

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. When the failure occurs at the first test after the start of daily production, tonnage subjected to reduced payment shall include the tonnage from the start of production that day.

**Table 2360.4-L6
Reduced Payment Schedule for Moving Average Test Results**

Item	Pay Factor ⁽¹⁾
Gradation (SEE FOOTNOTE #3 BELOW)	75 % ⁽³⁾
Coarse and Fine Aggregate Crushing	NA (individual failures only)
VMA ⁽²⁾	75 %
Asphalt Binder Content	75 %
Production Air Voids ⁽²⁾	70 %

- (1) Lowest Pay Factor applies when there are multiple reductions on a single test.
- (2) See criteria for mixture production start-up
- (3) Excluding the 0.075 mm [#200] sieve, use 95% pay factor if failure is within aggregate gradation broadband, Table 2360.2-E.

L7 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. When the failure occurs at the first test after the start of daily production, tonnage subjected to reduced payment shall include the tonnage from the start of production that day.

L8 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-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. When the failure occurs at the first test after the start of daily production, tonnage subjected to reduced payment shall include the tonnage from the start of production that day.

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 G_{mm} mixture max gravity, G_{mb} 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. Methods to analyze data for determination of bias are on file in the Bituminous Office.

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

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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, if the paving width is greater than the basic screed, auger and mainframe extensions, which meet manufacture's recommendations for the paving width, are required unless otherwise directed by the Engineer. Strike-off only extension assemblies are not allowed for mainline wearing course paving, unless directed by the Engineer.

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.

Automatic screed control by means of an erected string line shall only be required when stated in the Contract.

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 m² 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 mixture requirements. These results will be used for material acceptance. Acceptance of material will be in accordance with the criteria outlined in Section 2360.4L1, L2, L3, and L8.

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

B1a Pavement Density Determination

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

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

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

B2 Required Density

Minimum density requirements for 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 or have a different required minimum

density than the driving lane, the lot tonnage placed on the shoulder shall be delineated in separate lots from the driving lanes for the day paving was conducted.

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

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

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

**Table 2360.6-B2
Required Minimum Lot Density**

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

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

B2a Lots & Core Locations

**Table 2360.6-B2a
Lot Determination**

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

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

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 \pm 12.5 mm [6 inches \pm 0.5 inch] from the edge of the top of the mat (ex. center of 100 mm [4 inch] core barrel 200 mm \pm 12.5 mm [8 \pm 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 thicknesses 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.

B4 Maximum Density Acceptance and Payment Schedule

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

The Contractor's cores will be used for acceptance if the determined bulk specific gravity G_{mb} from AASHTO T-166, Mn/DOT modified or ASTM D6752 Mn/DOT modified (Corelok) 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-B4 or 2360.6-B4A. Incentive and disincentive payments are for both wearing and non-wearing courses.

When the density requirement has been reduced by one percent, per Table 2360.6-B2, footnote 1 & 2, payment adjustments for lot densities will be made as specified in Table 2360.6-B4A. Incentive payments are excluded when the minimum density has been reduced. However, at the Contractors request and with approval of

the Engineer, the reduced density requirement may be waived and density evaluated under Table 2360.6-B4, including incentives, for first lift constructed on aggregate base, reclaimed or cold in-place recycled base courses and first lift of an overlay on a roadway with a 6.35 metric ton [7 ton] or less spring load restriction (reduced density shall not be waived for the first lift constructed on PCC pavements). The request and approval shall be made after the first days paving and before the third days paving begins. Once the request has been approved, evaluation of density will be in accordance with Table 2360.6-B2 (excluding footnote 2) and Table 2360.6-B4, and will remain in effect for the duration of mixture placement on that lift. The Contractor will also be responsible for compliance with any construction requirements on subsequent lifts.

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

Percent of Max Specific Gravity ⁽²⁾ SP Wear All MV & LV, SP Shld (4% Void)	Percent of Max Specific Gravity ⁽²⁾ SP Non-Wear 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-B4A ⁽¹⁾
1% Reduced Table**

Percent of Max Specific Gravity ⁽²⁾ SP Wear All MV & LV, SP Shld (4% Void)	Percent of Max Specific Gravity ⁽²⁾ SP Non-Wear 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 in-place recycled base courses and first lift of an overlay on a roadway with a 6.35 metric ton [7 ton] or less spring load restriction (roadway includes shoulders). Minimum reduced by one percent on the first lift constructed on PCC pavements (reduced density cannot be waived).
- (2) In calculating the percent of maximum specific gravity, report to the nearest tenth.
- (3) The payment in this portion of the specification shall apply only if the day's weighted average individual production air voids are within - 0.5 percent of the target air void value. The weighted average air voids shall be based on all the mixture production tests (2360.4e) for the corresponding day and shall be weighted by the tons the corresponding test represents.
- (4) The HMA material represented by the lot shall be paid at a 70% pay factor, unless a single core density is less than 87.0% of the maximum specific gravity (Gmm). If a single core density is less than 87.0% of Gmm, the Engineer will decide whether the mixture is subject to removal and replacement or reduced payment. Reduced payment will be 50 percent of the Contract bid price. If the mixture is to be removed and replaced, the Contractor at his expense will remove and replace with mixture that meets the density requirement. The limits of the area to be removed and replaced will be determined by additional core samples. These additional core samples shall be taken at the same offset from centerline as the original core; unless the original low density core

was taken within 0.45 m [**1.5 feet**] of an edge of the paver pass. In that case, the additional cores shall be taken 0.45 m [**1.5 feet**] from the edge of the paver pass. The densities shall be determined at 15 m [**50 foot**] intervals, both ahead and back of the point of unacceptable core density (less than 87.0% of Gmm), until a point of acceptable core density (87.0% of Gmm or greater) is found. If the incremental core density testing extends into a previously accepted lot, removal of the unacceptable material will be required; however, the results of these tests shall not be used to recalculate the previously accepted lot density. All costs incurred from additional coring and testing, resulting from unacceptable core density, will be paid by the Contractor. The unacceptable pavement area is to be computed as the product of the longitudinal limits so determined by the 15 m [**50 foot**] cores and the full width of the paver pass, laying in the traffic lane or lanes. Shoulders shall be exempt from this calculation unless density failure occurred in the shoulder area.

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

C Ordinary Compaction Method

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

A control strip shall be constructed at the beginning of the work on each lift of each course. Each control strip shall have an area of at least 330 m² [**395 square yards**] and shall be of the same thickness as the lift it represents. The subgrade or pavement course upon which a control strip is to be constructed shall have the prior approval of the Engineer. The control strips shall remain in place and become part of the completed work.

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

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

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

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

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

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

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

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

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

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

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

C1 Rollers

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

C2 Steel-Wheeled Rollers

Steel-wheeled rollers shall be self-propelled and has a minimum total mass of 7.3 metric tons [**8 tons**], or as otherwise specified in the Contract. When vibratory rollers are used, they shall produce 45 kN per meter [**3,085 lbf per foot**] of width. The frequency should be at least 2400 vpm and amplitude setting low. The roller shall be capable of reversing without backlash and shall be equipped with spray attachments for moistening all rollers on both sets of wheels.

C3 Pneumatic-Tired Rollers

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

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

C3a Vibratory Pneumatic-Tired Rollers

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

C4 Trench Rollers

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

C5 Mixture Temperature Controls

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

**Table 2360.6-C5
Mixture Temperature Control**

Air Temperature °C [°F]	Compacted Mat Thickness, mm ^(A)			
	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 lift 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 lift placed. This thickness requirement will not apply to a leveling lift whether or not automatic grade controls are required. The Engineer may require removal and replacement, at the Contractor's expense, of any part of any lift that is constructed to less than the minimum required thickness.

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 day per lift will be used to determine daily compliance with thickness specifications.

On that portion of any lift constructed to more than the maximum permissible thickness, the materials used in the excess mixture above that required to construct that portion of the lift to the Plan thickness plus

6 mm [**1/4 inch**] may be excluded from the pay quantities and at the discretion of the Engineer and at the Contractor's expense may be required to be removed and replaced.

B Surface Requirements

After compaction, the finished surface of each lift shall be reasonably free of segregated, open and torn sections, and shall be smooth and true to the grade and cross section shown on the Plans with the following tolerances:

- (1) Where a leveling lift 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 lift placed other than leveling when automatic controls are used.
- (2) The surface of the final two lifts placed shall show no variation greater than 6 mm [**1/4 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 final lift asphalt wearing 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) Transverse joints (construction joints), at the beginning and end of a project, at paving exceptions, or caused by suspension of daily paving operations, shall show no variation greater than 6 mm [**1/4 inch**] from the edge of a 3 m [**10 foot**] straightedge centered longitudinally across the transverse joint. The Engineer may require correction by diamond grinding when material is placed outside the above-described limitations.
- (5) The transverse slope of the surface of each lift, exclusive of the shoulder wearing lift, shall not vary from the slope shown in the Plans by more than 0.4 percent.
- (6) The distance between the edge of each lift 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 lift 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.
- (7) The finished surface of each lift 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 in place at a reduced cost calculated at \$12 per square meter [**\$10 per square yard**].

