractor and subcontractor is promoting the full realization of equal employment opportunities. Any project may be scheduled for an in depth on-site contract compliance review. During the scheduled on-site review, the Contractor will be required to provide to Mn/DOT documentation of its "good faith efforts" as shown in EEO Pages 9-12, at 7 a-p of this contract.

2. The Economic Disadvantaged Employee Incentive Report (Form EEO-14, sample copy at EEO Page 22) is used only with State projects (designated by State Project (S.P.) numbers) for claiming incentive reimbursement on projects which have exceeded their state goals for minority and women employment. A completed form should be mailed to Michael A. Garza, Director, EEO Contract Management Office, Minnesota Department of Transportation, M.S. 170, 395 John Ireland Boulevard, St. Paul, Mn 55155, at the conclusion of the project.

3. If a Federally funded project requires On-the-Job-Training (OJT) participation, information is provided in the contract and can be located by referring to the Table of Contents for Division S. (OJT is also listed as a bid line item under Trainees.) When a contract requires OJT participation, the Prime Contractor shall submit a training plan to the Project Engineer at the preconstruction conference, and shall supply a copy to the Contract Compliance Specialist (CCS) assigned to the project. The training plan shall include the job classification titles of trainees, planned training activities and the approximate start date of trainees.

4. When a Contractor selects a trainee applicant for OJT, the Contractor completes an On The Job Training Program-Trainee Assignment form (sample copy at EEO Page 23) and submits it to the CCS assigned to the project for approval. The CCS notifies the Contractor and Project Engineer when applicant is approved.

5. Hours of work performed by OJT employees shall be documented on a monthly basis on the Certification of On-The-Job Training Hours form, (Mn/DOT Form No. 21860, sample copy at EEO Page 24). The Contractor shall submit the original and one copy to the Project Engineer, and one copy to the CCS assigned to the project.

Do not remove forms from this contract. Please duplicate forms from the copies in this contract, or the Mn/DOT Office of EEO Contract Management will provide these forms upon request. Please call the Office of EEO Contract Management, (612) 297-1376.

SPECIFIC FEDERAL EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (23 CFR 230, Subpart A, Appendix A, FAPG June 6, 1996)

1. General.

a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required contract Provisions (Form PR-1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of title 23, U.S.C., as established by Section 22 of the Federal-Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.

b. The contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.

c. The contractor and all his/her subcontractors holding subcontracts not including material suppliers, of $10,000 or more, will comply with the following minimum specific requirement activities of equal employment Opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The contractor will include these requirements in every subcontract of $10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. Equal Employment Opportunity Policy. The contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote their full realization of equal employment through a positive continuing program:

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training.

3. Equal Employment Opportunity Officer. The contractor will designate and make known to State highway agency contracting officers an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. Dissemination of Policy.

a. All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action will be made fully cognizant of, and will implement, the contractor's equal employment opportunity policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

(1). Periodic meetings of supervisory and personnel office staff will be conducted before the start of work and then not less often than once every six months, at which time the contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

(2). All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official, covering all major aspects of the contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the contractor.

(3). All personnel who are engaged in direct recruitment for the project will be instructed by the EEO officer or appropriate company official in the contractor's procedures for locating and hiring minority group employees.

b. In order to make the contractor's equal employment policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the contractor will take the following actions:

(1). Notices and posters setting forth the contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

(2). The contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. Recruitment.

a. When advertising for employees, the contractor will include in all advertisements for employees the notation "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

b. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the contractor will, through his EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where the implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

6. Personnel Actions. Wages, working conditions, and employee benefits shall be

SPECIFIC FEDERAL EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES *(con't)*

established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all his avenues of appeal.

7. Training and Promotion.

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e. apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event the Training Special Provision is provided under this contract, this subparagraph will be superseded as indicated in Attachment 2.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. Unions. If a contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group members and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the State highway agency.

9. Subcontracting.

a. The contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.

b. The contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

10. Records and Reports:

a. The contractor shall keep such records as necessary to determine compliance with the contractor's equal employment opportunity obligations. The records kept by the contractor will be designed to indicate:

(1) The number of minority and nonminority group members and women employed in each work classification on the project.

(2) The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractor's who rely in whole or in part on unions as a source of their work force),

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and

(4) The progress and efforts being made in securing the services of minority group subcontractors with meaningful minority and female representation among their employees.

b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.

c. The contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR-1391. If on-the-job training is being required by "Training Special Provision", the contractor will be required to furnish Form FHWA 1409.

STANDARD FEDERAL AND STATE EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS
(41 CFR 60-4.3 and Minnesota Statute 363.073)

Unless noted, the following apply to both Federal/federally assisted projects and State/state assisted projects. Item 3 applies to Federal/federally assisted projects only.

