June 12, 2015

ADDENDUM NO. 2
TO
BID DOCUMENTS FOR THE
COLONY ROAD, ESSEX ROAD, AND MANCHESTER ROAD
CONCRETE PAVEMENT REPAIR PROJECT
FOR THE
CITY OF ANN ARBOR, MICHIGAN

The following changes, additions, and/or deletions shall be made to the Bid Documents for the Colony Road, Essex Road, and Manchester Road Concrete Pavement Repair Project, for the City of Ann Arbor, Michigan, ITB No. 4379.

The information contained herein shall take precedence over the original documents and all previous addenda, and is appended thereto. **This Addendum includes 61 page(s).**

The Contractor is to acknowledge receipt of this Addendum No. 2 on page P-1 of the Bid Documents prior to submitting its Proposal.

Changes in the Bid Documents which are outlined below are referenced to a page or drawing in which they appear conspicuously. The Bidder is to take note in its review of the documents and include these changes as they affect work or details in other areas not specifically referenced here.

Item #1: Table of Contents, page TC-1; replace this page with attached page (ADD-2-3).

Item #2: Bid Forms, pages BF-1 thru BF-4; replace these pages with the attached pages (ADD-2-4 thru ADD-2-7). An electronic file (Microsoft Excel format), *ITB 4379_2015-024 Bid Form_Addendum2.xlsx*, is available on the MITN website for use in completing the bid.

Item #3: City of Ann Arbor Detailed Specification for Project Schedule, pages DS-15 and DS-16; replace these with pages (ADD-2-8 thru ADD-2-9).

Item #4: City of Ann Arbor Special Provision for Machine Grading, pages DS-17 thru DS-23; replace this with City of Ann Arbor Detailed Specification for Sidewalk, Sidewalk Ramp, and Driveway Approach Grading, page (ADD-2-10).

Item #5: City of Ann Arbor Special Provision for Soil Erosion and Sedimentation Control – Inlet Filter, page DS-25; replace this with City of Ann Arbor Detailed Specification for Soil Erosion and Sedimentation Control – Inlet Filter, page (ADD-2-11).

Item #6: City of Ann Arbor Special Provision for Adjust Structure Cover, pages DS-26 and DS-27; replace this with City of Ann Arbor Detailed Specification for Adjust Structure Cover, pages (ADD-2-12 and ADD-2-13).

Item #7: City of Ann Arbor Special Provision for Concrete Placement and Protection, pages DS-28 and DS-29; replace this with City of Ann Arbor Detailed Specification for Concrete Placement and Protection, pages (ADD-2-14 and ADD-2-15).

Item #8: City of Ann Arbor Detailed Specification for Concrete Sidewalk and Sidewalk Ramps, pages DS-30 and DS-31; replace this with City of Ann Arbor Detailed Specification for Concrete Sidewalk, Sidewalk Ramps, and Driveway Approaches pages (ADD-2-16 thru ADD-2-17).

Item #9: Insert Michigan Department of Transportation Special Provision for Pavement Ride Quality; pages (ADD-2-18 thru ADD-2-27).

Item #10: Insert Michigan Department of Transportation Special Provision for Managing Diamond Grinding Slurry from Ride Quality Concrete; pages (ADD-2-28 thru ADD-2-34).

Item #11: Contract Plan Set; replace plan set with the following file.

- ITB 4379_2015-024 Revised Bid Plan Set 22x34_FINAL - Addendum 2.pdf

Changes include the following:

Plan Sheet 1 – Revised “SHEET LIST TABLE” to show addition of sheets 26 and 27 for “SIDEWALK GRADES”.

Plan Sheet 2 – No revisions.

Plan Sheet 3 – Revised typical cross section(s) and driveway opening/approach detail and sheet title.

Plan Sheets 4 thru 9 – No revisions.

Plan Sheets 10, 12, 14, 16, and 20 – Revised sidewalk areas and quantities adjacent to ramps to reflect limits shown on plan sheets for “SIDEWALK GRADES”. Added note pertaining to removal and replacement of flags/sections of concrete sidewalk within the project limits.

Plan Sheets 11, 13, 15, 17, 19, 21, 23, and 25 – Revised all MDOT JOINT TYPE “E2” references to “E3” type joints.

Plan Sheets 18, 22, and 24 – Added note pertaining to removal and replacement of flags/sections of concrete sidewalk within the project limits.

Plan Sheets 26 and 27 – Added plan sheets for “SIDEWALK GRADES”.

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BID FORM

Section 1 - Schedule of Prices

Colony Road, Essex Road, and Manchester Road Concrete Pavement Repair Project
File No. 2015-024
Bid No. 4379

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total Price
1047051	Audio-visual Recording	LSUM	1.000		$ -
1047051	Project Supervision, Max $30,000	LSUM	1.000		$ -
1047051	General Conditions, Max $40,000	LSUM	1.000		$ -
2030011	Dr Structure, Rem	Ea	13.000		$ -
2030015	Sewer, Rem, Less than 24 inch	Ft	105.000		$ -
2040050	Pavt, Rem	Syd	87.000		$ -
2040055	Sidewalk, Rem	Syd	1123.000		$ -
2050023	Granular Material, Class II	Cyd	150.000		$ -
2057011	Grading, Sidewalk	Syd	1051.000		$ -
2057011	Grading, Sidewalk Ramp	Syd	72.000		$ -
2057011	Grading, Driveway Approach	Syd	87.000		$ -
2057021	Subgrade Undercutting	Cyd	100.000		$ -
2080020	Erosion Control, Inlet Protection, Fabric Drop	Ea	40.000		$ -
3020001	Aggregate Base	Ton	150.000		$ -
3020050	Aggregate Base, Conditioning	Syd	1000.000		$ -
3060020	Maintenance Gravel	Ton	150.000		$ -
4027001	Sewer, Cl IV, 12 inch, Tr Det I Modified	Ft	105.000		$ -
4030005	Dr Structure, Adj, Case 1	Ea	8.000		$ -
				TOTAL THIS PAGE	$ -

BID FORM

Section 1 - Schedule of Prices

Colony Road, Essex Road, and Manchester Road Concrete Pavement Repair Project
File No. 2015-024
Bid No. 4379

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total Price
4030010	Dr Structure Cover, Type B	Ea	6.000		$ -
4030050	Dr Structure Cover, Type K	Ea	17.000		$ -
4030200	Dr Structure, 24 inch dia	Ea	9.000		$ -
4037050	Dr Structure, Double Inlet	Ea	4.000		$ -
6020208	Joint, Expansion, E3	Ft	144.000		$ -
6020211	Joint, Plane of Weakness, W	Ft	1934.000		$ -
6027011	Bump Grinding	Syd	4750.000		$ -
6030005	Cement	Ton	1.000		$ -
6030010	Crack Sealing, Conc Pavt	Ft	462.000		$ -
6030020	Joint, Contraction, Crg	Ft	2672.000		$ -
6030021	Joint, Expansion, Erg	Ft	228.000		$ -
6030023	Joint, Tied, Trg	Ft	120.000		$ -
6030030	Lane Tie, Epoxy Anchored	Ea	741.000		$ -
6030042	Pavt Repr, Nonreinf Conc, 7 Inch	Syd	5042.000		$ -
6030080	Pavt Repr, Rem	Syd	5129.000		$ -
6030090	Saw Cut, Intermediate	Ft	464.000		$ -
6030095	Sawing and Sealing Longit Pavt Joints	Ft	1675.000		$ -
6030096	Sawing and Sealing Trans Pavt Joints	Ft	500.000		$ -
				TOTAL THIS PAGE	$ -

BID FORM

Section 1 - Schedule of Prices

Colony Road, Essex Road, and Manchester Road Concrete Pavement Repair Project
File No. 2015-024
Bid No. 4379