C Pavement Smoothness Specification – IRI (International Roughness Index)

C1 General

Pavement smoothness will be evaluated on the final mainline pavement surface using an Inertial Profiler (IP) and the International Roughness Index (IRI). Unless otherwise authorized by the Engineer, all smoothness testing shall be performed in the presence of the Engineer. The Engineer and the Contractor shall mutually agree upon scheduling of smoothness testing so that testing can be observed. Any testing performed without the Engineer's presence, unless otherwise authorized, may be ordered retested at the Contractor's expense.

The following Table 2360.7-A (IRI) shows pavement surfaces that are excluded from smoothness testing but subject to 2360.7B surface requirements.

**Table 2360.7 – A (IRI)
Testing Exclusions**

7.62 m [25 foot] feet either side of obstructions such as manholes, water supply castings, etc.*
Ramps, Loops, Climbing lanes
Side Streets, Side Connections
Turn Lanes, Storage Lanes, Crossovers, Bypass Lanes
Shoulders
Intersections constructed under traffic – Begin and end the exclusion 30.5m [100 feet] from the intersection radius
Sections less than 7.62 m [25 foot] in length
Acceleration, Deceleration Lanes
Projects less than 300m [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 concrete

*Mainline shall be included in profiling if obstructions are located in auxiliary or parking lanes

C1A Smoothness Requirements

Pavement smoothness requirements will be evaluated by the International Roughness Index (IRI) Equation A, Equation B, or Equation C. The pavement smoothness Equation will be identified in the Special Provisions of the proposal. Location of bumps and/or dips and magnitude will be based on California Test Method 526.

C2 Measurement

Smoothness will be measured with an IP, which produces both an IRI value and a profilogram (profile trace of the surface tested). The IP shall conform to the Class 1 requirements of ASTM E950-94 and must be certified according to the most recent procedure on file in the Bituminous Office. For pavement evaluation, one pass will be made in the right wheel path of each traffic lane. The IP shall be run 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 IP shall be operated at the optimum speed as defined by the manufacturer.

C3 Smoothness testing

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

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

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

The pavement surface will be divided into sections which represent continuous placement. A section will terminate 7.62 m [**25 foot**] before a bridge approach panel, bridge surface, manhole or similar

interruption. In the final pavement evaluation, 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 mi**]. A segment will be in one traffic lane only.

An IRI value shall be computed for each segment of 7.62 m [**25 foot**] or more. The IRI value will include the 7.62 m [**25 foot**] at the ends of the section only when the Contractor is responsible for the adjoining surface.

End of run areas not included in the IRI value and any sections of pavement less than 7.62 m [**25 foot**] in length shall be checked longitudinally with a 3.028 m [**10 ft**] straight edge and the surface shall not deviate from a straight line by more than 6 mm in 3.028 m [**1/4 inch in 10 ft**]. Transverse joints shall be evaluated by centering the straightedge longitudinally across the transverse joint.

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

The Contractor shall submit a final spreadsheet summary of the smoothness data to the Engineer within five calendar days after all mainline pavement placement. The summary shall be signed by the Contractor. The spreadsheet summary 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 final IRI value for the segment, the IRI based incentive/disincentive in dollars for the segment, and the deductions for bump(s)/dip(s) 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, a lane designation, the mix type of the final lift, the PG binder of the final lift, the date of the final smoothness runs, and the beginning and ending station of the continuous run. The following information shall be included at the bottom of each summary: a subtotal for the IRI based incentive/disincentive, a subtotal for the bump deductions, and a total for incentive/disincentive for both IRI values and bumps. Software to summarize the data is available from the Mn/DOT Bituminous Office at www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp.

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

C3A Retesting

The Engineer may require any portion or the total project to be retested if the results are questioned. This includes both IRI values and bump/dip locations. The Engineer will decide whether Mn/DOT, an independent testing firm (ITF), or the Contractor will retest the roadway surface.

If the retested IRI values differ by more than 10% from the original IRI values, the retested values will be used as the basis for acceptance and any incentive/disincentive payments. In addition, bump/dip locations as shown by the retest will replace the original results.

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

C4 IRI Values

The IP shall be equipped with automatic data reduction capabilities for determining the IRI values. An IRI value shall be calculated for each segment of the final pavement surface. The IRI values shall be determined by following NCHRP report 228. The IRI values shall be reported in units of m per km [**inches per mile**]. Both m per km and inches per mile shall be reported with two digits right of the decimal. Follow Mn/DOT rounding procedures per the Bituminous Manual section 5-693.730.

When there is a segment equal to or less than 76.2 m [**250 ft**] in length at the end of a lane of paving, the IRI value for that segment shall be mathematically weighted and added to and included in the evaluation of the adjacent segment. Segments greater than 76.2 m [**250 ft**] in length will be evaluated individually.

C4a Bumps and Dips – IRI Equation A and IRI Equation B

Bump/dip location will be determined in accordance with California Method 526. Bumps and dips equal to or exceeding 10.2 mm in a 7.62 m [**0.4 inch in a 25 ft**] 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.

The Contractor shall correct, by diamond grinding, all areas represented by bumps or dips of 10.2 mm [**0.4 inch**] or more as measured by California Test Method 526. However, the Engineer may allow bumps or dips of 10.2 mm to 15.2 mm [**0.4 inches to 0.6 inches**] in a 7.62 m [**25 foot**] span to be left uncorrected, and in such case, the contractor will be assessed a price deduct as specified in section C6 (“Payment”) of this special provision.

Corrected dips or bumps will be considered satisfactory when the profilogram shows the deviations are less than 10.2 mm in a 7.62 m [**0.4 inch in a 25 foot**] span.

C4b Bumps and Dips – IRI Equation C

Bump/dip location will be determined in accordance with California Method 526. Bumps and dips equal to or exceeding 12.7 mm in a 7.62 m [**0.5 inch in a 25 ft**] 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.

The Contractor shall correct, by diamond grinding, all areas represented by bumps or dips of 12.7 mm [**0.5 inch**] or more as measured by California Test Method 526. However, the Engineer may allow bumps or dips of 12.7 mm to 17.8 mm [**0.5 inches to 0.7 inches**] in a 7.62 m [**25 foot**] span to be left uncorrected, and in such case, the contractor will be assessed a price deduct as specified in section C6 (“Payment”) of this special provision.

Corrected dips or bumps will be considered satisfactory when the profilogram shows the deviations are less than 12.7 mm in a 7.62 m [**0.5 inch in a 25 foot**] span.

C5 Surface Correction

Unless otherwise approved by the Engineer, corrective work shall be by diamond grinding. Other methods may include; overlaying the area, or replacing the area by milling and inlaying. The Engineer shall approve of the Contractor’s method of correcting segment(s) prior to the Contractor starting corrective work. Any corrective actions by milling and inlay or overlay shall meet the specifications for ride quality over the entire length of the correction, including the first and last 7.62 m [**25 foot**]. Bumps or dips in excess of 10.2 mm [**0.4 inches**] where evaluation is by Equation A or B or bumps or dips in excess of 12.7 mm [**0.5 inch**] where evaluation is by Equation C that are located at transverse joints at areas of corrective actions utilizing overlay or milling and inlay, shall be removed by diamond grinding. The Contractor shall notify the Engineer prior to commencement of the corrective action. If the surface is corrected by overlay, inlay or replacement, the surface correction shall begin and end with a transverse saw cut. Surface corrections shall be made prior to placing permanent pavement markings. In the event that permanent pavement marking are damaged or destroyed during surface correction activities, they will be replaced at no cost to the Agency.

When pavement smoothness evaluation by Equation A is specified the Engineer may require that the Contractor, at no expense to the Department, correct segments with an IRI greater than 1.03 m per km [**65 inches/mile**] or the Engineer may assess a \$560 per 0.1 km [**\$900 per 0.1 mile**] penalty in lieu of requiring corrective work.

When pavement smoothness evaluation by Equation B is specified the Engineer may require that the Contractor, at no expense to the Department, correct segments with an IRI greater than 1.18 m per km **[75 inches/mile]** or the Engineer may assess a \$420 per 0.1 km **[\$675 per 0.1 mile]** penalty in lieu of requiring corrective work.