1. As used in these specifications:
   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer Identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 ($100,000 for State projects) the provisions of these specifications and the Notice which contains the applicable goals for minority and women participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4, 5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work on the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) to (p) of these specifications (itemized as 4 [a] to [o], Minnesota Rules

STANDARD FEDERAL AND STATE EEO CONSTRUCTION CONTRACT SPECIFICATIONS *(con't)*

5000.3535). The goals, set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minorities and utilization the Contractor should (shall, for State or state assisted projects) reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor shall make substantially uniform progress toward its goals in each craft during the period specified. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Federal goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance programs or from Federal procurement contracting officers. State goals are published periodically in the State Register in notice form, and may be obtained from the Minnesota Department of Human Rights or the Minnesota Department of Transportation Office of EEO Contract Management. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union, with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications and Executive Order 11246 and its associated rules and regulations for Federal or federally assisted projects, and Minnesota Statutes, Section 363.073 of the Minnesota Human Rights Act, or the rules adopted under the Act for State or state assisted projects.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained according to training programs approved by the Minnesota Department of Human Rights, the Minnesota Department of Labor and Industry, or the United States Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications must be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following (referred to in Minnesota Rules 5000.3535 as items 4(a) to (o):

(a) Ensure and maintain, or for State or state assisted projects make a good faith effort to maintain, a working environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work. For

STANDARD FEDERAL AND STATE EEO CONSTRUCTION (h)CONTRACT SPECIFICATIONS *(con't)*

Federal or federally assisted projects, the Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or women individuals working at such sites or in such facilities.

(b) Establish and maintain a current list of minority and women recruitment sources, provide written notification to minority and women recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(c) Maintain a current file of the names, addresses, and telephone numbers of each minority and women off-the-street applicant and minority or women referral from a union, a recruitment source, or community organization and of what action was taken with respect to each individual. If the individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor along with whatever additional actions the Contractor may have taken.

(d) Provide immediate written notification to the commissioner of the Minnesota Department of Human Rights for State or state assisted projects, or the director of the Office of Federal Contract Compliance for Federal or federally assisted projects, when the union, or unions with which the Contractor has a collective bargaining agreement, has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(e) Develop on-the-job training opportunities and/or participate in training programs for the areas which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the State of Minnesota for State or state assisted projects or the Department of Labor, for Federal or federally assisted projects. The Contractor shall provide notice of these programs to the sources compiled under (b).

(f) Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its equal employment opportunity obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and women employees at least once a year; and by posting the company equal employment opportunity policy on bulletin boards accessible to all employees at each location where construction work is performed.

STANDARD FEDERAL AND STATE EEO CONSTRUCTION CONTRACT SPECIFICATIONS *(con't)*

(g) Review, at least annually, the company's equal employment opportunity policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions; including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the first day of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(h) Disseminate the Contractor's equal employment opportunity policy externally by including it in any advertising in the news media, specifically including minority and women news media, and providing written notification to and discussing the Contractor's equal employment opportunity policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

(i) Direct its recruitment efforts, both oral and written, to minority, women, and community organizations; to schools with minority and women students; and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(j) Encourage present minority and women employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and women youth, both on the site and in other areas of a Contractor's work force.

(k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3. (This requirement applies only to Federal and federally assisted projects.)

(l) Conduct, at least annually, an inventory and evaluation at least of all minority and women personnel for promotional opportunities; and encourage these employees to seek or to prepare for, through appropriate training, such opportunities. (This is Item 4(k) in Minnesota Rules.)

(m) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out. (This is item 4(l) in Minnesota Rules.)

STANDARD FEDERAL AND STATE EEO CONSTRUCTION CONTRACT SPECIFICATIONS *(con't)*

(n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes. (This is item 4(m) in Minnesota Rules.)

(o) Document and maintain a record of all solicitations or offers for subcontracts from minority and women construction contractors and suppliers, including circulation of solicitations to minority and women contractor associations and other business associations. (This is item 4(n) in Minnesota Rules.)

(p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment opportunity policies and affirmative action obligations. (This is item 4(o) in Minnesota Rules.)

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7(a) to (p) for Federal or federally assisted projects, and 4(a)-(o) for State or state assisted projects). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7(a) to (p) or 4(a) to (o) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and women work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order for Federal or federally assisted projects, or Minnesota Rules for State or state assisted projects, if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order or Minnesota Rules part 5000.3520 if a specific minority group is under-utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, creed, religion, sex, or national origin. Minnesota Statutes 363.073, part 5000.3535 (Subp. 7) also prohibits discrimination with regard to marital status, status with regard to public assistance, disability, age, or sexual orientation.

STANDARD FEDERAL AND STATE EEO CONSTRUCTION CONTRACT SPECIFICATIONS *(con't)*

11. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts under the federal Executive Order 11246 or a local human rights ordinance, or whose certificate of compliance has been suspended or revoked pursuant to Minnesota Statutes, Section 363.073.