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total Price
6030100	Resealing Trans Joints with Hot-Poured Rubber	Ft	16605.000		$ -
6030101	Resealing Longit Joints with Hot-Poured Rubber	Ft	15568.000		$ -
8010005	Driveway, Nonreinf Conc, 6 Inch	Syd	87.000		$ -
8020002	Curb, Conc, Det E2	Ft	360.000		$ -
8037001	Detectable Warning Surface, Modified	Ft	90.000		$ -
8037010	Sidewalk, Conc, 4 inch, Modified	Sft	9111.000		$ -
8037010	Sidewalk, Conc, 6 inch, Modified	Sft	350.000		$ -
8037010	Sidewalk Ramp, Conc, 6 inch, Modified	Sft	647.000		$ -
8087001	Fence, Protective, Modified	Ft	1000.000		$ -
8110024	Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk	Ft	616.000		$ -
8110045	Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar	Ft	154.000		$ -
8110321	Rem Curing Compound, for Spec Mrkg	Sft	1480.000		$ -
8120010	Barricade, Type III, High Intensity, Double Sided,	Ea	8.000		$ -
8120011	Barricade, Type III, High Intensity, Double Sided,	Ea	8.000		$ -
8120120	Lighted Arrow, Type B, Furn	Ea	2.000		$ -
8120121	Lighted Arrow, Type B, Oper	Ea	2.000		$ -
8120170	Minor Traf Devices	LSUM	1.000		$ -
8120190	Part Width Intesection Construction	Ea	5.000		$ -
				TOTAL THIS PAGE	$ -

BID FORM

Section 1 - Schedule of Prices

Colony Road, Essex Road, and Manchester Road Concrete Pavement Repair Project
File No. 2015-024
Bid No. 4379

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total Price
8120250	Plastic Drum, High Intensity, Furn	Ea	125.000		$ -
8120251	Plastic Drum, High Intensity, Oper	Ea	125.000		$ -
8120330	Sign, Portable, Changeable Message, Furn	Ea	3.000		$ -
8120331	Sign, Portable, Changeable Message, Oper	Ea	3.000		$ -
8120350	Sign, Type B, Temp, Prismatic, Furn	Sft	609.000		$ -
8120351	Sign, Type B, Temp, Prismatic, Oper	Sft	609.000		$ -
8120370	Traf Regulator Control	LSUM	1.000		$ -
8127051	Minor Traffic Control, Max $5,000	LSUM	1.000		$ -
8127050	No Parking Sign	Ea	142.000		$ -
8157015	Irrigation System, Protection and Maintenance	LSUM	1.000		$ -
8167050	Slope Restoration	Syd	700.000		$ -
8230431	Gate Box, Adj, Case 1	Ea	1.000		$ -
				TOTAL THIS PAGE	$ -
				TOTAL FROM PAGE BF-1 (ADD-2-5)	$ -
				TOTAL FROM PAGE BF-2 (ADD-2-6)	$ -
				TOTAL FROM PAGE BF-3 (ADD-2-7)	$ -
				TOTAL BASE BID	$ -

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
PROJECT SCHEDULE

AA:DAD 1 of 2 06/11/15

The entirety of work under this Contract shall be completed in accordance with, and subject to, the scheduling requirements as outlined below, and all other requirements of the Contract Documents.

The Contractor is expected to be furnished with two (2) copies of the Contract, for its execution, on or before **July 7, 2015**. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance documentation, to the City by **July 17, 2015**. The Contractor shall not begin the work before the applicable date(s) as described herein without approval from the Project Engineer, and in no case before the receipt of the fully executed Contract and Notice to Proceed.

By no later than **July 13, 2015**, the Contractor shall submit a detailed schedule of work (progress schedule) for the Engineer's review and approval. The progress schedule must fully comply with the scheduling requirements contained in this Detailed Specification. Work shall not start until the progress schedule is approved in writing by the Engineer. The Contractor shall update the approved progress schedule each week, and present it to the Engineer at the weekly progress meeting.

The Contractor shall begin the work of this project on or before **July 27, 2015**, and only upon receipt of the fully executed Contract and Notice to Proceed. Appropriate time extensions shall be granted if the Notice to Proceed is delayed beyond this date.

With exception to bump grinding and joint sealing work the Contractor must complete all other project work within the Stage I and Stage II project limits by the following respective dates:

- Stage I - **August 29, 2015**
- Stage II -**October 3, 2015**

All work for entire project shall be completed on or before **November 15, 2015**.

Failure to complete the work as specified, within the times specified, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the payments due the Contractor **$500.00** in “Liquidated Damages”, and not as a penalty, for each and every calendar day the work remains incomplete beyond the date specified.

Time is of the essence in the performance of the work of this contract. The Contractor is expected to mobilize sufficient personnel and equipment and work throughout all authorized hours to complete the project by the final completion date. Should the Contractor demonstrate that they must work on some Sundays in order to maintain the project schedule, they may do so between the hours of 9:00 a.m. and 5:00 p.m. with prior approval from the City. There will be no additional compensation due to the Contractor for work performed on Sundays.

The Engineer may delay or stop the work due to threatening weather conditions. The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain. The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

The Contractor shall not work in the dark except as approved by the Engineer and only when lighting for night work is provided as detailed elsewhere in this contract. The Engineer may stop the work, or may require the Contractor to defer certain work to another day, if, in the Engineer's opinion, the work cannot be completed within the remaining daylight hours, or if inadequate daylight is present to either properly perform or inspect the work. The Contractor will not be compensated for unused materials or downtime, when delays or work stoppages are directed by the Engineer for darkness and/or inadequate remaining daylight reasons. The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the dark.

Liquidated Damages will be assessed until the required work is completed in the current construction season. If, with the Engineer’s approval, work is extended beyond seasonal limitations, the assessment of Liquidated Damages will be discontinued until the work is resumed in the following construction season.

If the construction contract is not completed within the specified period(s) including any extensions of time granted thereto, at the sole discretion of the City of Ann Arbor, this Contract may be terminated with no additional compensation due to the Contractor, and the Contractor may be forbidden to bid on future City of Ann Arbor projects for a period of at least three (3) years. If the Engineer elects to terminate the Contract, contract items paid for on a Lump Sum basis shall be paid up to a maximum percentage equal to the percentage of the contract work that has been completed.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
SIDEWALK, SIDEWALK RAMP, AND DRIVEWAY APPROACH GRADING

AA:DAD 1 of 1 06/11/15

a. Description. Remove miscellaneous structures and materials and complete all earthwork required to construct the proposed cross sections within the limits shown on the plans or stated in this special provision. All lines and grades will be as shown on the plans and as directed by the Engineer. Complete this work according to the Standard Specifications for Construction, this special provision, and as directed by the Engineer.

b. Materials. Furnish and place required base and embankment materials conforming to the Standard Specifications for Construction as necessary to achieve the required typical cross sections. Excavated material, if suitable, may be used as embankment material as approved by the Engineer.

c. Construction. Complete this work according to applicable sections of the Standard Specifications for Construction. Grading for sidewalks, sidewalk ramp, and driveway approaches includes, but is not limited to, the following work:

1. Stripping and stockpiling topsoil for use in turf establishment as approved.
2. Sawcutting existing pavements and curbs.
3. Removing rocks or boulders less than 0.5 cubic yards in volume.
4. Excavating material to a depth necessary for construction.
5. Disposing of excess and unsuitable material according to Section 205.
6. Furnishing and placing embankment material to the grades necessary for construction.
7. Shaping, grading, and compacting the subgrade and embankment to proposed grades.
8. Furnishing and placing Granular Material, Cl II base/bedding material to the required thickness.
9. Shaping, grading, and compacting base/bedding material to proposed grades.
10. Matching new sidewalk, sidewalk ramp, and driveway approach grades with existing grades as required.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit prices using the following pay items:

Pay Item	**Pay Unit**
Grading, Sidewalk	Square Yard
Grading, Sidewalk Ramp	Square Yard
Grading, Driveway Approach	Square Yard

The above items will be measured in area by the unit square yard and will be paid for at their respective contract unit prices, which prices shall be payment in full for all labor, equipment and material needed to accomplish this work.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
SOIL EROSION AND SEDIMENTATION CONTROL – INLET FILTER

AA:DAD 1 of 1 06/10/15

a. Description. This work consists of installing and maintaining inlet filters, as shown on the plans, in accordance with Section 208 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and. Filters shall be installed in existing and proposed inlets in order to minimize the erosion of soil and the sedimentation of water courses. The related work includes the installation, maintenance and removal of the filter cloth, cleaning as required during the performance of the project work, removing and disposing of accumulated sediment, and replacement of filters if required by the Engineer so as to provide a properly working inlet filter and a well-drained site.

b. Materials. The inlet filters shall be in accordance with the REGULAR FLOW SILTSACK® manufactured by ACF Environmental (800) 448-3636; FLEXSTORM® Style FX manufactured by Advanced Drainage Systems, Inc. (800) 821-6710; CATCH-ALL® manufactured by Price & Company (866) 960-4300, or Engineer approved equal.