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

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 subject to the approval of the Engineer. After all required corrective work is completed a final segment(s) IRI value and bump/dip tabulation shall be determined and submitted to the Engineer. Corrective work and re-evaluation shall be at the Contractor's expense.

Segments requiring grinding will be re-profiled within two working days of completion of grinding. Individual bumps/dips and segments requiring grinding shall be completed with 15 working days of notification.

C6 Payment

The cost of traffic control for certified smoothness testing and/or any corrective work is 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 IRI value. The total ride incentive shall not exceed 10% of the total mix price for pavement smoothness evaluated under IRI Equation A, 5% of the total mix price for pavement smoothness evaluated under Equation B, or 5% of the total mix price for pavement smoothness evaluated under Equation C. Total mix shall be defined as **all** mixture placed on the project. Pay adjustments for incentives will only be based on the segment IRI value before any corrective work has been performed. Any segment that contains corrective action for IRI value or bumps is not eligible for incentive pay.

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 pavement smoothness evaluated under Equation A uncorrected bumps or dips greater than or equal to 10.2 mm **[0.4 inches]** in a 7.62 m **[25 foot]** span will be assessed a price deduction of \$900 per event.

For pavement smoothness evaluated under Equation B uncorrected bumps or dips greater than or equal to 10.2 mm **[0.4 inches]** in a 7.62 m **[25 foot]** span will be assessed a price deduction of \$675 per event.

For pavement smoothness evaluated under Equation C uncorrected deviations (bumps or dips) greater than or equal to 12.7 mm **[0.5 inches]** in a 7.62 m **[25 foot]** span will be assessed a price deduction of \$450 per event.

Combinations of bumps and dips which arise from the same single bump or dip are considered to be one event, and shall be counted only once for the purposes of calculating price deductions. Typically, bump-dip-bump combinations, or dip-bump-dip combinations, that are confined to a 30 feet longitudinal segment are considered to be one event.

Bumps or dips resulting from a construction joint will be assessed a \$900 penalty, regardless of the IRI Equation used for evaluation or pavement smoothness.

Incentive/disincentive payments will be based on the IRI determined for each segment and will be based on the following equations and criteria.

C6a IRI Equation A*

IRI m/km [inches/mile]

< 0.47 m/km [**< 30 inches/mile**]

0.47 m/km to 1.03 m/km [**30 inches/mile to 65 inches/mile**]

1.03 m/km [**> 65 inches/mile**]

* Typically, 3-lift minimum construction

Incentive/Disincentive \$/0.1km [\$/0.1mile]

\$249 [**\$400**]

\$523 – (IRI x 584) [**\$850 – (IRI x 15)**]

-\$560 [**-\$900**]

C6b IRI Equation B*

IRI m/km [inches/mile]

< 0.52 m/km [**< 33 inches/mile**]

0.52 m/km to 1.18 m/km [**33 inches/mile to 75 inches/mile**]

1.18 m/km [**> 75 inches/mile**]

* Typically, 2-lift construction

Incentive/Disincentive \$/0.1km [\$/0.1mile]

\$168 [**\$270**]

\$373 – (IRI x 395) [**\$600 – (IRI x 10)**]

-\$420 [**-\$675**]

C6c IRI Equation C*

IRI m/km [inches/mile]

< 0.57 m/km [**< 36 inches/mile**]

0.57 m/km to 1.34 m/km [**36 inches/mile to 85 inches/mile**]

1.34 m/km [**> 85 inches/mile**]

* Typically, single lift construction

Incentive/Disincentive \$/0.1km [\$/0.1mile]

\$112 [**\$180**]

\$258 – (IRI x 257) [**\$414 – (IRI x 6.5)**]

-\$280 [**-\$450**]

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 and/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, 21-22, 23-34). The Mn/DOT Office of Civil Rights 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). Mn/DOT's Office of Civil Rights 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 Pages 21-34 of these Special Provisions may be omitted from projects with no Federal funding.

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**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 Page 14) and "Required Contract Provisions - Federal-Aid Construction Contracts" (EEO Pages 23-34).
2. The goals and timetables for minority and women participation, expressed in percentage terms of hours of labor 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, 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 (OFCCP) 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.** (651) 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 Office of Civil Rights at (651) 366-3073.

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 Monthly Employment Compliance Report 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 Report (Form EEO-12, sample copy at EEO Pages 17-18) once prior to work commencing on the project, unless one has been completed already within the calendar year.

The prime contractor of each project collects Monthly Employment Compliance Reports from each subcontractor who performed work during the month, and completes a Monthly Employment Compliance Report on its own work force. For the month of July only, an EEO-13 is required for each payroll period within the month of July. The prime contractor submits the EEO-13 forms to the Mn/DOT Project Engineer by the 15th day 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. 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.
3. 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 21) and submits it to the CCS assigned to the project for approval. The CCS notifies the Contractor and Project Engineer when the applicant is approved.
4. 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 22). 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 Civil Rights will provide these forms upon request. Please call the Office of Civil Rights, (651) 366-3073.

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, pre apprenticeship, 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/her 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 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

SPECIFIC FEDERAL EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (*con't*)

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/her 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 non minority 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 a "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 Civil Rights. 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
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 woman off-the-street applicant and minority or woman 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 therefore 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 non segregated 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	Minority Goal	Women Goal
Aitkin	2.2%	6.9%	5%	6%
Anoka	2.9%	6.9%	11%	6%
Becker	0.7%	6.9%	6%	6%
Beltrami	2.0%	6.9%	6%	6%
Benton	0.5%	6.9%	3%	6%
Big Stone	2.2%	6.9%	4%	6%
Blue Earth	2.2%	6.9%	4%	6%
Brown	2.2%	6.9%	4%	6%
Carlton	1.2%	6.9%	5%	6%
Carver	2.9%	6.9%	11%	6%
Cass	2.2%	6.9%	6%	6%
Chippewa	2.2%	6.9%	4%	6%
Chisago	2.9%	6.9%	3%	6%
Clay	0.7%	6.9%	6%	6%
Clearwater	2.0%	6.9%	6%	6%
Cook	1.2%	6.9%	5%	6%
Cottonwood	0.8%	6.9%	4%	6%
Crow Wing	2.2%	6.9%	6%	6%
Dakota	2.9%	6.9%	11%	6%
Dodge	0.9%	6.9%	4%	6%
Douglas	2.2%	6.9%	6%	6%
Faribault	2.2%	6.9%	4%	6%
Fillmore	0.9%	6.9%	4%	6%
Freeborn	0.9%	6.9%	4%	6%
Goodhue	2.2%	6.9%	4%	6%
Grant	2.2%	6.9%	6%	6%
Hennepin	2.9%	6.9%	11%	6%
Houston	0.6%	6.9%	4%	6%
Hubbard	2.0%	6.9%	6%	6%
Isanti	2.2%	6.9%	3%	6%
Itasca	1.2%	6.9%	5%	6%
Jackson	0.8%	6.9%	4%	6%
Kanabec	2.2%	6.9%	3%	6%
Kandiyohi	2.2%	6.9%	3%	6%
Kittson	2.0%	6.9%	6%	6%
Koochiching	1.2%	6.9%	5%	6%
Lac Qui Parle	2.2%	6.9%	4%	6%
Lake	1.2%	6.9%	5%	6%
Lake of the Woods	2.0%	6.9%	6%	6%
Le Sueur	2.2%	6.9%	4%	6%
Lincoln	0.8%	6.9%	4%	6%
Lyon	0.8%	6.9%	4%	6%