12. The Contractor shall carry out such sanctions for violation of these specifications and of the equal opportunity clause, including suspension, termination, and cancellation of existing contracts as may be imposed or ordered pursuant to Minnesota Statutes, Section 363.073, and its implementing rules for State or state assisted projects, or Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs for Federal or federally assisted projects. Any contractor who fails to carry out such sanctions shall be in violation of these specifications and Minnesota Statutes, Section 363.073, or Executive Order 11246 as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications (paragraph 4 in Minnesota Rules 5000.3535), so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of these Specifications or Minnesota Statutes, Section 363.073 and its implementing rules, or Executive Order 11246 and its regulations, the commissioner or the director shall proceed in accordance with Minnesota Rules part 5000.3570 for State or state assisted projects, or 41 CFR 60-4.8 for Federal or federally assisted projects.

14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Minnesota Department of Human Rights or the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (for example, mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing provided in this part shall be construed as a limitation upon the application of other state or federal laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents.

EQUAL OPPORTUNITY CLAUSE

(41 CFR Part 60-1.4 b, 7-1-96 Edition)

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; and, selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Highway Agency (SHA) setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
3. The Contractor will send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The Contractor will comply with all provisions of Executive Order 11246, Equal Employment Opportunity, dated September 24, 1965, and of the rules, regulations (41 CFR Part 60), and relevant orders of the Secretary of Labor.
5. The Contractor will furnish all information and reports required by Executive Order 11246 and by rules, regulations, and orders of the Secretary of Labor, pursuant thereto, and will permit access to its books, records, and accounts by the Federal Highway Administration (FHWA) and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract, or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts or federally-assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
7. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraph (1) through (7) in every subcontract or purchase order so that such provisions will be binding upon each subcontractor or vendor, unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246. The Contractor will take such action with respect to any subcontract or purchase order as the Secretary of Labor, SHA, or the Federal Highway Administration (FHWA) may direct as a means of enforcing such provisions, including sanctions for noncompliance. In the event a contractor becomes a party to litigation by a subcontractor or vendor as a result of such direction, the contractor may request the SHA to enter into such litigation to protect the interest of the State. In addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

Minority and Women Employment Goals

County	Federal Goals		State Goals		
	Minority Goal	Women Goal	Total Minority Goal (or)		Women Goal
			Skilled	Unskilled	
Aitkin	2.2%	6.9%	3.9%		9.4%
Anoka	2.9%	6.9%	6.7%	7.3%	9.4%
Becker	0.7%	6.9%	2.5%		9.4%
Beltrami	2.0%	6.9%	10.2%		9.4%
Benton	0.5%	6.9%	1.4%		9.4%
Big Stone	2.2%	6.9%	2.2%		9.4%
Blue Earth	2.2%	6.9%	2.2%		9.4%
Brown	2.2%	6.9%	2.2%		9.4%
Carlton	1.2%	6.9%	3.9%		9.4%
Carver	2.9%	6.9%	6.7%	7.3%	9.4%
Cass	2.2%	6.9%	2.6%		9.4%
Chippewa	2.2%	6.9%	2.2%		9.4%
Chisago	2.9%	6.9%	2.9%		9.4%
Clay	0.7%	6.9%	2.5%		9.4%
Clearwater	2.0%	6.9%	10.2%		9.4%
Cook	1.2%	6.9%	3.9%		9.4%
Cottonwood	0.8%	6.9%	1.8%		9.4%
Crow Wing-	2.2%	6.9%	2.6%		9.4%
Dakota	2.9%	6.9%	6.7%	7.3%	9.4%
Dodge	0.9%	6.9%	1.9%		9.4%
Douglas	2.2%	6.9%	2.5%		9.4%
Faribault	2.2%	6.9%	2.2%		9.4%
Fillmore	0.9%	6.9%	1.9%		9.4%
Freeborn	0.9%	6.9%	1.9%		9.4%
Goodhue	2.2%	6.9%	2.2%		9.4%
Grant	2.2%	6.9%	2.5%		9.4%
Hennepin	2.9%	6.9%	8.6% *but in Mpls:* 17.7%	9.5% *but in Mpls:* 19.8%	9.4%
Houston	0.6%	6.9%	1.9%		9.4%
Hubbard	2.0%	6.9%	10.2%		9.4%
Isanti	2.2%	6.9%	2.2%		9.4%
Itasca	1.2%	6.9%	3.9%		9.4%
Jackson	0.8%	6.9%	1.8%		9.4%
Kanabec	2.2%	6.9%	2.2%		9.4%
Kandiyohi	2.2%	6.9%	2.2%		9.4%
Kittson	2.0%	6.9%	2.7%		9.4%
Koochiching	1.2%	6.9%	3.9%		9.4%
Lac Qui Parle	2.2%	6.9%	2.2%		9.4%
Lake	1.2%	6.9%	3.9%		9.4%
Lake of the Woods	2.0%	6.9%	10.2%		9.4%
Le Sueur	2.2%	6.9%	2.2%		9.4%
Lincoln	0.8%	6.9%	1.8%		9.4%
Lyon	0.8%	6.9%	1.8%		9.4%

