

APPLICABLE STANDARDS

BOOK 3

MICHIGAN DEPARTMENT OF TRANSPORTATION
Metro Region
Design-Build Project

Ambassador Bridge Plaza - Gateway Completion

Job Number: 116071A
Control Section: 82194



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1 INTRODUCTION

This is a listing of standards that the Contractor shall utilize in performing the final design and construction of the Project described in the RFP. It shall be the Contractor's responsibility to ensure that the most current version at the time of the Proposal Due Date is used for each of the references listed, unless noted otherwise or directed by MDOT. See each section for specific requirements from the references, as well as the hierarchy of the references for that section.

MDOT and Other References. All Project design and construction shall be performed in accordance with the requirements of this RFP and the Michigan Department of Transportation (MDOT) *Standard Specifications for Construction*, 2003 Edition (Standard Specifications), as well as the other special provisions, manuals, technical memoranda, standards, and guidelines listed in the Contract Documents. The criteria listed within the Standard Specifications and the MDOT engineering manuals and other references are considered minimums in terms of the required quality of Project workmanship and design. Where MDOT has not included a special provision applicable to the Contractor's Work, or where the Contractor proposes additional or different special provisions, these special provisions shall be subject to the Approval of MDOT. If it is not clear to the Contractor how the special provisions, manuals, technical memoranda, standards, or guidelines should be interpreted, the Contractor shall have the obligation to raise the issue with MDOT. Regardless of whether the Contractor raises the issue, MDOT shall always have the right to notify the Contractor if the Contractor is interpreting the requirements incorrectly.

MDOT Web site. Ordering information for most MDOT references, including specifications, plans, and details, is on MDOT's Web site: <http://www.michigan.gov/mdot/>

MDOT Manuals. When an RFP document or manual refers to other MDOT manuals, the applicable MDOT version in effect at the time of the Proposal Due Date shall be used.

Road Design Manual. Specifically, the Roadway geometric design shall be in accordance with the *MDOT Road Design Manual*, which specifies MDOT's new Construction/Reconstruction Standards. These standards shall be used for each of the design elements described in this RFP, unless otherwise noted.

Other Design Criteria. Unless otherwise specified in this RFP, the Project design shall be governed by MDOT policies, specifications, standards, manuals, guidelines, and technical memoranda, including all addenda, supplements, and revisions thereto. Generally, the design shall comply with the criteria established by MDOT and AASHTO. The latest version (current version as of the Proposal Due Date) of these references shall be used unless otherwise specified.

Web sites. Web sites have been supplied to the Contractor for some of the standards listed below for convenience only in an effort to help the Contractor locate the required standard. The Web sites are not guaranteed to be correct. It is ultimately the Contractor's responsibility to locate the required standard and to determine if the standard has been modified pursuant to this RFP.

General modifications. The following modifications shall apply to applicable standards listed in Book 3.

GENERAL

1. All references to standards, codes, or criteria, or to the latest version of other standards, codes, or criteria in Book 2 of the Contract Documents shall mean the latest version as of the Proposal Due Date.
2. Certain MDOT standards have been written as guidance documents and not as mandatory requirements. For purposes of this Project, the Contractor shall assume that all provisions of MDOT standards, including figures and tables, are mandatory, and guidelines shall be assumed to be requirements. All words such as "should," "may," "could," and "can" shall mean "shall" unless the context requires otherwise, as determined in the sole discretion of MDOT. The Contractor shall disregard qualifying words such as "usually," "normally," and "generally." In addition, references to MDOT's preferred practices

and policies shall be construed to be mandatory requirements unless the context requires otherwise, as determined in the sole discretion of MDOT. It shall be in MDOT's sole discretion to determine when the context does not require a provision to be mandatory.