The Contractor shall submit product data sheets and a sample of the filter material for inlet filters for Engineer approval prior to ordering materials.

c. Methods of Construction. The Contractor shall install, maintain, clean, and re-install and/or replace inlet filters in accordance with the manufacturer's specifications and as directed by the Engineer. The Contractor shall dispose of debris off-site.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

Pay Item	**Pay Unit**
Erosion Control, Inlet Filter	Each

Erosion Control, Inlet Filter will be measured by the unit installed and will be paid for at the contract unit price per each, for which price shall be payment in full for all labor, equipment, and materials needed to furnish, install, maintain, clean and remove the inlet filter, and re-install and/or replace the inlet filter as needed.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
ADJUST STRUCTURE COVER

a. Description. This work shall include the final adjustment of structure covers in accordance with section 403 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, as shown on the plans, and as specified herein. The adjustment of existing valve wells, existing valve boxes, and monument boxes will also be included in this item of work.

The Contractor shall also be required to coordinate the adjustment of private utility structure covers and ensure that the adjustment has been properly performed with the respective utility prior to placing any final paving materials.

b. Materials. In bituminous pavement areas, adjustments shall be made using MDOT P-NC concrete as specified in section 601 of the MDOT 2012 Standard Specifications for Construction. In areas of concrete pavement, adjustments shall be made at the time of paving and encased with the grade of concrete used in the roadway.

c. Construction. Structure Covers, monument boxes, water valve boxes and all other public utility underground access or control point covers shall be adjusted to conform to the finished surface section and elevation. The adjusting of castings in lawn areas shall be performed in a one-step process. The adjusting of castings in a bituminous pavement area shall be performed in two steps: step one is the lowering of the structure cover to below the subgrade elevation and plating of the structure; step two is the final adjustment to finish grade made prior to placing the bituminous wearing surface. In areas of concrete pavement, the final adjustment of the structure to finish grade shall be made at the time of concrete pavement forming. All structures in areas of concrete pavement shall be approved by the Engineer prior to the placement of any concrete pavement.

All structures final adjustment is to be to the elevation which results in their top surface being flush with the finished grade. The work is to be accomplished and checked by using a 10 foot straight edge that is placed parallel, and then perpendicular to, the pavement centerline. Failure to meet these conditions will result in the readjustment of the structure and finish patching of the area, as directed by the Engineer, at the Contractor's expense.

All private utility manholes and valve covers (Electric, Gas, Telecommunications, etc.) will be adjusted during this project by the Utility. It is the responsibility of the Contractor to coordinate with these private utilities by giving adequate notice and arranging for any adjustment of structures or valves by these utilities. It shall be the sole responsibility of the Contractor to ensure that this work is completed in a timely manner.

The Contractor shall replace all existing structures covers, top portions of valve boxes and monument boxes.

As directed by the Engineer and within two days of their removal, the Contractor shall stockpile on-site, in a location that is mutually agreeable to the Engineer and Contractor, the existing structure covers. The City of Ann Arbor’s forces will pick-up the structure covers at a time that is convenient to them and mutually agreeable to the Contractor. The Contractor shall provide

the equipment and manpower to load the castings on the City's vehicle(s) so that they can be removed from the site by the City.

All adjustments in areas of proposed bituminous pavement shall be backfilled with Grade P-NC concrete, from the depth of excavation necessary for adjustment, to an elevation 2 inches below the top flange or adjusted casting. This material shall be included in this item of work and will not be paid for separately.

Structure covers shall be adjusted to between flush and ¼ inch below final pavement surfaces.

There is a possibility that the Contractor may find hidden utility structures during the work. It is the Contractor's responsibility to inform the respective utility owner(s) of the findings. In such instances, the City may direct the Contractor to adjust the structure(s) to grade. This work will be paid as "Adjust Structure Cover."

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

Pay Item	**Pay Unit**
Adjust Structure Cover	Each

Adjust Structure Cover will be measured and paid for at the contract unit price for each structure that is adjusted, which price shall be payment in full for all labor, equipment and material needed to accomplish this work.

Where the required adjustment on a structure is more than 15 inches below the proposed finished grade of the structure, valve box, control point, or monument box, the amount of the adjustment in excess of the upper 15 inches of the finished structure, shall be measured and paid for as "Additional Depth Structure Adjust/Repair." This shall also cover the repair of manholes and structures where, less than the substantial rebuilding of the structure, as determined by the Engineer, is required.

Payment for adjusting for new drainage structures, new manholes, new valves-in-wells and new valves-in-boxes shall be included in the respective items and will not be paid for under this item. The work for adjusting these items, however, shall be performed in accordance with this special provision.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
CONCRETE PLACEMENT AND PROTECTION

AA:DAD 1 of 2 06/10/15

a. Description. This work shall consist of furnishing all labor, material, and equipment needed to furnish, place, and protect all concrete material in accordance with the requirements of this special provision. These requirements shall not apply to concrete bridge decks, unless otherwise noted.

b. Materials. The concrete shall meet the requirements of sections 601 and 701 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

The Contractor shall propose specific concrete mix designs for the intended project purpose in accordance with the requirements of this special provision and other applicable special provisions and/or project requirements. The Engineer's acceptance of a mix design shall not relieve the Contractor of their responsibility for the manufacture of the concrete mixture(s), its placement, or performance.

c. Construction. The Contractor shall perform all concrete placement operations in weather that is suitable for the successful placement and curing of the concrete materials. Concrete shall not be placed during periods of active precipitation.

The Contractor shall complete all needed formwork, base and/or sub-base preparation, and any other related items that are deemed necessary for the proper completion of the work. The Contractor shall not commence the placement of concrete until they receive all needed approvals from the Engineer for placement. The Engineer's approval of the Contractor to place concrete shall not relieve the Contractor of their responsibility for the proper placement and protection of the concrete materials or its long-term performance.

During periods when precipitation is threatening, provide durable, plastic sheeting, approved by the Engineer, in sufficient quantity to cover and protect all freshly placed concrete such that precipitation does not come into contact with the concrete. The Contractor shall arrange the placement of the plastic sheeting such that the surface of any freshly placed concrete is not marred by contact with the plastic; any seams in the plastic sheeting shall be water tight. The Contractor shall place adequate supports along and over the freshly placed concrete to prevent contact of the plastic and concrete. The Contractor shall ensure that sufficient dams or barriers are placed along the edges of the freshly placed concrete to prevent erosion of the underlying materials or damage to the edges of the freshly placed concrete. All measures shall be effective.

Any concrete damaged by precipitation shall be removed and replaced at the Contractor's expense. The Engineer shall decide if the concrete has been damaged and the limits of removal and replacement.

Concrete shall only be placed when the rate of surface evaporation at the site is less than 0.20 pounds per square foot per hour, according to figure 706-1 of the MDOT 2012 Standard Specifications for Construction. The Contractor shall provide approved equipment for determining the relative humidity and wind velocity at the site.

Water shall not be added to the placed concrete in order to aid finishing. Any water added to the concrete for slump adjustments shall be done by adding water to the mixing unit and thoroughly re-mixing the concrete for 30 revolutions of the mixing unit at mixing speed. Water shall not be added such that the design water-to-cement ratio of the concrete mixture or the design slump of the concrete mix is exceeded.

Concrete curing shall be performed in accordance with subsection 602.03.M of the MDOT 2012 Standard Specifications for Construction. Curing operations shall take precedence over texturing operations and continued concrete placement. All curing compound applied shall provide uniform coverage over the entire surface being protected. The placement of curing compound shall be free of spots, blotches, or uncovered or non-uniformly covered areas. Should any areas be determined to exist by the Engineer, the curing compound shall be immediately re-applied by the Contractor at no additional cost to the project.