County	Federal Goals		State Goals		
	Minority Goal	Women Goal	Total Minority Goal (or) Skilled	Unskilled	Women Goal
Mahnomen	2.0%	6.9%	10.2%		9.4%
Marshall	2.0%	6.9%	2.7%		9.4%
Martin	2.2%	6.9%	2.2%		9.4%
McLeod	2.2%	6.9%	2.2%		9.4%
Meeker	2.2%	6.9%	2.2%		9.4%
Mille Lacs	2.2%	6.9%	2.2%		9.4%
Morrison	2.2%	6.9%	2.6%		9.4%
Mower	0.9%	6.9%	1.9%		9.4%
Murray	0.8%	6.9%	1.8%		9.4%
Nicollet	2.2%	6.9%	2.2%		9.4%
Nobles	0.8%	6.9%	1.8%		9.4%
Norman	2.0%	6.9%	2.7%		9.4%
Olmsted	1.4%	6.9%	1.9%		9.4%
Otter Tail	2.2%	6.9%	2.5%		9.4%
Pennington	2.0%	6.9%	2.7%		9.4%
Pine	2.2%	6.9%	2.2%		9.4%
Pipestone	0.8%	6.9%	1.8%		9.4%
Polk	1.2%	6.9%	2.7%		9.4%
Pope	2.2%	6.9%	2.5%		9.4%
Ramsey	2.9%	6.9%	8.1% *but in St Paul:* 14.3%	9.0% *but in St Paul:* 15.4%	9.4%
Red Lake	2.0%	6.9%	2.7%		9.4%
Redwood	0.8%	6.9%	1.8%		9.4%
Renville	2.2%	6.9%	2.2%		9.4%
Rice	2.2%	6.9%	2.2%		9.4%
Rock	0.8%	6.9%	1.8%		9.4%
Roseau	2.0%	6.9%	2.7%		9.4%
Scott	2.9%	6.9%	6.7%	7.3%	9.4%
Sherburne	0.5%	6.9%	1.4%		9.4%
Sibley	2.2%	6.9%	2.2%		9.4%
St. Louis	1.0%	6.9%	3.9%		9.4%
Stearns	0.5%	6.9%	1.4%		9.4%
Steele	0.9%	6.9%	1.9%		9.4%
Stevens	2.2%	6.9%	2.5%		9.4%
Swift	2.2%	6.9%	2.2%		9.4%
Todd	2.2%	6.9%	2.6%		9.4%
Traverse	2.2%	6.9%	2.5%		9.4%
Wabasha	0.9%	6.9%	1.9%		9.4%
Wadena	2.2%	6.9%	2.6%		9.4%
Waseca	2.2%	6.9%	2.2%		9.4%
Washington	2.9%	6.9%	6.7%	7.3%	9.4%
Watonwan	2.2%	6.9%	2.2%		9.4%
Wilkin	0.7%	6.9%	2.5%		9.4%
Winona	0.6%	6.9%	1.9%		9.4%
Wright	2.9%	6.9%	2.9%		9.4%
Yellow Medicine	2.2%	6.9%	2.2%		9.4%

Minnesota Department of Transportation
Office of EEO Contract Management
Contractor Employment Data

1. Contractor Name and Address:

	2. Employment Data a) Name: Last Name, First Name, MI	b) Social Security #	c) New Hire (Y or N)	d) Ethnicity	e) Gender (M or F)	f) Trade/Foreman, Supervisors, Managers	g) Level (A, J, or T)
1.							
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28.							
29.							
30.							

If you have submitted this form at any time during this calendar year, you do not need to submit another one.

Minnesota Department of Transportation
Office of EEO Contract Management

INSTRUCTIONS FOR EEO-12
CONTRACTOR EMPLOYMENT DATA

This form should be submitted at the Pre-Con to the Project Engineer prior to the start of your first Mn/DOT construction project for the calendar year.

1. Contractor Name and Address self-explanatory.

2. Employment Data information will coincide with your employment records.

   2a. Name should be listed Last Name, First Name, and Middle Initial. This will enable Mn/DOT EEO staff to readily identify individuals on all projects.

   2b. Social Security Number self-explanatory.

   2c. New Hire is to be indicated with a "Y" for Yes or an "N" for No. "New Hire" is an employee who has not worked for you in any capacity or on any other project within the current calendar year.

   2d. Ethnicity can be indicated by Black (B), Hispanic (H), American Indian/Alaskan Native (AI), Asian/Pacific Islander (AP), or White (W).

   2e. Gender is to be indicated with an "M" for Males or an "F" for Females.

   2f. Trade/Foreman, Supervisors, Managers self-explanatory. List the specific trade that applies unless the employee fits one of the other three categories.

   2g. Level "A" is for an Apprentice, "J" is for a Journey Worker, and "T" is for a Mn/DOT Trainee.

If you have questions about filling out this form, contact the Office of EEO Contract Management at (651) 282-6026. (Please make copies as you need them.)