3. When a standard refers to an action being necessary, needed, or recommended, the Contractor shall construe the action as required unless the context requires otherwise, as determined in the sole discretion of MDOT.
4. Some standards may provide general information (e.g., descriptions of MDOT divisions and their duties, descriptions of legal authority, or descriptions of internal MDOT procedures) that does not apply to design-build contracts; however, in some cases it may not be clear whether rights or responsibilities are applicable to the Contractor. If it is unclear whether specific provisions in the standard are applicable to the Contractor, the Contractor shall raise the issue with MDOT and MDOT shall make that determination in its sole discretion.
5. If the Contractor believes that an item in the standards is unclear, the Contractor shall have the obligation to raise the issue with MDOT. Regardless of whether the Contractor raises the issue, MDOT shall always have the right to notify the Contractor if the Contractor is interpreting the requirement incorrectly.

QUANTITIES AND PAYMENT

1. All references related to pay items or quantities, measurement for payment, method of measurement, basis of payment, extra work, adjustment of unit prices, or similar phrases shall be disregarded by the Contractor, except guidance or information on disincentives for Nonconforming Work shall be either the specific dollar amount or percent set forth in the Standards or a unit price proposed by the Contractor and Approved by MDOT.
2. When a standard refers to "extra work," "compensation for," "at the Department's expense," "quantity adjustments," "equivalent quantities," or similar phrases, such references shall be disregarded. It is the intent that the payment of the Contract Price will be full compensation for all Work performed pursuant to the Design-Build Contract unless specific provisions for additional payments are contained in Book 1 or Book 2 of the Contract Documents.

ROLES AND RESPONSIBILITIES

1. When a standard refers to "Engineer" relating to design responsibilities, such references shall mean the Contractor's Engineer, unless otherwise specified. It shall be in MDOT's sole discretion to determine when the context refers to design responsibilities.
2. When a standard uses the term "Engineer" relating to construction inspection, materials testing, disposal, restoration, extension of time, testing frequency, testing results and suitable method, such term shall mean MDOT. It shall be in MDOT's sole discretion to determine when the context refers to these applications.
3. When a standard uses the term "Engineer" relating to activation or de-activation of railroad or highway signals, or the approval of any activities involving the use of explosives, such term shall mean MDOT.
4. When an Approval or Authorization of the "Engineer" or "MDOT" is required in a standard for the use of alternative or substituted processes or components, the "Engineer" shall mean MDOT.
5. When a standard requires actions, dimensions, spacing, design information, materials as designed, means, or methods that are "either as indicated in the Plans or as designated by the Engineer," the Contractor shall disregard the phrase "or as designated by the Engineer."
6. When a standard refers to the "Engineer" ordering work beyond the scope of Work in the Contract, "Engineer" shall mean MDOT. Whenever the Engineer may order work that results in additional costs to MDOT, the "Engineer" shall mean MDOT.
7. Wherever references to "Engineer" result in testing or Acceptance procedures being assigned to the Engineer, Acceptance will be on behalf of MDOT. MDOT reserves the right to perform additional tests and inspections as necessary to confirm that the Work is in conformance with Contract requirements and will be the only party authorized to Accept or Approve the Work on behalf of the State.

8. When a standard refers to unauthorized Work or to Acceptance of non-conforming Work by the “Engineer,” the “Engineer” shall mean MDOT.
9. When a standard refers to “Department,” departments or divisions within MDOT, or specific job titles within MDOT, such reference shall mean MDOT.
10. Any acceptances on behalf of MDOT, Department or the State shall be performed by MDOT.
11. When any references occur in a standard to the “Engineer” that refers to the time period after Final Acceptance, the term “Engineer” shall mean MDOT.
12. When a standard requires notifications to the “Engineer”, the “Engineer” shall mean MDOT.
13. When a standard refers to an Approval of any correction or repair that deviates from the Contract requirements, the Approval must be by MDOT.
14. When a standard refers to items that will be performed or provided by MDOT or by a division or employee of MDOT, the Contractor shall construe the requirements as applying to the Contractor unless otherwise specified in the Contract Documents, or unless the context requires otherwise. It shall be in MDOT’s sole discretion to determine when the context requires otherwise.
15. When a standard refers to the “Project Manager” as it relates to plan processes, sending information or requesting information from internal MDOT entities, the term “Project Manager” shall mean MDOT. The Contractor shall submit all requests directly to the MDOT Project Manager on the Project.

2 LIST OF STANDARDS

Specific References Cited for the RFP:

Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire.

W = Standard is available as a download on the organization's Web site, Contractor's responsibility to acquire.