The Contractor shall take all precautions when placing concrete to protect it from damage due to the elements. Concrete shall not be placed during precipitation events.

Concrete shall be protected from weather and temperature according to the requirements of subsection 602.03.T MDOT 2012 Standard Specifications for Construction. Concrete shall not be placed when the temperature of the plastic concrete mixture itself is greater than 90° F. In conditions where low temperature protection is required, the Contractor shall cover the concrete with insulated blankets, or other means as approved by the Engineer, to protect the concrete from damage. The concrete shall remain protected until it has reached a compressive strength of at least 1000 psi, or as directed by the Engineer.

d. Measurement and Payment. All costs associated with the conformance to the requirements of this Special Provision will not be paid for separately, but shall be considered to be included in the respective items of work.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
CONCRETE SIDEWALKS, SIDEWALK RAMPS, AND DRIVEWAY APPROACHES

AA:DAD 1 of 2 06/10/15

a. Description. This work shall consist of constructing concrete sidewalks, sidewalk ramps, and driveway approaches of the types as indicated on the plans in accordance with attached details, and as directed by the Engineer. All work shall be in accordance with sections 801 and 803 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, and as specified herein.

b. Materials. The materials shall meet the requirements as specified sections 801 and 803 of the MDOT 2012 Standard Specifications for Construction and as required herein. The concrete mixture for driveway approaches shall be Grade P-NC (658 lbs/yd^3 cement content) as specified in section 601 of the MDOT 2012 Standard Specifications.

The grade of concrete for all remaining items covered by this Detailed Specification shall be Grade P1 as specified in section 601 of the 2012 MDOT Standard Specifications for Construction. The Contractor may elect to add GGBFS to P1 mixtures in accordance with the requirements of the contract documents. No additional payment will be made for concrete mixtures containing GGBFS.

All concrete mixtures shall contain 6AA coarse aggregates which are either natural or limestone and meet the requirements of section 902 of the MDOT 2012 Standard Specifications for Construction.

It shall be the Contractor's sole responsibility to propose specific concrete mix designs which meet the requirements of this Detailed Specification.

c. Construction Methods. The Contractor is responsible to construct all sidewalks, sidewalk ramps, curbs, and all other applicable concrete items within ADAAG compliance. All sidewalk and curb ramps must be constructed in accordance with MDOT Standard Plan Series R-28.

Where concrete sidewalk (except across driveways) and sidewalk ramps are to be placed, they shall be placed on a minimum of 4 inches of Granular Material Class II compacted to 95% of its maximum dry density. Bedding for concrete driveway approaches and sidewalk across driveways shall be in accordance with the detail shown on the plans.

Prior to placing any concrete, the subgrade shall be completed and trimmed to final elevation. If a cold joint is required, the existing concrete is to be cleaned with compressed air to expose the aggregate in the concrete.

Where indicated on the plans, the Contractor shall horizontally sawcut curbs to provide openings for sidewalk ramps. The Engineer shall define the extent of sawcutting both horizontally and vertically. This work will not be paid for separately, but shall be included in the corresponding price of the ADA ramp to be placed.

All sidewalk ramps shall be installed with detectable warning units. Reference the Detailed Specification entitled "Detectable Warning Surface" for additional requirements.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit prices respectively for the following pay items:

Pay Item	**Pay Unit**
Sidewalk, Conc, ___ inch, Modified	Square Foot
Sidewalk Ramp, Conc, ___ inch, Modified	Square Foot
Driveway, Nonreinf Conc, 6 Inch	Square Yard

The items **Sidewalk, Conc, ___ inch, Modified** and **Sidewalk Ramp, Conc, ___ inch, Modified** will be measured in area by the unit square foot and will be paid for at their respective contract unit prices, which prices shall be payment in full for all labor, equipment and material needed to accomplish this work. The unit price shall also include all costs associated with sawcutting curbs to provide openings for sidewalk ramps as indicated on the plans.

The item **Driveway, Nonreinf Conc, 6 Inch** will be measured in area by the unit square yard and be paid for at the respective contract unit price, which price shall be payment in full for all labor, equipment and material needed to accomplish this work.

Where the Engineer directs the use of high early strength concrete for pay items that are not specifically designated to use Grade “P-NC” concrete, the additional cement shall be paid for separately. No additional payment will be made for cement for pay items that are designated to use Grade “P-NC.” concrete.

Excavation for placement of Granular Material Class II bedding material shall be included in the item of work **Sidewalk, Sidewalk Ramp, and Driveway Approach Grading**, and shall not be paid for separately.

Detectable warning units shall be paid for in accordance with the Detailed Specification for Detectable Warning Surface.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
PAVEMENT RIDE QUALITY (MRI ACCEPTANCE CRITERIA)

CFS:TEH 1 of 10 APPR:KPK:JFS:08-23-12
FHWA:APPR:09-05-12

a. Description. This work consists of providing a pavement surface with acceptable ride quality for all pavements covered by this special provision. Furnish, operate and maintain a profiler, in proper calibration, to measure ride quality for quality control purposes. Prepare and submit a Ride Quality Plan and, if required, a corrective action plan, to the Engineer for approval. Complete all corrective action as required by this special provision.

Ensure that the pavement on which ride quality measurements are taken, including acceptance runs conducted by the Engineer, is clean prior to ride quality measurements.

The following subsections of the Standard Specifications for Construction apply only to areas excluded from pavement ride quality in Class II, III and IV sections:

Subsection 501.03.H (10 foot straightedge on HMA pavements)

Subsection 602.03.I (10 foot straightedge on concrete pavements)

b. Terminology.

Bridge Ride Quality Limits. That area between the two end reference lines or between the outermost limits of any structure expansion joint devices, whichever is longer. Within Class I sections ride quality requirements will apply unless specifically noted otherwise. Within Class II, Class III and Class IV sections, bridge ride quality limits will be considered predetermined excluded areas.

Certified Operator. Operators of profilers used for acceptance testing who pass a proficiency test and are certified by the Department.

Class I Ride Quality. Sections where no project specific excluded areas are allowed, a threshold MRI criteria must be met, and incentives and penalties may apply.

Class II Ride Quality. Sections where threshold MRI criteria must be met, but incentives and penalties do not apply.

Class III Ride Quality. Sections where the pre-construction MRI must be maintained or improved by a specified percentage. Penalties may apply in lieu of corrective action.

Class IV Ride Quality. Sections where acceptance is based on a 10 foot straightedge criteria. Incentives and penalties do not apply.

Contractor Quality Control Run. Informational run(s) made by the Contractor to determine ride

quality acceptability, need for corrective action, or need for a process change. Also includes runs made after corrective action to determine if corrective action has been sufficient.

Correction Areas. Areas of the pavement which exceed any of the correction limits for ride quality as defined in Table 1 or Table 2 as applicable.

Course. A layer of a particular bituminous mixture, paved in one or more lifts.

Equipment Validation Section. Equipment Validation Sections are established throughout the state with a minimum of one in each MDOT Region. The Engineer determines a reference MRI value for each validation site based on the mean of 10 runs taken with Department owned or provided equipment. The standard deviation of the 10 runs is also calculated.

International Roughness Index (IRI). A statistic used to determine the amount of roughness in a measured longitudinal profile. The IRI is computed from a single longitudinal profile using a quarter-car simulation as described in the paper "On the Calculation of International Roughness Index from Longitudinal Road Profile" (Sayers 1995). The IRI is reported as described in ASTM E 1926.

Mean Roughness Index (MRI). A number calculated by averaging the IRI values from the two wheel path profiles.

Predetermined Excluded Areas. Areas of pavement within the project where this Pavement Ride Quality special provision does not apply. Straightedge requirements of subsection 501.03.H or 602.03.I of the Standard Specifications for Construction will apply. Predetermined excluded areas include:

- Ramps other than freeway-to-freeway ramps
- All ramp tapers
- Shoulders
- Railroad crossings
- Designated QC/QA loose material sampling areas on the wearing course of HMA pavement projects within Class II, Class III and Class IV sections only. This will not include areas where informational samples are taken by the Contractor for other purposes

Profile. The elevation of a pavement along a line parallel to the centerline of the pavement. Also defined as a two dimensional plot of the elevation of a pavement, taken in a longitudinal direction, and drawn to scale. Profiles are measured separately along each wheel path of a lane.