This information can be submitted electronically via the web, on disk, or e-mail. To find out more about this possibility please call Mn/DOT's Office of EEO Contact Management at (651) 282-6026.

If you have submitted this form at any time during this calendar year, you do not need to submit another one.

Minnesota Department of Transportation
Office of EEO Contract Management
Employment Compliance Report
EEO-13

1. SP/SAP: (circle one)

County or City:

2. Reporting Period:
to

3. Contractor Name and Address:

4. [ ] Prime Contractor
[ ] Subcontractor
5. Dollar Amount of Contract:

6. Percent of Completion:

7. Employment Data a) Name: Last, First, MI	b) Social Security #	c) New Hire (Y or N)	d) Ethnicity	e) Gender (M or F)	f) Trade type/Foreman, Supervisors, Managers	g) Level (A, J, or T)	h) Hrs Worked This Period
1.							
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24.							
25.							

8. CONTRACT GOALS

MINNESOTA GOALS		% OBTAINED	
_____ %	Minority	_____ %	
_____ %	Skilled	_____ %	
_____ %	Unskilled	_____ %	
_____ %	Women	_____ %	

10. Prepared by: (Signature)

(Title) (Date)

Phone:

11. Reviewed by: (Signature)

(Title) (Date)

Phone:

Minnesota Department of Transportation
Office of EEO Contract Management

INSTRUCTIONS FOR EEO-13
EMPLOYMENT COMPLIANCE REPORT

1.-5. Self-explanatory, (Reporting Period should coincide with weekly Certified Payrolls).

6. Percent of Completion is the estimated percentage of work completed including this reporting period.

7. Employment Data information will coincide with your employment records. All professional, supervisory and managerial hours actually worked on the project site must be included, whether or not they appear on the certified payroll.

7a. Name should be listed Last Name, First Name, and Middle Initial. This will enable Mn/DOT EEO staff to readily identify individuals on all projects.

7b. Social Security Number self-explanatory.

7c. New Hire is to be indicated with a "Y" for Yes or an "N" for No. "New Hire" is an employee who has not worked for you in any capacity or on any other project within the current calendar year.

7d. Ethnicity can be indicated by Black (B), Hispanic (H), American Indian/Alaskan Native (AI), Asian/Pacific Islander (AP), or White (W).

7e. Gender is to be indicated with an "M" for Males or an "F" for Females.

7f. Trade/Foreman, Supervisors, Managers list the specific trade that applies unless employee fits one of the other three categories.

7g. Level "A" is for an Apprentice, "J" is for a Journey Worker, and "T" is for a Mn/DOT Trainee.

7h. Hours Worked for This Period will be all hours worked by the individual, for each trade, during the reporting period.

8. Contract Goals are the percent of total project hours to be worked by minority and women employees. The goals are determined by the geographic location and source of funding for the project. Projects in excess of $100,000 with any State funding must meet the State Employment Goals. (See chart on EEO Pages 15-16.) Minority and women employee hours shall be distributed evenly throughout the length of the project and in every trade and craft that performs work on the project.

% Obtained is the percent of the total project hours worked by minority and women employees, up to and including this reporting period.

10. Prepared by Contractor Designee is the signature of the prime or subcontractor's EEO officer/designee.

11. Reviewed by Project Engineer is the signature of the Mn/DOT staff monitoring the project.

If you have questions about filling out this form, contact the Office of EEO Contract Management at (651) 282-6026. (This information should be recorded weekly, but only has to be submitted monthly. Please make copies as you need them.)

This information can be submitted electronically via the web, on disk, or e-mail. To find out more about this possibility please call Mn/DOT's Office of EEO Contact Management at (651) 282-6026.

ECONOMICALLY DISADVANTAGED EMPLOYEE (EDE) INCENTIVE PROGRAM

When the Contractor or subcontractor on a State Project (S.P.) has met the goals for minority and female participation as set forth in the "Notice of Requirement for Affirmative Action to ensure Equal Employment Opportunity" contained in the Proposal for the Project (EEO Page 2), hours of minority employment in excess of the minimum required to meet the goal will be reimbursed at the rate of $2.00 per hour. Hours of employment of qualified and certified economically disadvantaged employees shall be added to the excess minority hours to calculate the total reimbursement. Monies otherwise due the contractor will be adjusted to incorporate the reimbursement. This program is not available for State-Aid Projects.

For purposes of this provision, economically disadvantaged is defined as being a member of a household whose household income is less than the poverty guideline. The poverty income guidelines for all Minnesota counties are as follows (2001 Poverty Guidelines):

Family Size	Aggregate Income	Family Size	Aggregate Income
1	$8,590	6	$23,690
2	$11,610	7	$26,710
3	$14,630	8	$29,730
4	$17,650	9	$30,450
5	$20,670	10	$33,250

No employee who is utilized by the Contractor to comply with the minimum requirements for affirmative action hereunder shall qualify for the incentive payment. The Contractor will be required to certify that each economically disadvantaged employee for whom an incentive payment is sought meets the criteria set forth herein at the time of hire.