Minnesota Department of Transportation
 Office of Civil Rights

County	Federal Goals		State Goals	
	Minority Goal	Women Goal	Minority Goal	Women Goal
Mahnomen	2.0%	6.9%	6%	6%
Marshall	2.0%	6.9%	6%	6%
Martin	2.2%	6.9%	4%	6%
McLeod	2.2%	6.9%	3%	6%
Meeker	2.2%	6.9%	3%	6%
Mille Lacs	2.2%	6.9%	3%	6%
Morrison	2.2%	6.9%	6%	6%
Mower	0.9%	6.9%	4%	6%
Murray	0.8%	6.9%	4%	6%
Nicollet	2.2%	6.9%	4%	6%
Nobles	0.8%	6.9%	4%	6%
Norman	2.0%	6.9%	6%	6%
Olmsted	1.4%	6.9%	4%	6%
Otter Tail	2.2%	6.9%	6%	6%
Pennington	2.0%	6.9%	6%	6%
Pine	2.2%	6.9%	3%	6%
Pipestone	0.8%	6.9%	4%	6%
Polk	1.2%	6.9%	6%	6%
Pope	2.2%	6.9%	6%	6%
Ramsey	2.9%	6.9%	11%	6%
Red Lake	2.0%	6.9%	6%	6%
Redwood	0.8%	6.9%	4%	6%
Renville	2.2%	6.9%	3%	6%
Rice	2.2%	6.9%	4%	6%
Rock	0.8%	6.9%	4%	6%
Roseau	2.0%	6.9%	6%	6%
Scott	2.9%	6.9%	11%	6%
Sherburne	0.5%	6.9%	3%	6%
Sibley	2.2%	6.9%	4%	6%
St. Louis	1.0%	6.9%	5%	6%
Stearns	0.5%	6.9%	3%	6%
Steele	0.9%	6.9%	4%	6%
Stevens	2.2%	6.9%	6%	6%
Swift	2.2%	6.9%	4%	6%
Todd	2.2%	6.9%	6%	6%
Traverse	2.2%	6.9%	6%	6%
Wabasha	0.9%	6.9%	4%	6%
Wadena	2.2%	6.9%	6%	6%
Waseca	2.2%	6.9%	4%	6%
Washington	2.9%	6.9%	11%	6%
Watonwan	2.2%	6.9%	4%	6%
Wilkin	0.7%	6.9%	6%	6%
Winona	0.6%	6.9%	4%	6%
Wright	2.9%	6.9%	3%	6%
Yellow Medicine	2.2%	6.9%	4%	6%

Minnesota Department of Transportation
 Office of Civil Rights
 Contractor Employment Data

1. Contractor Name and Address:

2. Employment Data		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)
a) Name: Last Name, First Name, MI							
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
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24.							
25.							
26.							
27.							

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. (Prime and Subs)

1. Contractor Name and Address self-explanatory.
2. Employment Data information will coincide with your employment records.
 - 2a. Name should be listed First Name, Middle Initial, and Last Name. 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 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 approved Trainee.

If you have questions about filling out this form, contact the Office of Civil Rights at (651) 366-3073.
(Please make copies as you need them.)

This information can be submitted electronically via the web, through Mn/DOT’s Work force Information Tracking Initiative (WITI) Program. To open a free account to gain access to WITI or to find out more about this possibility please contact Mn/DOT’s Office of Civil Rights at (651) 366-3015.

**Minnesota Department of Transportation
Office of Civil Rights
Monthly Employment Compliance Report
EEO-13**

1. SP <input type="checkbox"/> SAP <input type="checkbox"/>		3. Contractor Name:		4. Prime <input type="checkbox"/> Subcontractor <input type="checkbox"/>	
(Check one) SP#		Federal Tax ID:		(check one)	
County or City		Street Address:		5. Dollar Amount of Contract:	
2. Reporting Period _____ to _____		City, State Zip		6. Percent of Completion:	
7. Employment Data		e) Gender M or F		g) Level (A, J or T)	
a) Name: Last, First Middle Initial		d) Ethnicity		h) Hours Worked This Period	
b) Social Security #		c) New Hire (Y or N)			
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
8. Contract Goals		9. Prepared by: (Signature)		10. Reviewed by: (Signature)	
MINNESOTA GOALS		Print Name:		Print Name:	
% Minority _____%		Title:		Title:	
% Women _____%		Date:		Date:	
		Phone:		Phone:	
		Fax:		Fax:	

INSTRUCTIONS FOR EEO-13
MONTHLY EMPLOYMENT COMPLIANCE REPORT

- 1.-5. Self-explanatory – State Project #, county project is located in, are you a prime or sub, and contract value.
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 trade that applies unless the 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 approved Trainee.
 - 7h. Hours Worked for This Period will be all hours worked by the individual, for each trade, during the specified 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. Projects in excess of \$10,000 with any Federal funding must meet the Federal 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.
9. Prepared by Contractor Designee is the signature of the prime or subcontractor’s EEO officer/designee.
10. 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 Civil Rights at (651) 366-3073.
(Please make copies as you need them.)

This information can be submitted electronically via the web, through Mn/DOT’s Work force Information Tracking Initiative (WITI) Program. To open a free account to gain access to WITI or to find out more about this possibility please contact Mn/DOT’s Office of Civil Rights at (651) 366-3015.



MINNESOTA DEPARTMENT OF TRANSPORTATION
ON-THE-JOB TRAINING PROGRAM
TRAINEE ASSIGNMENT

SP #: _____ Location: _____ District: _____

Project Engineer: _____ Phone: () _____

Prime Contractor: _____ Phone: () _____

Address: _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

Training Contractor: _____ Phone: () _____

Address: _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

TRAINEE

Job Title or Trade Classification: _____ Number of Training Hours on this Project: _____

Name: _____ S.S.#: _____

Address: _____ Phone: () _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

Approximate Start Date: _____

Approximate Completion Date: _____

Is the trainee a member of a certified apprenticeship program?

If YES, verify with Apprenticeship Form or Indenture Number: _____

<p>1. Ethnic Background: Hispanic _____; Black _____; Asian/Pacific Islander _____; White _____;</p> <p>Am. Ind/Alaskan _____ (Verify with Tribal I.D. # or Affiliation _____).</p> <p>2. Male; _____ Female; _____.</p>

SCHEDULE OF PRICES

NOTICE TO BIDDERS

Particular note should be made in regard to the clarity of numerals (figures) and to the procedure for alterations and the required certificate as directed by Section 1301.

The following abbreviations may be used in item description and unit of measure in the Schedule of Prices.

A	Arch	JA	Jacked
A-S	Antiseepage	LIN FT	Linear Feet
AB	Asbestos Bonded	LG	Long
ACT	Actuated	MAINT	Maintenance
AGG	Aggregate	MATL	Material
ALUM	Aluminum	MGM	1000 Board Feet
ASB	Asbestos	MET	Metal
ASPH	Asphaltic	MOD	Modification
ASSY	Assemblies	MPA	Metal Pipe Arch
B+B	Balled & Burlapped	MTD	Mounted
BC	Bituminous Coated	NON MET	Non Metallic
BIT	Bituminous	NON PERF	Non-Perforated
BLDG	Building	NON REINF	Non-Reinforced
BR	Bridge	OH	Overhead
CAL	Caliper	P-A	Pipe-Arch
CB	Catch Basin	PAVT	Pavement
CEM	Cement	PERF	Perofrated
C and G	Curb and Gutter	PL	Plate
CI	Cast Iron	PNEUM	Pneumatic
C-I-P	Cast-in-Place	PREC	Precast
CL	Class	PREST	Prestressed
COMM	Commercial	PVC	Poly Vinyl Chloride
CONC	Concrete	RCPA	Reinforced Concrete Pipe Arch
COND	Conductor	REINF	Reinforced
CONN	Connection	RELO	Relocation
CONST	Construct	RESTOR	Restoration
CONT	Continuously	RMC	Rigid Metallic Conduit
CP	Cattle Pass	RNMC	Rigid Non Metallic Conduit
CTD	Coated	RDWY	Roadway
CU FT	Cubic Feet	S-G	Sand & Gravel
CU YD	Cubic Yard	SIG	Signal
CULV	Culvert	SPE	Special
CWT	Hundred Weight	SQ FT	Square Feet
DES	Design	SQ YD	Square Yard
DBL	Double	STA	Station
DI	Drop Inlet	STD	Standard
DIAM	Diameter	STL	Steel
DRWY	Driveway	STKPL	Stockpile
EXC	Excavation	STR	Strength
EXP	Expansion	STRUCT	Structural
FAB	Fabric	SPPA	Structural Plate Pipe Arch
FE	Fence	SYS	System
FERT	Fertilizer	T	Traffic
F+I	Furnish & Install	TBR	Timber
FOUND	Foundation	TEMP	Temporary
FT LG	Feet Long	THERMO	Thermoplastic
FURN	Furnish	TRTD	Treated
GA	Gauge	UNDERGRD	Underground
GRAN	Granular	UNTRTD	Untreated
HI	High	VAR	Variable
INP	In Place	VM	Vehicular Measure
INST	Install	WEAR	Wearing

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

CONTRACT

DATE OF OPENING : July 25, 2008

CALL ORDER : 141

JOB NUMBER : 080141

PROJECTS

8821-177

COUNTY : ST LOUIS

CODE: U010

1. ULLAND BROTHERS INC

JOB NUMBER : 080141

S.P. 8821-177 --- STATE FUNDS --- In St. Louis County on
T.H. 53 from 1.774 miles South to 4.320 miles North of Jct
USTH 169 --- Bituminous Mill and Overlay And Signal
Revisions