Profiler. In general, a device that measures the elevation of a pavement and creates a profile. In particular, a device that meets the requirements for a General Motors type rapid travel profiler, as stated in MTM 726 - *Michigan Test Method for Determining Ride Quality Using a GM Type Rapid Travel Profilometer*.

Project Specific Excluded Areas. Pavement areas identified in the approved ride quality plan where this Pavement Ride Quality special provision does not apply. Straightedge requirements will apply. No project specific excluded areas will be considered within Class I Ride Quality sections of the project.

Ride Point of Beginning. Ride Point of Beginning will be 20 feet after the start of the new pavement surface.

Ride Point of Ending. Ride Point of Ending will be 20 feet before the end of the new pavement surface.

Ride Quality Equipment Certification. A process managed by the Department to assure that ride quality measuring equipment are capable of measuring ride quality to the standards established in MTM 730 - *Michigan Test Method for Certification of Profilometers*.

Ride Quality Measurement Area. The traveled way, collector distributor roadways, freeway to freeway ramps, and other areas as shown on the plans.

Section. A portion of a project which has a single class of ride quality assigned to it. Section beginning and section ending points will be defined in the Notice to Bidders for Ride Quality Limits contained in the contract.

Segment. For ride quality reporting purposes, each lane of each section will be subdivided into segments. A full segment is 0.1 miles long while a partial segment is less than 0.1 miles long.

Wheel Path. Longitudinal locations 3 feet from each edge of a lane.

c. Ride Quality Plan. Submit a written Ride Quality Plan to the Engineer for approval a minimum of 14 calendar days prior to the start of paving operations. The Engineer will submit the Plan to the Pavement Evaluation Group at Construction Field Services for concurrent review and to coordinate ride quality acceptance testing. Do not begin paving operations before acceptance of the Ride Quality Plan by the Engineer. The Engineer will notify the Contractor in writing of approval, or any objections to the Plan, within 14 calendar days of receipt of the Plan.

Include the following minimum details in the Ride Quality Plan:

1. Equipment used to measure ride quality on the project for quality control.

2. Proposed project specific excluded areas (see Section (d) of this special provision). Use the form “Proposed Ride Quality Excluded Areas” (MDOT Form 1978).

3. Method(s) to correct surface irregularities.

4. Correction layout method.

5. Anticipated ride quality measurement schedule for acceptance testing, including how project staging will affect Department access to the completed pavement.

6. Predetermined excluded areas that apply to this project

d. Project Specific Excluded Areas. Propose for exclusion, from Class II, III and IV ride quality sections, circumstances or physical features that will substantially hinder the ability to achieve ride quality. Identify these proposed areas in the Ride Quality Plan submitted to the Engineer for approval prior to paving. The Engineer has the right to accept or reject each proposed project specific excluded area. Project Specific Excluded Areas may include, but are not limited to, the following for freeway and non-freeway projects:

1. Freeway Pavements. Areas where the constructed pavement must match grades of an existing feature (e.g. curb and gutter or an existing lane that will not be overlaid).

2. Non-Freeway Pavements.

A. Areas where the constructed pavement must match grades of an existing feature (e.g. curb and gutter, or an existing lane that will not be overlaid).

B. Major at-grade intersections with part width or staged construction (where traffic flow is maintained during construction) may be considered for exclusion if listed as such in the ride quality plan. The excluded area will extend between the approach and departure spring points of the intersection.

C. In general, areas surrounding existing utility and drainage structures may be designated as excluded areas.

D. In general, pavement gapped areas may be designated as excluded areas.

3. Bridge Decks (as defined by the Bridge Ride Quality Limits). For bridge decks included in Class I sections, no exclusions will be considered.

Project specific excluded areas will not be considered for Class I Ride Quality sections.

e. Contractor Quality Control Runs. Test in accordance with MTM 726. If the equipment used to measure ride quality excludes a given distance at the beginning and end of each run, account for this when marking the actual starting and stopping locations.

For any Hot Mix Asphalt (HMA) project with 2 or more lifts, take quality control runs on both the leveling and top courses.

f. Corrective Action Requirements. Take initial corrective action to address all surface irregularities (bumps or dips) on any leveling course that exceed 0.5 inches in 25 feet.

Take corrective action to address all surface irregularities (bumps or dips) as defined in Table 1 or Table 2 prior to the ride quality acceptance runs on the final riding surface.

Use quality control measurements to locate surface irregularities. Examine the California profilograph type plot with the Engineer to identify surface irregularities following the guidance in MTM 727 and field check the locations to verify that correction is justified. Alternate bump finding methods which utilize the ProVAL software may be considered by the Engineer, if agreed to by the Contractor. All quality control measurements are at Contractor's expense.

Submit a corrective action plan to the Engineer for approval. The Engineer must approve of the Contractor's corrective method prior to the Contractor starting corrective work. Any corrective action must meet the specifications for ride quality over the entire length of the segment. Replace, at no cost to the Department, any permanent pavement markings that are damaged or destroyed during surface correction activities. All proposed corrective action is at the Contractor's expense.

Use a profilograph or profiler to locate and mark all surface irregularities requiring correction. Correct all segments containing areas exceeding the corrective limits shown in Table 1 or Table 2.

Corrective action for Class I, II, III and IV sections must consist of the following methods:

1. For Concrete Pavement and Diamond Grinding Work Types. Diamond grind in accordance with subsections 603.03.A.4 and 603.03.C of the Standard Specifications for Construction. Do not impair surface drainage or create any areas that allow water to pond.

2. For All Other Work Types. Use one or a combination of the following methods:

A. Diamond grind the HMA surface in accordance with the requirements as stated in subsections 603.03.A.4 and 603.03.C of the Standard Specifications for Construction. Do not impair surface drainage or create any areas that allow water to pond

B. Fine Tooth Milling. Provide equipment that consistently mills the HMA surface in one or more passes to the required grade or cross section with the required uniform textured surface. Do not impair surface drainage or create any areas that allow water to pond. Use equipment that will not cause damage to the underlying surface of the pavement. To remove residue and excess water, provide vacuum equipment that extracts the milled material and excess water from the pavement and prevents dust from escaping into the air.

Provide machines equipped with the following:

(1) Automatically controlled and activated cutting drums,

(2) Grade reference and transverse slope control capabilities, and

(3) Cutting drums with teeth spacing at a maximum 5/16 inch (8 mm).

Mill HMA pavement in the longitudinal direction beginning and ending at lines perpendicular to the pavement centerline. Ensure the milled surface has a mean texture depth of at least 0.03 inches, in accordance with ASTM E 965.

Construct a uniform transverse slope with no depressions or misalignment greater than 1/8 inch when checked with a 10-foot straightedge. Provide for cross slope drainage.

C. Remove and replace a minimum of 1.5 inches of HMA pavement surface one full lane width wide by the length required (a minimum of 100 feet).

D. Profile milling can be used for corrective action on leveling and base courses only.

For Class III pavements (all design speeds) that exceed the correction limits indicated in Table 1 or Table 2, the Engineer may assess penalties in accordance with Table 3 in lieu of corrective action.

Do not, under any circumstance, subject the pavement to an artificial heat source.

g. Documentation of Ride Limits. As part of the corrective action plan provide a list of approved excluded areas on the form “Proposed Ride Quality Excluded Areas” (MDOT form 1978) for each lane. Include the locations of any noted surface irregularities on new surfaces that the Engineer evaluated and agreed did not require correction.

h. Ride Quality Acceptance. The Engineer will take measurements for ride quality acceptance. Ride quality acceptance testing will be completed within 7 days of notification provided the following conditions are met: the entire length of the pavement (or an entire phase of a phased project) can be accessed and measured, the pavement is clean and clear of all obstructions for the

entire length of a proposed run, and the Contractor has kept the Engineer informed of changes to the anticipated ride quality measurement schedule. It is the Engineer's responsibility to coordinate ride quality measurement with the appropriate MDOT personnel. The Engineer will determine pavement acceptance based on the selected method of measurement for the final MRI for each lane for the entire project length minus excluded areas. Each tenth-mile segment of pavement falling outside the acceptable range for ride quality will be removed and replaced or corrected at the Contractor's expense.