Recruitment resources for economically disadvantaged employees (EDE) are listed below:

1. **Council on Black Minnesotans**
   2233 University Avenue West
   Suite 426 Wright Building
   St. Paul, MN 55114
   Tel: 651-642-0811
   Fax: 651-643-3580

2. **Council on Asian-Pacific Minnesotans**
   200 University Avenue West,
   Suite 100
   St. Paul, MN 55103
   Tel: 651-296-0538
   Fax: 651-297-8735

3. **Minnesota Indian Affairs Council**
   1450 Energy Park Drive
   Room 140 West
   St. Paul, MN 55108
   Tel: 651-643-3032
   Fax: 651-643-3077

4. **Chicano Latino Affairs Council**
   555 Park Street
   Suite 408
   St. Paul, MN 55103
   Tel: 651-296-9587
   Fax: 651-297-1297

Minnesota Department of Transportation
EEO Contract Management Office
ECONOMIC DISADVANTAGED EMPLOYEE INCENTIVE REPORT

S.P./S.A.P. No:_____ County
or City:_____
Month:_____, 19 ____

Contractor:
Address:
_____
_

☐ Prime Contractor ☐ Subcontractor

Job Categories	Total Hours by EDEs
Officials/Managers	
Supervisors	
Foremen/Women	
Clerical	
Equipment Operators	
Mechanics	
Truck drivers	
Ironworkers	
Carpenters	
Cement Masons	
Electricians	
Pipefitters, Plumbers	
Painters	
Laborers	
Total	

Names of Economic Disadvantaged Employees (EDE):

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

AFFIDAVIT

I, _____, being first duly sworn, do depose and say:

1. That I am the authorized representative of: _____
(Name of individual, partnership or corporation)
and that I have the authority to make this Affidavit for and on behalf of said Contractor;
2. That the Economic Disadvantaged Employee (EDE) incentive hours listed were performed by qualified EDE's.
3. That I have fully informed myself regarding the accuracy of the statements made in this Affidavit.

Signed: _____
Contractor or Authorized Representative (Date)

Subscribed and sworn to before me this

_____ day of _____, 19_____.

_____
Notary Public My commission expires:
_____, 19_____.

CONTRACT GOALS

MINNESOTA		% OBTAINED
_____%	MINORITY	_____%
_____%	(Or) Skilled	_____%
_____%	Unskilled	_____%
9.4 %	WOMEN	_____%

For Mn/DOT use only

☐ Compliance

☐ Non-compliance

☐ Process Payment

_____
(Approved by) (Date)

NOTICE TO BIDDERS

Particular note should be made in regard to the clarity of numerals (figures) and to the procedure for alterations and the required certificate as directed by Section 1301.

The following abreviations may be used in item description and unit of measure in the Schedule of Prices.

A	Arch
A-S	Antiseepage
AB	Asbestos Bonded
ACT	Actuated
AGG	Aggregate
ALUM	Aluminum
ASB	Asbestos
ASPH	Asphaltic
ASSY	Assemblies
B+B	Balled & Burlapped
BC	Bituminous Coated
BIT	Bituminous
BLDG	Building
BR	Bridge
CAL	Caliper
CB	Catch Basin
CEM	Cement
C and G	Curb and Gutter
CI	Cast Iron
C-I-P	Cast-in-Place
CL	Class
COMM	Commercial
CONC	Concrete
COND	Conductor
CONN	Connection
CONST	Construct
CONT	Continuously
CP	Cattle Pass
CTD	Coated
CU FT	Cubic Feet
CU YD	Cubic Yard
CULV	Culvert
CWT	Hundred Weight
DES	Design
DBL	Double
DI	Drop Inlet
DIAM	Diameter
DRWY	Driveway
EXC	Excavation
EXP	Expansion
FAB	Fabric
FE	Fence
FERT	Fertilizer
F+I	Furnish & Install
FOUND	Foundation
FT LG	Feet Long
FURN	Furnish
GA	Gauge
GRAN	Granular
HI	High
INP	In Place
INST	Install
JA	Jacked
LIN FT	Linear Feet
LG	Long
MAINT	Maintenance
MATL	Material
MBM	1000 Board Feet
MET	Metal
MOD	Modification
MPA	Metal Pipe Arch
MTD	Mounted
NON MET	Non Metallic
NON PERF	Non-Perforated
NON REINF	Non-Reinforced
OH	Overhead
P-A	Pipe-Arch
PAVT	Pavement
PERF	Perforated
PL	Plate
PNEUM	Pneumatic
PREC	Precast
PREST	Prestressed
PVC	Poly Vinyl Chloride
RCPA	Reinforced Concrete Pipe Arch
REINF	Reinforced
RELO	Relocation
RESTOR	Restoration
RMC	Rigid Metallic Conduit
RNMC	Rigid Non Metallic Conduit
RDWY	Roadway
S-G	Sand & Gravel
SIG	Signal
SPE	Special
SQ FT	Square Feet
SQ YD	Square Yard
STA	Station
STD	Standard
STL	Steel
STKPL	Stockpile
STR	Strength
STRUCT	Structural
SPPA	Structural Plate Pipe Arch
SYS	System
T	Traffic
TBR	Timber
TEMP	Temporary
THERMO	Thermoplastic
TRTD	Treated
UNDERGRD	Underground
UNTRTD	Untreated
VAR	Variable
VM	Vehicular Measure
WEAR	Wearing