SITE	CONTRACT TIME	LIQUIDATED DAMAGES
CONTRACT	20 WORK DAYS	\$ 0.00

CONTRACT ID: 080141

PROJECT(S): 8821-177

ROUTE: TH 53

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 BITUMINOUS MILL & OVERLAY ETC

0010	2021501/00010 MOBILIZATION	LUMP SUM				51,698.21
0020	2051501/00010 MAINT AND RESTORATION OF HAUL ROADS	LUMP SUM				1.00
0030	2104501/00052 REMOVE CABLES	260.000 LIN FT	1.60000			416.00
0040	2105607/00037 HAUL & STOCKPILE BIT MATERIAL (LV)	6,700.000 CU YD	7.50000			50,250.00
0050	2232501/00040 MILL BITUMINOUS SURFACE (1.5")	168,504.000 SQ YD	0.50000			84,252.00
0060	2232501/00080 MILL BITUMINOUS SURFACE (3.0")	9,949.000 SQ YD	1.00000			9,949.00
0073	2360501/24500 TYPE SP 12.5 WEARING COURSE MIXTURE (4,E)	14,723.000 TON	49.00000			721,427.00
0080	2563601/00010 TRAFFIC CONTROL	LUMP SUM				24,000.00
0090	2565602/51717 NMC LOOP DETECTOR 6'X6'	16.000 EACH	1,000.00000			16,000.00
0100	2565603/05270 2/C#14	520.000 LIN FT	1.60000			832.00

CONTRACT ID: 080141

PROJECT(S): 8821-177

ROUTE: TH 53

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	2580603/00010 INTERIM PAVEMENT MARKING	12,507.000 LIN FT	0.35000		4,377.45	
0120	2582502/31108 8" SOLID LINE WHITE-POLY PREFORM (GROUND IN)	1,669.000 LIN FT	6.00000		10,014.00	
0130	2582502/31124 24" SOLID LINE WHITE-POLY PREFORM (GROUND IN)	294.000 LIN FT	19.00000		5,586.00	
0140	2582502/31204 4" BROKEN LINE WHITE-POLY PREFORM (GROUND IN)	12,830.000 LIN FT	2.71000		34,769.30	
0150	2582502/41104 4" SOLID LINE WHITE-EPOXY	77,802.000 LIN FT	0.20000		15,560.40	
0160	2582502/42104 4" SOLID LINE YELLOW-EPOXY	67,038.000 LIN FT	0.20000		13,407.60	
0170	2582503/00130 CROSSWALK MARKING-POLY PREFORM (GROUND IN)	2,412.000 SQ FT	9.95000		23,999.40	
	TOTAL BID				1,066,539.36	

State Project No. _____

8821-177

\$1,066,539.36

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 guaranty.

DISADVANTAGED BUSINESS ENTERPRISE CERTIFICATION: Our firm will meet a minimum goal of _____ % of this contract to Disadvantaged Business Enterprises. A bidder who fails to indicate a specific 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 by each bidder.

RECEIPT OF ADDENDA as required by 1210 of the Specifications:
The undersigned hereby acknowledges receipt of and has considered:

Addendum No. 1 Dated 07/16/08 Addendum No. _____ Dated / /
Addendum No. _____ Dated / / Addendum No. _____ Dated / /

Signed: MICHAEL WELCH

EXECUTION OF PROPOSAL as required by 1206 of the Specifications:

This proposal dated the 25 th day of July, 2008

Signed: _____, as an individual.

Signature: _____

doing business under the name and style of _____

Signed: _____, for _____ a partnership.

NAME

BUSINESS ADDRESS

Signed:  for ULLAND BROTHERS, INC

a corporation incorporated under the laws of the state of Minnesota

Name of President MICHAEL WELCH Name of Secretary LAURA McMILLAN

Name of Vice-President RYAN SWANSON Name of Treasurer LANCE STRANDBERG

Business Address 1634 HWY 210
CLOQUET, MN

(NOTE: Signatures shall comply with 1206 of the Specifications.)

**APPENDIX-C: CRACKING DATA FROM SITE VISITS AND MnDOT
PAVEMENT MANAGEMENT SYSTEM (PMS) (TASK-2A)**

The cracking data collected from the site visits as well as MnDOT's PMS is provided in this appendix. The data is organized in the same order as the construction plans.

The cracking data from site visits show the location of transverse crack (distance from the start of the section) as well as the length of the cracks.

The MnDOT PMS data consists of historical crack counts and severity levels as well as other pavement distresses.

Crack Data Collection Sheet

Highway: TH 1 (EB)

Date: 6/18/2014

Mile Marker /
Landmark: RP 230

Sheet of

SP: 8821-103

Section Start: Lat: XX° XX' XX" N Long: XX° XX' XX" W

Section End: Lat: XX° XX' XX" N Long: XX° XX' XX" W

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
0		X		6	X		
0		X		10		X	
13		X		2	X		
20		X		30		X	
53		X		2	X		
69		X		3	X		
75		X		10		X	
87		X		2	X		
87		X		6		X	
97		X		2	X		
97		X		2		X	
103		X		2	X		
110		X		2		X	
115		X		6	X		
120		X		2		X	
124		X		3		X	
141		X		1	X		
145		X		2	X		
148		X		3	X		
155		X		20		X	
179		X		3	X		
183		X		12	X		
186		X		4	X		
186		X		20		X	
192		X		6	X		
192		X		15		X	
197		X		8	X		
200		X		1	X		
213		X		6	X		
213		X		6		X	
220		X		4	X		

220	X	10	X		
227	X	2	X		
231	X	6	X		
234	X	2	X		
255	X	2		X	
258	X	2	X		
260	X	5		X	
269	X	3	X		
277	X	8	X		
286	X	8	X		
301	X	8	X		
309	X	8	X		
311	X	2	X		
331	X	2	X		
338	X	6	X		
340	X	4	X		
350	X	3	X		
357	X	2	X		
363	X	6	X		
366	X	4	X		
371	X	6	X		
387	X	2	X		
390	X	2	X		
392	X	8		X	
396	X	6	X		
404	X	2	X		
404	X	8		X	
407	X	2	X		extensive ravelling
417	X	12	X		
420	X	6		X	
428	X	2	X		
426	X	8	X		
426	X	4		X	
440	X	3	X		
446	X	2	X		
483	X	12	X		
538	X	3	X		
551	X	2	X		
556	X	4	X		
566	X	4	X		
570	X	2		X	
577	X	8	X		
577	X	15		X	
579	X	2	X		
583	X	2	X		
590	X	8	X		
595	X	8	X		

606		X		4	X	
618		X		2	X	
624		X		2	X	
626		X		2	X	
630		X		8	X	
630		X		10		X
634		X		2	X	
643		X		12	X	
656		X		12	X	
673		X		8	X	
673		X		4		X
678		X		4	X	
685		X		8	X	
687		X		20		X
709		X		3	X	
711		X		7	X	
720		X		8	X	
728		X		2	X	
728		X		40		X
742		X		2	X	
751		X		3	X	
771		X		6	X	
840		X		10		X
896		X		4	X	
909		X		2	X	
918		X		4	X	
918		X		75		X
925		X		4	X	
937		X		2	X	
958		X		3	X	
970		X		3	X	

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	0.0	36.8		0.00	368.00
MnDOT	0.0	82.0			
Section length:	1000 ft				
UMD method:					
$\% \text{Cracking}_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% \text{Cracking}_{MNDOT} = \frac{\# \text{ of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



6/18/14 Visit:

- 4" OL on reclaimed
- much smoother ride than OL
- appears to be a dry mix
- centerline joint cracking

Crack Data Collection Sheet

Highway: TH 1 (EB)

Date: 6/18/2014

Mile Marker /
Landmark: RP 235

Sheet of

SP: 8821-103

Section Start: Lat: XX° XX' XX" N Long: XX° XX' XX" W

Section End: Lat: XX° XX' XX" N Long: XX° XX' XX" W

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
1		X		12	X		
1		X		12		X	
8		X		12	X		
8		X		42		X	
24		X		12	X		
24		X		20		X	
31		X		12	X		
31		X		6		X	
37		X		2	X		
37		X		4		X	
41		X		10	X		
41		X		8		X	
50		X		12	X		
50		X		6		X	
56		X		8	X		
56		X		14		X	
65		X		7	X		
68		X		12	X		
68		X		24		X	
72		X		3	X		
79		X		12	X		
79		X		64		X	
97		X		12	X		
97		X		30		X	
100		X		10	X		
100		X		24		X	1 sq meter alligator cracking
119		X		10	X		
119		X		8		X	
128		X		12	X		
128		X		9		X	
138		X		6	X		