1. Unit of Measurement. Ride quality measurements will be calculated and reported by the Engineer as MRI. Calculations will be in accordance with MTM 726.

2. Project Layout. Acceptance runs will be laid out in one tenth-mile segments in the direction of travel starting at the section beginning point and ending at the section ending point. Distance measurement will be continuous through excluded areas. Segments that include an excluded area will be reported as partial segments. Project phasing will not affect project layout.

3. Measurement Means. One of the following methods will be selected by the Engineer at the time of approval of the Ride Quality Control Plan. Method B can only apply if agreed to by the Contractor:

A. The Engineer will provide and operate a certified profiler. Should discrepancies exist between the Department's acceptance measurement and the Contractor's quality control measurements, the Contractor may request that the segments of the project with discrepancies be tested for acceptance using method B.

B. The Engineer will provide a Certified Operator to operate the Contractor's certified profiler. The Contractor may require that their employee drive the vehicle the profiler is mounted on, but the Engineer must be in total control of the profile measurement and analysis.

4. Equipment Validation. For each day that acceptance measurements are taken, the Engineer will verify that the profiler passes all daily checks as outlined in MTM 726. In addition, for each day that acceptance measurements are taken using Contractor provided equipment, the Engineer will use one of the following three methods to validate the profiler operation:

A. Measure a nearby Equipment Validation Section. One run will be made with the Contractor's profiler and the shape of California-type profilograph plot must visually match valid plots previously obtained by Department owned or provided equipment. In addition, the MRI value obtained by the Contractor's profiler must be within two standard deviations of the Department's previously determined reference value, using the Department's previously determined standard deviation.

B. When acceptance measurements are taken on consecutive days, re-measure a one tenth-mile long portion of the previous day's acceptance runs. Method A or C must have been used to validate equipment operation on the first day of acceptance testing. One run will be made and the graphical representation of the profile (for example, a California Profilograph plot) must visually match the valid plot previously obtained. In addition, the MRI value obtained must be within 5.7 percent of the previous day's value.

C. Measure a one tenth-mile long portion of the project with both Contractor and Engineer-supplied equipment. One run will be made with each piece of equipment and the

graphical representation of the profile (for example, a California Profilograph plot) must visually match. In addition, the MRI value obtained by the Contractor's equipment must be within 10 percent of the value obtained by the Engineer's equipment.

The Engineer may require equipment re-certification if measurements cannot be validated or the equipment repeatedly fails daily checks.

5. Calculation Method. The Engineer will calculate and report an MRI value for each tenth-mile segment and for the entire length of each lane in each section. Reported values will be rounded to the nearest whole number following ASTM E 29.

Segments less than a tenth of a mile in length will be reported as partial segments and the MRI calculation will account for the shorter length by using weighted averaging.

Ride quality on Class III sections will be measured by the Engineer before and after construction. The "before" measurement will be completed in the same construction season as the paving. The "after" measurement will be completed within 10 days after completion of each stage of paving. Before and after MRI values (for the entire lane length and for each tenth-mile segment) will be compared to calculate the percentage improvement in ride quality. Percent improvement values will be rounded to the nearest whole percent following the rounding method of ASTM E 29.

Acceptance test results will be made available to the Contractor within 7 calendar days of the run.

6. Ride Quality Requirements. Required ride quality values are given in the attached tables for each Class of Ride Quality. Each lane of each section must meet the criteria listed for both the entire length of the lane, and for each tenth-mile segment.

i. Measurement Appeal Process. Appeal only applies if method h.3.A is used for acceptance measurement. If the Engineer's acceptance measurements indicate corrective action is required and the Contractor's quality control measurements show no corrective action is required, the Contractor may request that the disputed segments be rerun and accepted based on method h.3.B. Any costs for maintaining traffic for appeal reruns will be borne by the party whose ride data are shown to be incorrect.

j. Measurement and Payment. All costs associated with quality control ride quality measurements are included in other items of work and will not be paid for separately.

All corrections within the limits of ride quality will be done at the Contractor's expense. In addition, all corrections required to bring excluded areas into compliance with the straightedge requirements of subsections 501.03.H or 602.03.I of the Standard Specifications for Construction, will be done at the Contractors expense.

Corrections requested by the Engineer to areas outside the limits of ride quality (such as existing pavement) or to excluded areas that meet the straightedge requirements will be done under the direction of the Engineer and paid for at the contract unit price for the following pay item:

Pay Item	**Pay Unit**
Bump Grinding	Square Yard

Table 1: Ride Quality Requirements (MRI) for Design Speeds Greater than 50 mph

Class	Work Type	For Total Length of Lane		For Each Tenth-Mile Segment	Surface Irregularities Subject to Correction (a)
		Acceptable Range (MRI)	Correction Limit (MRI)	Correction Limit (MRI)	
I	HMA Pavement (Excluding Bridge Decks)	0-70	> 70	> 75	> 0.3 inch in 25 feet
I	Concrete Pavement (Excluding Bridge Decks)	0-70	> 70	> 75	> 0.3 inch in 25 feet
I	Bridge Decks (b)	0-130	130	N/A	> 1/8 inch in 10 feet
II	HMA or Composite Pavement (2 or more lifts)	0-75	> 75	> 85	> 0.3 inch in 25 feet
II	Concrete Pavement	0-75	> 75	> 85	> 0.3 inch in 25 feet
III	Single Course HMA Overlay (with milling)	≥ 25% Improvement (c)	< 25% Improvement (c)	> Initial MRI (c)	N/A
III	Single Course HMA Overlay (without milling)	≥ 20% Improvement if initial MRI is > 165	< 20% Improvement if initial MRI is > 165	> Initial MRI (c)	N/A
		< 105 if the initial MRI is ≤ 165.	> 105 if the initial MRI is ≤ 165.	> Initial MRI (c)	N/A
III	Diamond Grinding	≥ 40% Improvement (d)	< 40% Improvement (d)	< 30% Improvement (d)	> 0.3 inch in 25 feet
IV	HMA Pavement	N/A	N/A	N/A	(e)
IV	Concrete Pavement	N/A	N/A	N/A	(f)

a. See Section f of this special provision.
b. Includes all new bridge decks, and all shallow and deep concrete overlays within Class I sections.
c. Requirement waived if final MRI ≤ 85.
d. Requirement waived if final MRI ≤ 75.
e. See subsection 501.03.H of the Standard Specifications for Construction.
f. See subsection 602.03.I of the Standard Specifications for Construction.

Table 2: Ride Quality Requirements (MRI) for Design Speeds 30 to 50 mph

Class	Work Type	For Total Length of Lane		For Each Tenth-Mile Segment	Surface Irregularities Subject to Correction (a)
		Acceptable Range (MRI)	Correction Limit (MRI)	Correction Limit (MRI)	
II	HMA or Composite Pavement (2 or more lifts)	0-100	> 100	> 125	> 0.5 inch in 25 feet
II	Concrete Pavement	0-100	> 100	> 125	> 0.5 inch in 25 feet
III	Single Course HMA Overlay (with milling)	≥ 25% Improvement (b)	< 25% Improvement (b)	> Initial MRI (b)	N/A
III	Single Course HMA Overlay (without milling)	≥ 20% Improvement if initial MRI is > 165	< 20% Improvement if initial MRI is > 165	> Initial MRI (b)	N/A
		< 105 if the initial MRI is ≤ 165	> 105 if the initial MRI is ≤ 165	> Initial MRI (b)	N/A
III	Diamond Grinding	≥ 40% Improvement (b)	< 40% Improvement (b)	< 30% Improvement (b)	> 0.3 inch in 25 feet
IV	HMA Pavement	N/A	N/A	N/A	(c)
IV	Concrete Pavement	N/A	N/A	N/A	(d)

a. See section f of this special provision.
b. Requirement waived if final MRI ≤ 100.
c. See subsection 501.03.H of the Standard Specifications for Construction.
d. See subsection 602.03.I of the Standard Specifications for Construction.