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 JOINT AND SIDEWALK REPAIR ETC					
0010	2021501/00010 MOBILIZATION	LUMP SUM			141,262.00	
0020	2102501/00010 PAVEMENT MARKING REMOVAL	215.000 SQ FT	1.20000		258.00	
0030	2102501/00020 PAVEMENT MARKING REMOVAL-PERMANENT	395.000 SQ FT	1.20000		474.00	
0040	2102502/00010 PAVEMENT MARKING REMOVAL	4,860.000 LIN FT	0.40000		1,944.00	
0050	2102502/00020 PAVEMENT MARKING REMOVAL-PERMANENT	15,805.000 LIN FT	0.40000		6,322.00	
0060	2104501/00022 REMOVE CURB AND GUTTER	73.000 LIN FT	4.00000		292.00	
0070	2104503/00021 REMOVE CONCRETE WALK	784.000 SQ FT	1.50000		1,176.00	
0080	2104503/00121 REMOVE BITUMINOUS PAVEMENT	515.000 SQ FT	1.00000		515.00	
0090	2104505/00013 REMOVE CONCRETE MEDIAN	67.000 SQ YD	9.00000		603.00	

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0100	2104511/00011 SAWING CONCRETE PAVEMENT (FULL DEPTH)	266.000 LIN FT	7.50000		1,995.00	
0110	2105507/00010 SUBGRADE EXCAVATION	10.000 CU YD	150.00000		1,500.00	
0120	2211503/00050 AGGREGATE BASE (CV) CLASS 5	20.000 CU YD	35.00000		700.00	
0130	2357502/00010 BITUMINOUS MATERIAL FOR TACK COAT	14.000 GALLON	15.00000		210.00	
0140	2360504/24900 TYPE SP 12.5 WEARING COURSE MIXTURE (4L)	344.000 SQ YD-IN	16.00000		5,504.00	
0150	2506522/00011 ADJUST FRAME & RING CASTING	5.000 EACH	300.00000		1,500.00	
0160	2521501/00040 4" CONCRETE WALK	784.000 SQ FT	4.00000		3,136.00	
0170	2531501/02320 CONCRETE CURB & GUTTER DESIGN B624	73.000 LIN FT	25.00000		1,825.00	
0180	2531503/00010 CONCRETE MEDIAN	67.000 SQ YD	40.00000		2,680.00	
0190	2533504/00010 CONCRETE MEDIAN BARRIER DESIGN 8337	2,320.000 LIN FT	9.00000		20,880.00	

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0200	2533603/00040 RELOCATE CONCRETE MEDIAN BARRIER	2,320.000 LIN FT	2.00000		4,640.00	
0210	2563601/00010 TRAFFIC CONTROL	LUMP SUM			89,500.00	
0220	2563602/00002 RAISED PAVEMENT MARKER TEMPORARY	1,938.000 EACH	1.45000		2,810.10	
0230	2563610/00020 POLICE OFFICER	120.000 HOUR	70.00000		8,400.00	
0240	2564603/13100 4" SOLID LINE YELLOW-PAINT	1,190.000 LIN FT	0.31000		368.90	
0250	2564603/13108 4" DOUBLE SOLID LINE YELLOW-PAINT	8,440.000 LIN FT	0.62000		5,232.80	
0260	2564603/31100 4" SOLID LINE WHITE-EPOXY	6,335.000 LIN FT	0.35000		2,217.25	
0270	2564603/31300 12" SOLID LINE WHITE-EPOXY	770.000 LIN FT	3.40000		2,618.00	
0280	2564603/31600 24" SOLID LINE WHITE-EPOXY	270.000 LIN FT	7.00000		1,890.00	
0290	2564603/32100 4" BROKEN LINE WHITE-EPOXY	2,485.000 LIN FT	0.77000		1,913.45	

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0300	2564603/33102 4" DOUBLE SOLID LINE YELLOW-EPOXY	4,645.000 LIN FT	0.68000		3,158.60	
0310	2581501/00010 REMOVABLE PREFORMED PLASTIC MARKING	10,981.000 LIN FT	1.00000		10,981.00	
0320	2581602/00020 PAVEMENT MESSAGE (LT ARROW) REMOVABLE POLY PREFORMED	2.000 EACH	75.00000		150.00	
0330	2581602/00021 PAVEMENT MESSAGE (RT ARROW) REMOVABLE POLY PREFORMED	3.000 EACH	75.00000		225.00	
0340	2581603/00020 REMOVABLE PREFORMED PLASTIC MASK (BLACK)	1,090.000 LIN FT	2.00000		2,180.00	