138	X	10	X
144	X	12	X
152	X	12	X
159	X	6	X
165	X	12	X
165	X	5	X
170	X	10	X
170	X	6	X
177	X	10	X
177	X	18	X
186	X	12	X
186	X	12	X
197	X	12	X
197	X	6	X
202	X	10	X
202	X	12	X
214	X	12	X
222	X	12	X
222	X	6	X
230	X	12	X
230	X	8	X
237	X	10	X
242	X	12	X
242	X	8	X
248	X	10	X
256	X	12	X
256	X	8	X
264	X	12	X
270	X	10	X
278	X	12	X
278	X	4	X
281	X	12	X
281	X	9	X
288	X	12	X
288	X	14	X
301	X	12	X
304	X	4	X
308	X	8	X
313	X	12	X
313	X	18	X
328	X	12	X
335	X	12	X
342	X	12	X
354	X	12	X
354	X	12	X
367	X	12	X
367	X	10	X

381		X		12	X		
390		X		6	X		
398		X		12	X		
398		X		8		X	
406		X		7	X		
406		X		6		X	
417		X		12	X		
417		X		14		X	
425		X		12	X		
429		X		3		X	
431		X		8	X		
431		X		4		X	
435		X		12	X		
435		X		12		X	
444		X		6	X		
444		X		8		X	
451		X		12	X		
451		X		14		X	
466		X		12	X		
473		X		12	X		
479		X		4	X		
482		X		12	X		
484		X		12	X		
502		X		2	X		
503		X		7	X		
503		X		12		X	
507		X		4	X		
518		X		12	X		
528		X		12	X		
547		X		12	X		0.5 sq meter alligator cracking
554		X		30		X	
571		X		12	X		1 sq meter alligator cracking
571		X		8		X	
577		X		8	X		30 ft stretch alligator 18" wide
604		X		12	X		
604		X		14		X	
615		X		12	X		
628		X		8	X		
633		X		8		X	
633		X		12	X		
654		X		12	X		
670		X		12	X		
670		X		24		X	
684		X		12	X		
684		X		14		X	
697		X		4	X		
697		X		12		X	

705		X		12	X		
716		X		12	X		
724		X		4	X		
728		X		12	X		
733		X		7	X		
742		X		12	X		
742		X		14		X	
755		X		10	X		
755		X		6		X	
763		X		8	X		
763		X		7		X	
768		X		8	X		
768		X		10		X	
777		X		10	X		
777		X		7		X	
780		X		4	X		
785		X		10	X		
787		X		3	X		100 sq ft alligator cracking 18" wide WP
804		X		12	X		
822		X		12	X		
840		X		12	X		
845		X					overlay missing in alligator crack (WP)
852		X					overlay missing in alligator crack (WP)
852		X		12	X		
866		X		10	X		
869		X		2	X		
875		X					overlay missing in alligator crack (WP)
883		X					overlay missing in alligator crack (WP)
891		X		12	X		
898		X		3	X		
906		X		4	X		
912		X		10	X		
932		X		12	X		
945		X		12	X		
945		X		10		X	
956		X		12	X		
971		X		12	X		
983		X		10	X		
986		X		7	X		
994		X		12	X		

Percent Cracking			Length of Total Transverse Crac		
	Lane			Lane	
	P	D		P	D
UMD	0.0	100.0	Total	0.00	1070.00
MnDOT	0.0	100.0			
Section length: 1000 ft					
UMD method:					
$\% Cracking_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% Cracking_{MnDOT} = \frac{\# \text{ of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



6/18/14 Visit:

- 1-1/2" OL on old AC
- Extremely poor ride
- High severity cracking
- extensive wheel path cracking
- alligator cracking everywhere
- CL joint severe segregation

Crack Data Collection Sheet

Highway: TH 2 (EB)

Date: 1/3/2014

Mile Marker /
Landmark: R.P. 157

Sheet 1 of 1

SP: 1102-59

Section Start: Lat: _____ Long: _____

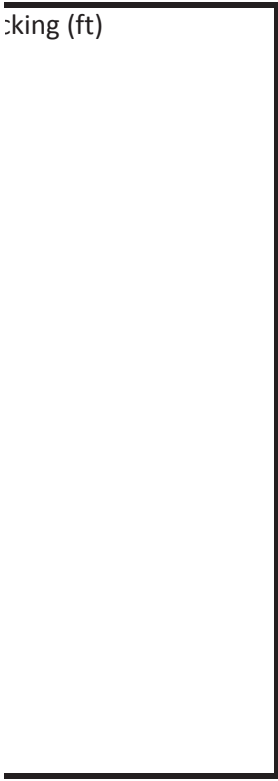
Section End: Lat: _____ Long: _____

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
8		X		12	X		
29		X		12	X		
33		X		4	X		
43		X		12	X		
44		X		3	X		
44		X		14		X	centerline of lane
71		X		12	X		
86		X		12	X		
86		X		8	X		
94		X		4	X		
94		X		4	X		
107		X		12	X		
110		X		12		X	
116		X		6	X		
123		X		12	X		
148		X		12	X		
165		X		16	X		
165		X		5		X	angled longitudinal crack
173		X		12	X		
195		X		12	X		
208		X		12	X		
229		X		12	X		
238		X		12	X		
254		X		12	X		
282		X		12	X		
308		X		12	X		
320		X		12	X		
338		X		12	X		
361		X		12	X		
399		X		12	X		
417		X		4	X		

431		X		4		X	
446		X		12	X		
450		X		5	X		
475		X		4	X		
475		X		4	X		
493		X		12	X		
524		X		12	X		
524		X		10		X	
524		X		6		X	
531		X		5	X		
540		X		10		X	
560		X		12	X		
570		X		7		X	
585		X		12	X		
591		X		20		X	
600		X		3	X		
611		X		12	X		
632		X		12	X		
643		X		12	X		
649		X		12	X		
658		X		12	X		
658		X		8		X	
675		X		12	X		
698		X		12	X		
710		X		3	X		
718		X		12	X		
729		X		9		X	
738		X		12	X		
751		X		12	X		
758		X		9		X	
768		X		14	X		
787		X		12	X		construction joint cracked
794		X		12	X		
820		X		12	X		
843		X		12	X		
843		X		14			alligator cracking (no designation)
843		X		7		X	
870		X		12	X		
875		X		5		X	
897		X		12	X		
897		X		20		X	
917		X		12	X		
948		X		12	X		also raveling until end of section
982		X		12	X		

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	0.0	61.5		0.00	615.00
MnDOT	0.0	59.0			
Section length:	1000 ft				
UMD method:					
$\% \text{Cracking}_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% \text{Cracking}_{MNDOT} = \frac{\# \text{ of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



1/3/2014

- Significant raveling from 948 to 1000 feet
- Shoulder cracked T & L throughout.
- Alligator and raveling throughout.
- Dry mix, lot of distributed cracking.
- Some fatigue/alligator cracking in wheel path.
- Centerline joint crack
- High amount of mid-low severity transverse cracks
- Mix looks like T.H. 113

Crack Data Collection Sheet

Highway: T.H. 6 (NB)

Date: 1/3/2014

Mile Marker /
Landmark: R.P. 118

Sheet 1 of 1

SP: 3107-42

Section Start: Lat: _____ Long: _____

Section End: Lat: _____ Long: _____

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
4		X		8	X		
11		X		12	X		
33		X		12	X		
37		X		12	X		
41		X		12	X		
57		X		8	X		
65		X		12	X		
65		X		6		X	
72		X		12	X		
75		X		12	X		
94		X		12	X		
105		X		12	X		
108		X		6	X		
111		X		7	X		
111		X		7	X		
117		X		12	X		
144		X		12	X		
154		X		12	X		
160		X		12	X		
172		X		12	X		
179		X		12	X		
181		X		20		X	
193		X		12	X		
201		X		12	X		
209		X		12	X		
227		X		12	X		
243		X		12	X		
258		X		12	X		
258		X		6	X		
273		X		12	X		
281		X		12	X		