Table 3: Optional Penalties for Class III Pavements in Lieu of Corrective Action Based on Final MRI

Class	Work Type	Acceptable Range (MRI) from Table 1 or Table 2, as applicable	Actual Range of Improvement in MRI for total length of lane		
III	Single Course HMA Overlay (with milling)	≥ 25% Improvement (a)	20-24% Improvement	15-19% Improvement	< 15% Improvement
III	Single Course HMA Overlay (without milling)	≥ 20% Improvement if initial MRI is > 165	15-19% Improvement	10-14% Improvement	< 10% Improvement
III	Single Course HMA Overlay (without milling)	< 105 if initial MRI is ≤ 165	≥ 105 and < 115	≥ 115 and < 135	≥ 135
III	Diamond Grinding (b)	≥ 40% Improvement	35-39% Improvement	25-34% Improvement	< 25% Improvement
		Penalty Amount (c)	**$200.00/segment of traffic lane**	**$400.00/segment of traffic lane**	**$600.00/segment of traffic lane**

a. Requirement waived if final MRI ≤ 85 for design speeds above 50 mph or if final MRI ≤ 100 for design speeds 30 to 50 mph.
b. For diamond grinding all surface irregularities per Table 1 or 2 must be addressed in each segment.
c. Penalties will be determined based on the average MRI value for the total section length of each lane. The penalties will be assessed for the entire section length of the lane. Calculate lane lengths to the nearest tenth of a mile.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MANAGING DIAMOND GRINDING SLURRY FROM RIDE QUALITY CONCRETE

C&T:EMB 1 of 7 C&T:APPR:CJB:KPK:12-07-11

a. Description. This work consists of sampling, testing, monitoring, managing, and neutralizing diamond grinding slurry for ride quality for concrete pavements. The work also consists of collecting, hauling and disposing of diamond grinding slurry or residue for ride quality for concrete pavements for projects in areas with enclosed drainage systems that require the slurry to be collected and hauled.

b. Construction Details. Perform the work as per the Special Provision for Ride Quality except as modified herein.

c. PH Control Plan. Provide a written pH control plan to the Engineer prior to diamond grinding. The pH control plan must list all personnel, equipment, supplies necessary to obtain samples, sampling methods, testing methods, method of monitoring, management, and neutralization of the pH of the diamond grinding slurry, if required. The pH control plan must be administered by a qualified employee of the Contractor. The individual must have full authority to take all actions for the successful implementation of the pH control plan. The plan must specify what actions will be taken in order for the slurry to meet the pH requirements. Sample, test, monitor, manage and if necessary neutralize the diamond grinding residue or slurry prior to disposing or discharging of the slurry.

1. Sampling and Testing. The residue must be sampled and tested to determine if the slurry is a corrosive hazardous waste (pH greater than or equal to 12.5 or lower than 2). PH paper with a narrow range or a calibrated pH meter may be used to monitor the slurry pH in the field. At least 4 separate representative samples per day must be split and tested by a MDEQ certified laboratory as well as by the field method. The pH control plan must specify what actions will be taken if laboratory results are not consistent with the field results. Certify in writing that the testing equipment to be used is properly calibrated and the data and correction information should be included in the pH control plan. Maintain the records of all pH tests taken and provide copies of the daily reports to the Engineer. See page 7 for a copy of a pH testing log form or submit an approved equal. Evaluate the results using the "mean plus standard deviation approach" as described in the MDEQ's "Verification of Soil Remediation" guidance document or another equally representative sampling strategy. The number of samples tested will vary depending on volume of waste generated, pH range, consistency of the pH slurry, and the area being diamond ground. When directed by the Engineer, sample and test all material that appears inconsistent with similar material being sampled. The Engineer retains the right to sample and test the slurry at any time during the project.

2. Monitoring. Continuously monitor the residue throughout the diamond grinding process to ensure that the pH levels are maintained below 12.5 and above 2.0 prior to disposal or discharge. The pH control plan must specify what actions will be taken in order to meet the requirements of a pH lower than 12.5 and above 2.0.

3. Neutralization of pH. If the test results indicate the grinding residue or slurry has a pH greater than 12.5 or less than 2, which is corrosive hazardous waste, then neutralize the pH prior to discharging or contain the slurry and manage the slurry as a hazardous waste. Neutralize the pH by altering the pH to be greater than 2 or less than 12.5. If the Contractor elects to neutralize the pH after generation, the neutralization must occur in a container, tank or a transport vehicle. Follow subsection 715.03.A of the Standard Specifications for Construction for worker training, training program, contingency plan, records, etc. The contingency plan must address how accidental spills or releases of hazardous waste will be contained and cleaned up.

4. Managing. Manage the grinding residue or slurry to prevent release of a hazardous waste and to neutralize the pH when necessary prior to disposal or discharge.

5. Collecting and Hauling. If the grinding residue or slurry is generated, collected and hauled with a pH greater than 12.5, then a licensed hazardous waste hauler is required to transport the material. Prior to transport off the project site, a site identification number must be obtained as described in section d below. A uniform hazardous waste manifest is required for each load if the material is being disposed of at a hazardous waste facility. Use Uniform Hazardous Waste Manifest, EPA Form 8700-22. If the slurry is non hazardous, then the material can be treated as a liquid industrial waste and can be hauled by either the diamond grinding Contractor with MDEQ generator identification or transport identification number, or a licensed liquid industrial waste hauler must transport the material. See section f below for “Options for the Diamond Grinding Slurry”.

d. Generator or Transporter Identification Number. A generator or transporter identification number is required prior to collection and hauling of the diamond grinding slurry since it is classified as a liquid industrial waste. The generator identification number can be obtained from the MDEQ, Waste and Hazardous Materials Division Notification Unit, PO Box 30241, Lansing MI 48909-7741 by completing the MDEQ Form EQP5150, Site Identification Form. For copies and instructions of the form see the MDEQ website at www.michigan.gov/deq or call 517-335-2690. In order to register as a liquid industrial waste generator or transporter, check the box on page 2 of the form under Section X. Type of Regulated Waste Activity, Subsection E, Liquid Industrial Waste Activities at this location, check all that apply: box 1 Liquid Industrial Waste Transporter or box 2, Liquid Industrial Waste Generator. If the diamond grinding Contractor does not have a generator or transporter identification number, then the Contractor can use the MDOT Region’s Liquid Industrial Waste identification number for the generator number provided the waste is non hazardous, and but the Contractor will be required to use a licensed liquid industrial waste hauler to transport the non hazardous diamond grinding slurry. If the diamond grinding Contractor is listed as the generator of the waste and has a generator identification number, then the diamond grinding Contractor can transport the diamond grinding slurry.

e. Disposal Requirements for Diamond Grinding Pavement Slurry (Non Hazardous Only).

1. The Contractor must not allow the discharge of the diamond grinding residue or slurry to enter a closed drainage system. In these areas, the residue or slurry must be collected, hauled, and managed as specified under section f, “Options for the Diamond Grinding Slurry.”

2. Obtain approval for the spreading method from the Engineer prior to the beginning of the diamond grinding operation. Apply the slurry at a uniform rate not to exceed 5 dry tons of diamond grinding slurry an acre to the site within MDOT right-of-way. This equates to applying the slurry to an area approximately three times the amount of area being diamond ground. Spread the non hazardous grinding residue or slurry along the shoulders or slopes of the roadway, a minimum of 5 feet from the edge of curb, and per approval from the Engineer. The residue or slurry may not be spread within 100 feet of any natural stream or lake, within 5 feet of a water filled ditch, or such that the spread rate generates surface runoff. If any these conditions are present then the Contractor must collect, haul, and manage the residue or slurry per as specified under section f, “Options for the Diamond Grinding Slurry.”

f. Options for the Diamond Grinding Slurry (Non Hazardous Only).

1. Land Application Option for Diamond Grinding Concrete Pavement Slurry. This work consists of collecting, handling, transporting, manifesting, and managing the application of the diamond grinding concrete pavement slurry within MDOT right-of-way. All work must be according to the “MDEQ Concrete Grinding Slurry Exemption” dated October 30, 2003 and this special provision.