SECTION 0002 BRIDGE NO 2440

0350	2401511/03633 STRUCTURAL CONCRETE (3Y33)	170.000 SQ FT	0.01000		1.70	
0360	2401618/00002 SPECIAL SURFACE FINISH (INPLACE)	16,162.000 SQ FT	0.70000		11,313.40	
0370	2402591/00199 EXPANSION JOINT DEVICES TYPE SPECIAL	2,982.000 LIN FT	100.00000		298,200.00	
0380	2404501/00200 CONCRETE WEARING COURSE (3U17A)	1,400.000 SQ FT	12.75000		17,850.00	

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0390	2404618/00011 BLASTING (SPECIAL)	1,400.000 SQ FT	1.00000		1,400.00	
0400	2433505/00011 REMOVE SLAB TYPE 1	1,400.000 SQ FT	14.00000		19,600.00	
0410	2433505/00013 REMOVE SLAB TYPE 3	170.000 SQ FT	24.00000		4,080.00	
0420	2433601/00040 RECONSTRUCT CONDUIT SYSTEM (LIGHTING)	LUMP SUM			1,800.00	
0430	2433603/00401 CLEAN AND SEAL JOINTS TYPE 1	496.000 LIN FT	4.20000		2,083.20	
0440	2433603/02010 RECONSTRUCT EXPANSION JOINT TYPE A	340.000 LIN FT	233.00000		79,220.00	
0450	2433603/02040 RECONSTRUCT EXPANSION JOINT TYPE D	2,642.000 LIN FT	205.00000		541,610.00	
0460	2433606/00010 SEAL OVERLAY CRACKS	6.000 GALLON	825.00000		4,950.00	
0470	2433618/00100 REPAIR CONCRETE SURFACE	4,000.000 SQ FT	97.00000		388,000.00	

SECTION 0003 BRIDGE NO 27164

CONTRACT ID: 030101 PROJECT(S): 2710-33 ROUTE: TH 65=105
2710-2440 TH 65=105
2710-27164 TH 65=105

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0480	2401511/03534 STRUCTURAL CONCRETE (3X33A)	250.000 SQ FT	10.00000		2,500.00	
0490	2433505/00011 REMOVE SLAB TYPE 1	200.000 SQ FT	15.00000		3,000.00	
0500	2433505/00012 REMOVE SLAB TYPE 2	50.000 SQ FT	20.00000		1,000.00	
0510	2433603/00401 CLEAN AND SEAL JOINTS TYPE 1	2,192.000 LIN FT	4.25000		9,316.00	
0520	2433603/02090 RECONSTRUCT EXPANSION JOINT TYPE SPECIAL	325.000 LIN FT	49.00000		15,925.00	
0530	2433618/00110 CONCRETE SURFACE REPAIR	6.000 SQ FT	24.00000		144.00	
	TOTAL BID				1,731,054.40	

Form 21126D (SF Rev. 1-00)

State Project No. 2710-33

$1,731,054.40

PROPOSAL GUARANTY required by 1208 of the Specifications: "A (certified check) (bond). prepared as required by 1208 of the Specifications and payable to the Commissioner of Transportation, in an amount equal to at least 5% of the total amount of the bid is submitted herewith as a proposal quaranty.

TARGETED GROUP BUSINESS CERTIFICATION: Our firm will meet a minimum goal of 0.00 % of this contract to Targeted Group Businesses. A bidder who fails to indicate a spcific goal above must fulfill the total goals indicated in this proposal.

NON-COLLUSION AFFIDAVIT: A non-Collusion affidavit is found in this proposal which must be signed be each bidder.

RECEIPT OF ADDENDA as required by 1210 of the Specifications:
The undersigned hereby acknowledges receipt of and has considered:

Addendum No. _____ Dated / / Addendum No. _____ Dated _____

Addendum No. _____ Dated / / Addendum No. _____ Dated _____

Signed: M. S. MCGRAY

EXECUTION OF PROPOSAL as required by 1206 of the Specifications:

This proposal dated the 25th day of April, 2003

Signed: _____, P.O. Address _____ as an individual.

Signed: _____, P.O. Address _____ as an individual.

doing budiness under the name and style of _____

Signed: _____, for _____ a partnership.

NAME	BUSINESS ADDRESS

Signed: _____, for PROGRESSIVE CONTRACTORS INC, a corporation incorporated under the laws of the State of Minnesota

Name of President M. S. MCGRAY Name of Secretary RONALD E. GIBBONS

Name of Vice-President GERALD E. INGMAN Name of Treasurer _____

Business Address 14123 42nd St. N. E.
P O Box 416
St. Michael, MN 55376

(NOTE: Signatures shall comply with 1206 of the Specifications.)