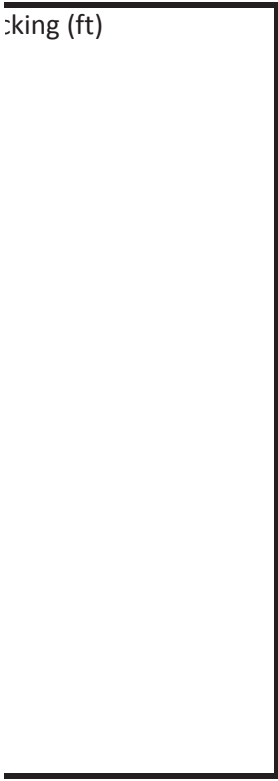
294		X		12	X	
312		X		12	X	
317		X		20		X
317		X		20	X	
327		X		3	X	
329		X		14	X	
332		X		20		X
352		X		12	X	
357		X		12	X	
374		X		12	X	
382		X		12	X	
391		X		12	X	
400		X		12	X	
410		X		1		X
411		X		12	X	
423		X		12	X	
424		X		10		X
424		X		10	X	
436		X		12	X	
448		X		12	X	
464		X		12	X	
466		X		12	X	
476		X		6	X	
478		X		12	X	
478		X		10		X
483		X		12	X	
488		X		6	X	
488		X		12	X	
488		X		7		X
496		X		12	X	
501		X		7		X
510		X		12	X	
536		X		12	X	
538		X		12	X	
542		X		7	X	
547		X		12	X	
550		X		12	X	
558		X		12	X	
566		X		12	X	
569		X		12	X	
579		X		16		X
578		X		12	X	
595		X		12	X	
600		X		12	X	
600		X		10	X	
617		X		12	X	
625		X		6	X	

628		X		12	X	
647		X		12	X	
664		X		12	X	
675		X		12	X	
684		X		12	X	
693		X		12	X	
696		X		12	X	
709		X		12	X	
721		X		12	X	
728		X		12	X	
728		X		20		X
739		X		12	X	
749		X		12	X	
757		X		12	X	
757		X		7		X
766		X		12	X	
780		X		12	X	
791		X		12	X	
798		X		12	X	
810		X		12	X	
817		X		12	X	
830		X		12	X	
843		X		2		X
846		X		12	X	
855		X		12	X	
858		X		5	X	
864		X		12	X	
873		X		12	X	
880		X		12	X	
893		X		12	X	
893		X		8	X	
893		X		12		X
909		X		12	X	
921		X		12	X	
931		X		12	X	
934		X		5		X
943		X		12	X	
949		X		7	X	
953		X		12	X	
959		X		12	X	
965		X		12	X	
973		X		12	X	
978		X		12	X	
982		X		6	X	
988		X		12	X	
988		X		4		X
997		X		12	X	

997		x		2		x	
-----	--	---	--	---	--	---	--

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	0.0	4.8		0.00	48.00
MnDOT	0.0	4.0			
Section length:	1000 ft				
UMD method:					
$\% \text{ Cracking}_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% \text{ Cracking}_{MnDOT} = \left(\frac{\text{number of cracks in section}}{50} \right) \times 100$					

cking (ft)



1/3/2014

-Section 2 (R.P. 123)

-Good performer (approx. 5-8 cracks/mile)

-4.5" O/L (reclaimed)

Crack Data Collection Sheet

Highway: T.H. 6 (NB)

Date: 1/3/2014

Mile Marker /
Landmark: R.P. 123

Sheet 1 of 1

SP: 3107-42


Section Start: Lat: _____ Long: _____

Section End: Lat: _____ Long: _____

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
103		X		12	X		
215		X		12	X		
663		X		12	X		
910		X		12	X		

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	0.0	100.0		0.00	1230.00
MnDOT	0.0	100.0			
Section length:	1000 ft				
UMD method:					
$\% \text{Cracking}_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% \text{Cracking}_{MnDOT} = \left(\frac{\text{number of cracks in section}}{50} \right) \times 100$					

cking (ft)



1/3/2014

-Talmoon

-Section 1 -- 1.5" O/L -- old bit

-Poor performer (approx. 100 cracks/1000')

Crack Data Collection Sheet

Highway: TH 10 WB

Date: 10/17/2013

Mile Marker /
Landmark: RP 159

Sheet of

SP: 0502-95

Section Start: Lat: 45° 47' 55.847" N Long: 094° 15' 49.023" W

Section End: Lat: 45° 48' 01.878" N Long: 094° 15' 56.855" W

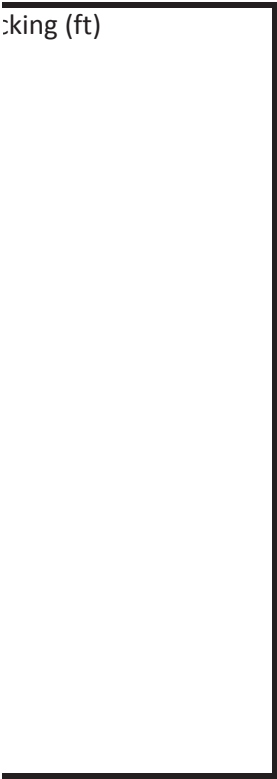
Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
1	X	X	12	12	X		
15	X		3	-	X		
21	X		10	-	X		
31		X	-	3	X		
36	X	X	12	12	X		
56	X	X	12	12	X		
67		X	-	-		X	67 ft Longitudinal
73	X		12	-	X		
75		X	-	12	X		
80		X	-	8	X		
83	X		8	-	X		2-4 ft transverse cracks
89		X	-	1	X		
91	X		10	-	X	X	2x10 ft longitudinal
107	X	X	12	12	X	X	2x10 ft longitudinal
120		X	-	4	X	X	2x10 ft longitudinal
124	X	X	12	3	X		
130	X		6	-	X		
136	X	X	8	6	X		
153	X	X	12	12	X		
170	X	X	1	12	X		
175		X	-	2	X		
186	X	X	12	12	X	X	8 ft longitudinal in wheelpath
196		X	-	2	X		
206	X	X	12	12	X		
218		X	-	8	X		
223	X		12	-	X		
250	X	X	12	12	X		
255	X		12	-	X		
264	X	X	12	12	X		
266		X	-	4	X		
274		X	-	10	X		

285	X	X	12	12	X		
301	X	X	12	12	X		
310		X	-	3	X		
327	X		12	-	X		
333		X	-	8	X		
345	X	X	12	12	X		
350		X	-	6	X		
359		X	-	4	X		
360	X		12	-	X		
380	X	X	12	12	X		
381		X	-	2	X		
384	X		12	-	X		
392		X	-	12	X		
396	X	X	12	6	X		
404		X	-	5	X		
417	X	X	11	5	X		
435	X	X	12	12	X		
455	X	X	12	12	X	X	8 ft longitudinal LWP, driving lane
468	X		4	-	X		
480	X	X	12	4	X		
492		X	-	12	X		
497	X		12	-	X		
506		X	-	12	X		
517		X	-	10	X		
519	X		12	-	X	X	Longitudinal drive lane near edge
529	X		4	-	X		
542	X	X	4	4	X	X	Longitudinal drive lane near edge
559	X		10	-	X		
570	X		10	-	X		
585	X	X	12	12	X		580-640 longitudinal in turn lane
612	X		24	-	X		2-12 ft transverse cracks
629	X	X	12	12	X		
640	X		12	-	X		
655	X		4	-	X		
663	X		5	-	X		
682	X	X	12	12	X		
693	X		12	-	X		
703	X	X	12	2	X		
710	X		5	-	X		
725	X	X	12	12	X		
731	X		3	-	X		
739	X	X	12	2	X		
751		X	-	12	X		
754	X		12	-	X		
768	X		12	-	X		
780	X	X	12	12	X		
799	X	X	12	12	X		

816	X		12	-		
831	X	X	12	12	X	
845	X	X	12	12	X	
852	X		12	-	X	
860	X	X	12	12	X	
868	X		12	-	X	
874	X		10	-	X	
879		X	-	8	X	
893	X		12	-	X	
903		X	-	12	X	
921	X		12	-	X	
942	X	X	6	12	X	
952	X		12	-	X	
968	X		12	-	X	
982		X	-	12	X	
987	X		12	-	X	

Percent Cracking			Length of Total Transverse Cracking		
	Lane		Total	Lane	
	P	D		P	D
UMD	72.20	51.60		722.00	516.00
MnDOT	68.00	58.00			
Section length:	1000 ft				
UMD method:					
$\% \text{Cracking}_{\text{UMD}} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% \text{Cracking}_{\text{MnDOT}} = \frac{\text{\# of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



Crack Data Collection Sheet

Highway: TH 10 WB

Date: 10/17/2013

Mile Marker /
Landmark: RP 161 WB

Sheet of

SP: 0502-95

Section Start: Lat: ??? Long: ???