A. Transporting. The diamond grinding Contractor with a generator or transport identification number or a licensed liquid industrial waste hauler must transport the diamond grinding slurry from the diamond grinder to the approved site within MDOT right-of-way. The slurry must be covered so as to prevent loss to the environment during transport and delivery to the application site.

B. Manifests. Prepare a waste disposal manifest, with copies to Engineer, which contains information on the point of generation including roadway, roadway direction, and mile points, the volume transported, and the application area including roadway, direction, and mile points where the diamond grinding slurry is to be applied. A waste disposal manifest is required for each load. Use Uniform Hazardous Waste Manifest, EPA Form 8700-22.

C. Application. Apply the slurry at a uniform rate not to exceed 5 dry tons of diamond grinding slurry an acre to the site within MDOT right-of-way. This equates to applying the slurry to an area approximately three times the amount of area being diamond ground. The slurry must not be applied in a manner that adversely restricts soil permeability or causes ponding, pooling, or runoff in the area. The site of application will be designated by the Engineer in the plans and meet the requirements as listed earlier in section e of this special provision. The application of the slurry must not be applied to an application site unless the water table is at least 30 inches below the surface of the soil at the time of application.

D. Liquid Waste Exemption. Land application of concrete grinding slurry managed according to the “MDEQ Concrete Grinding Slurry Exemption” dated October 30, 2003, and according to this special provision, has been determined by MDEQ to be authorized in accordance with an applicable statute and therefore exempt from the 1994 PA 45, Part 121, prohibition on discharge to soil found in Section 12113(2)(a).

2. Disposal Option of Diamond Grinding Concrete Pavement Slurry. This work consists of collecting, handling, transporting, manifesting, and managing the non hazardous liquid

industrial waste disposal of the diamond grinding concrete pavement slurry for projects where the slurry is collected and hauled. All work must be according to the "MDEQ Concrete Grinding Slurry Exemption" dated October 30, 2003 and this special provision.

A. Transporting. The diamond grinding Contractor with a generator or transport identification number or a licensed liquid industrial waste hauler must transport the diamond grinding slurry from the diamond grinder to a licensed Type II municipal landfill or a licensed liquid wastewater facility. The slurry must be covered so as to prevent loss to the environment during transport and delivery to the licensed facility.

B. Manifests. The Contractor or the licensed liquid industrial waste hauler must prepare a waste disposal manifest, with copies to the Engineer, which contains information on the point of generation including roadway, roadway direction, and mile points, the volume transported, and the licensed facility. A waste disposal manifest is required for each load. Use uniform Hazardous Waste Manifest. EPA Form 8700-22. Include MDOT project site location information in block 14 of the manifest.

C. Solid Waste Facility. The diamond grinding slurry may be disposed of in a Type II municipal landfill licensed pursuant to 1994 PA 451, Part 115 provided the disposal is consistent with the landfill's waste acceptance policies and the slurry is solidified sufficiently to pass the paint filter test.

D. Licensed Liquid Industrial Waste Facility. The diamond grinding slurry may also be processed as a liquid industrial waste at a licensed liquid industrial waste facility pursuant to 1994 PA 451, Part 121 provided the disposal is consistent with licensed liquid waste facility processor acceptance policies.

3. Dewatering Option for Diamond Grinding Concrete Pavement. This work consists of the diamond grinding Contractor using a mechanical separation method to dewater, reduce, reuse, and recycle portions of the diamond grinding concrete pavement slurry for projects with enclosed drainage systems. The dewatering site must be located within MDOT right-of-way or with a site associated with the project. All work must be according to section 603 of the Standard Specifications for Construction, except as modified herein and the "MDEQ Concrete Grinding Slurry Exemption" dated October 30, 2003.

A. Transporting. The diamond grinding Contractor with a generator or transport identification number or a licensed liquid industrial waste hauler must transport the diamond grinding slurry from the diamond grinder to the dewatering site. The slurry must be covered so as to prevent loss to the environment during transport and delivery to the application site.

B. Manifests for Slurry. The Contractor or a licensed liquid industrial waste hauler must prepare a waste disposal manifest, with copies to the Engineer, which contains information on the point of generation including roadway, roadway direction, and mile points, the volume transported, and the licensed facility. A waste disposal manifest is required for each load. Use Uniform Hazardous Waste Manifest, EPA Form 8700-22. See page 6 for an approved "Diamond Grinding Slurry Tracking Log" form.

C. Dewatering. Propose a dewatering method which will separate the solid and liquid from the slurry (Mobile belt filter press, centrifuge tanks, or other separation methods may be submitted for approval). No unlined or lined pits are permitted at this

time. Separate the diamond grinding slurry into solid and liquid phases at the dewatering site.

D. Dewatering Site Location. The dewatering site must either be located within the project limits on MDOT right-of-way or at an off site location associated with the project (for example a contractor staging area, contractor's yard, concrete crushing facility, concrete plant, etc). MDEQ must be notified of the location of any off site dewatering sites. Contact Duane Roskosky, Environmental Quality Specialist, Waste and Hazardous Materials Division, Michigan Department of Environmental Quality, P. O. Box 30241, Lansing, MI , 48909-7741. Provide copies of the notification to the Engineer.

E. Solid. The solid material from the separation facility must be properly disposed of in a Type II landfill. Storage of the solid material greater than 60 days at any project or dewatering location will require the material to be covered per the "MDEQ Concrete Grinding Slurry Exemption" dated October 30, 2003. The MDEQ must be notified of the location of any stockpiles of dewatered solid material. See notification information as listed in subsection f.3.D of this special provision.

F. Liquid. The liquid material from the separation facility must be collected and recycled for reuse for the diamond grinding operation. After the diamond grinding is complete, the remaining decant liquid must be disposed of at a licensed liquid industrial waste facility provided the disposal is consistent with licensed liquid waste facility processor acceptance policies.

G. Manifests for Decant Liquid. The decant liquid must be manifested from the processing site to the licensed liquid industrial waste facility. The diamond grinding contractor with a generator or transport identification number or a licensed industrial waste hauler must transport the decant water. The decant liquid must be covered so as to prevent loss to the environment during transport and delivery to the licensed liquid industrial waste facility. Use Uniform Hazardous Waste Manifest, EPA Form 8700-22. Include MDOT project site location information in block 14 of the manifest.

g. Contractor Responsibility for Method of Operations. The Contractor is required to comply with all federal, state and local laws. This special provision is intended to set forth minimum steps to avoid violating environmental laws. It remains the responsibility of the Contractor to determine whether more than those minimum steps may be required and then, at the expense of the Contractor, to perform the work required by this contract in whatever manner may be required to comply with applicable laws. The Contractor is liable to the Department for any fines, costs, or remediation costs incurred by the Department as a result of the Contractor's failure to be in compliance with this special provision and all federal, state and local laws.

h. Records. MDOT must maintain a copy of all manifests for a period of 3 years and make them available to the MDEQ upon request.

i. Measurement and Payment. All costs associated with the sampling, testing, monitoring ph, neutralizing ph, collecting, handling, transporting by Contractor or licensed liquid industrial waste hauler, manifesting the waste, and managing the diamond grinding slurry, will not be paid for separately but will be included in the payment for other items.

MDOT DIAMOND GRINDING SLURRY TRACKING LOG

Control Section/Job Number _____ **Generator ID Number**_____

Delivery Engineer _____

Project Description and Location _____

Route and Dewatering Unit Location _____

Prime Contractor _____ **Diamond Grinding Contractor** _____

(Transporter) _____

Date	Volume	Project Section/Origin	Driver's Signature	Destination: Designated Dewatering Unit	Dewatering Unit Operator Signature
Michigan Department of Environmental Quality requires that a summary of liquid industrial waste movement on this form be supplied on a yearly basis (Jan. 1 - Dec. 31)					

DIAMOND GRINDING SLURRY PH TESTING LOG

Control Section/Job Number ____________________________________

Delivery Engineer ____

Project Description and Location ____

Route ____

Prime Contractor ____ **Diamond Grinding Contractor** _____________________________________

Date	pH	Test Method	Volume (gallons)	Accumulated Volume (gallons)	Location (Stationing)	Sample split with Laboratory	Lab pH results	Field Tester's Signature
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		
		☐ pH meter ☐ pH tape				☐ Yes ☐ No		