Section End: Lat: 45° 46' 35.234" N Long: 094° 14' 33.734" W

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
12	X	X	12	12	X		
32	X	X	12	12	X		
50	X		12	-	X		
59	X	X	3	12	X		
75	X		12	-	X		
77		X	-	12	X		
101	X	X	12	12	X		
129	X	X	12	12	X		
150		X	-	12	X		
152	X		3	-	X		
176	X	X	12	12	X		
197		X	-	12	X		
199	X		12	-	X		
220	X	X	12	12	X		
229	X		2	-	X		
251		X	-	12	X		
252	X		12	-	X		
273	X		12	-	X		
295	X	X	12	12	X		centerline is cracked for length of section
308	X	X	12	12	X		
332	X	X	12	12	X		
358	X		8	-	X		long edge crack for length of section near fog
365	X	X	12	12	X		
386	X	X	12	6	X		
408	X	X	12	12	X		
421	X		4	-	X		
442	X	X	12	12	X		
461	X	X	12	12	X		
479		X	-	8	X		
484	X	X	12	12	X		
498		X	-	6	X		

505		X	-	12	X	
508	X	X	6	4	X	
513	X		-	4	X	
526		X	-	12	X	
533	X		12	-	X	
549	X		6	-	X	
553		X	-	3	X	
562	X		2	-	X	
576	X	X	12	12	X	
611	X		12	-	X	
623		X	-	12	X	
628		X	-	8	X	
647	X	X	12	8	X	
673	X	X	12	12	X	
690	X	X	4	6	X	
698	X		12	-	X	
703	X		8	-	X	
706		X	-	6	X	
720	X		12	-	X	
724		X	-	12	X	
735	X		12	-	X	
738		X	-	6	X	
75	X	X	12	12	X	
785	X	X	12	12	X	
797		X	-	2	X	
806		X	-	6	X	
824	X	X	12	12	X	
843	X		12	-	X	
851		X	-	4	X	
871	X	X	12	12	X	
888		X	-	12	X	
903	X	X	12	12	X	
925	X		12	-	X	
951	X	X	12	12	X	
975	X	X	12	12	X	
992		X	-	2	X	
994	X		3	-	X	

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	49.3	47.5		493.00	475.00
MnDOT	49.0	47.0			
Section length:	1000 ft				
UMD method:					
$\% Cracking_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% Cracking_{MnDOT} = \frac{\# \text{ of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



Crack Data Collection Sheet

Highway: TH 53 (NB)

Date: 6/18/2014

Mile Marker /
Landmark: 169 Ely Sign (Exit 3/4 Mile)

Sheet of

SP: 8821-177

Section Start: Lat: XX° XX' XX" N Long: XX° XX' XX" W

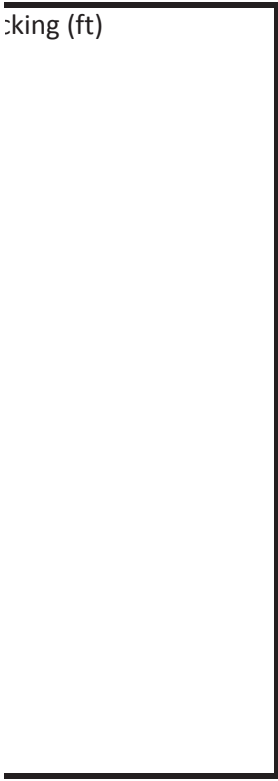
Section End: Lat: XX° XX' XX" N Long: XX° XX' XX" W

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
10	X	X	12	12	X		
24	X		12		X		
40	X	X	12	12	X		
62	X		12		X		
72		X	12		X		
80	X		12		X		
97		X		12	X		
109	X		12		X		
122		X		12	X		
123	X		12		X		
126	X	X	12	12	X		
203	X		12		X		
217		X		12	X		
220	X		12		X		
250	X	X	12	12	X		
276	X	X	12	12	X		
304	X	X	12	12	X		
315	X		8		X		
334	X	X	12	12	X		
352	X	X	12	6	X		
362	X	X	2	12	X		
366	X	X	12	6	X		
391	X	X	12	12	X		
411	X	X	12	12	X		
438	X		12		X		
443		X		12	X		
452	X		12		X		
474	X	X	12	12	X		
493	X		12		X		
500		X		12	X		
512	X		12		X		

522	X		12		X	
526		X		12	X	
538	X		12		X	
575	X	X	12	12	X	
593	X		12		X	
611	X	X	12	12	X	
636	X	X	12	12	X	
657		X		28		X
676		X		12	X	
680	X		12		X	
715	X		12		X	
731		X		12	X	
750	X	X	12	12	X	
795		X		12	X	
798	X	X	12	8	X	
826	X	X	12	12	X	
836		X		12	X	
838	X		12		X	
859	X	X	12	12	X	
870	X		12		X	
885	X	X	12	4	X	
900		X		12	X	
905	X		12		X	
913		X		8	X	
917	X	X	12	6	X	
938		X		6	X	
940	X	X	12	6	X	
949	X		6		X	
952	X	X	12	12	X	
970	X	X	12	12	X	
984		X		12	X	
999	X	X	12	12	X	

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	55.6	43.4		556.00	434.00
MnDOT	47.0	41.0			
Section length:	1000 ft				
UMD method:					
$\% Cracking_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% Cracking_{MnDOT} = \frac{\# \text{ of cracks}}{\left(\frac{\text{length of section}}{10} \right)} \times 100$					

cking (ft)



6/18/14 Visit:

- OK ride
- Large amount of TC
- raveling in some portions
- 100% reflective cracking
- shoulder cracking unsealed
- cracks in driving area sealed
- shoulder cracking 2:1 to lane cracking

Crack Data Collection Sheet

Highway: TH 113 (EB)

Date: 1/2/2014

Mile Marker /
Landmark: RP 10

Sheet 1 of 1

SP: 4407-12

Section Start: Lat: 47° 10' 50.235" N Long: 096° 02' 48.733" W

Section End: Lat: 47° 10' 50.454" N Long: 096° 02' 34.444" W

Distance from start (ft)	Lane		Crack Length (ft)		Type		Remarks
	P	D	P	D	T	L	
3		X		12	X		
5		X		5		X	
21		X		12	X		
46		X		6	X		
47		X		12	X		
57		X		14		X	
71		X		12	X		
76		X		8	X		
82		X		9		X	
92		X		8	X		
113		X		12	X		
129		X		7	X		
129		X		5		X	
134		X		7	X		
136		X		6		X	
143		X		12	X		
149		X		4	X		
149		X		12		X	
160		X		12	X		
160		X		20		X	
177		X		12	X		
177		X		8		X	
185		X		12	X		
185		X		10		X	
194		X		9	X		
200		X		12	X		
200		X		6		X	
208		X		8	X		
210		X		4	X		
219		X		12	X		
234		X		12	X		

248		X		12	X	
257		X		12	X	
270		X		12	X	
281		X		12	X	
293		X		12	X	
303		X		8		X
310		X		12	X	
313		X		8		X
325		X		12	X	
334		X		12	X	
346		X		12	X	
355		X		12	X	
377		X		12	X	
378		X		6	X	
378		X		6	X	
385		X		12	X	
407		X		3		X
410		X		12	X	
412		X		2	X	
412		X		6		X
416		X		12	X	
424		X		4	X	
424		X		6		X
427		X		8	X	
429		X		4	X	
433		X		12	X	
461		X		12	X	
462		X		4	X	
489		X		12	X	
502		X		12	X	
510		X		12	X	
548		X		12	X	
548		X		4	X	
561		X		10	X	
567		X		12	X	
575		X		12	X	
591		X		12	X	
602		X		8	X	
602		X		2		X
611		X		12	X	
620		X		7	X	
624		X		12	X	
632		X		12	X	
648		X		12	X	
649		X		4	X	
649		X		4		X
667		X		12	X	

676		X		12	X	
708		X		12	X	
731		X		12	X	
744		X		12	X	
745		X		3	X	
778		X		12	X	
778		X		24		X
781		X		12	X	
796		X		6	X	
807		X		12	X	
807		X		16		X
819		X		3	X	
822		X		3	X	
830		X		12	X	
845		X		12	X	
860		X		12	X	
872		X		12	X	
879		X		12	X	
890		X		12	X	
909		X		12	X	
916		X		11		X
947		X		12	X	
952		X		8		X
969		X		1	X	
970		X		12	X	
999		X		12	X	

Percent Cracking			Length of Total Transverse Crac		
	Lane		Total	Lane	
	P	D		P	D
UMD	0.0	82.8		0.00	828.00
MnDOT	0.0	83.0			
Section length:	1000 ft				
UMD method:					
$\% Cracking_{UMD} = \left(\frac{\sum_{i=1}^n \text{length of crack}_i}{\text{length of section}} \right) \times 100$					
Where : n = number of cracks					
*length of section typically = 1000 ft					
MnDOT method:					
$\% Cracking_{MnDOT} = \left(\frac{\text{number of cracks in section}}{50} \right) \times 100$					

cking (ft)