E = Document to be given to Contractor in electronic PDF format. In some cases, if a different format is available, the document may be provided to the Contractor on a DVD with other Contract Document materials.

Organization	Standard	Availability
AASHTO	<i>A Policy on the Accommodation of Utilities Within Freeway Right-of-Way</i>	IS
AASHTO	<i>A Guide for Accommodating Utilities Within Highway Right-of-Way</i>	IS
AASHTO	<i>A Guide for Transportation Landscape and Environmental Design</i>	IS
AASHTO	<i>A Guide for Achieving Flexibility in Highway Design</i>	IS
AASHTO	<i>A Policy on Geometric Design of Highways and Streets, 6th Edition</i>	IS
AASHTO	<i>A Policy on Design Standards Interstate System</i>	IS
AASHTO	<i>Construction Handbook for Bridge Temporary Works, 1st Edition</i>	IS
AASHTO	<i>Guide Design Specifications for Bridge Temporary Works, 1st Edition</i>	IS
AASHTO	<i>Guide for Design of Pavement Structures, 4th Editions</i>	IS
AASHTO	<i>Guide for Park-and-Ride Facilities, 2nd Edition</i>	IS
AASHTO	<i>Guide for the Development of Bicycle Facilities, 3rd Edition, 1999</i>	IS
AASHTO	<i>Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition</i>	IS
AASHTO	<i>Guide Specifications for Horizontally Curved Steel Girder Highway Bridges, 2003 and Errata</i>	IS
AASHTO	<i>Manual on Subsurface Investigation, 1st Edition, 1988</i>	IS
AASHTO	<i>Manual for Condition Evaluation of Bridges, 2nd Edition</i>	IS
AASHTO	<i>Provisional Standards</i>	IS
AASHTO	<i>Roadside Design Guide, 4th Edition</i>	IS

Organization	Standard	Availability
AASHTO	<i>Right of Way and Utilities Guidelines and Best Practices</i> http://cms.transportation.org/sites/rightofway/docs/aabp%20report%20final.pdf	W
AASHTO	<i>Roadway Lighting Design Guide</i>	IS
AASHTO	<i>Standard Specifications for Materials and Methods of Sampling and Testing</i>	IS
AASHTO	<i>Standard Specifications for Highway Bridges, 17th Edition</i>	IS
AASHTO	<i>Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5th Edition</i>	IS
AASHTO/NSBA	<i>Steel Bridge Erection Guide Specification</i>	IS
AASHTO	<i>The Manual for Bridge Evaluation</i>	IS
AASHTO	<i>AASHTO Guide Specifications – Thermal Effects in Concrete Bridge Superstructures, 1st Edition</i>	IS
AASHTO/AWS	<i>AASHTO/AWS D1.5M/D1.5:2010 Bridge Welding Code, 6th Edition</i>	IS
AASHTO/NSBA Steel Bridge Collaboration	<i>Guide Specification for Coating Systems with Inorganic Zinc-Rich Primer, S 8.1-2002</i> http://www.steelbridge.org/standards.htm	W
AASHTO/NSBA Steel Bridge Collaboration	<i>Shop Detail Drawing Review/Approval Guidelines, G 1.1-2000</i> http://www.steelbridge.org/standards.htm	W
AASHTO/NSBA Steel Bridge Collaboration	<i>Shop Detail Drawing Presentation Guidelines, G 1.3-2002</i> http://www.steelbridge.org/standards.htm	W
AASHTO/NSBA Steel Bridge Collaboration	<i>Steel Bridge Bearing Design and Detailing Guidelines, G9.1-2004</i> http://www.steelbridge.org/standards.htm	W
AASHTO/NSBA Steel Bridge Collaboration	<i>Steel Bridge Fabrication Guide Specification, S 2.1-2002</i> http://www.steelbridge.org/standards.htm	W
AASHTO/NSBA Steel Bridge Collaboration	<i>Steel Bridge Fabrication QC/QA Guide Specification, S 4.1-2002</i> http://www.steelbridge.org/standards.htm	W
ACI	<i>318-08: Building Code Requirements for Structural Concrete and Commentary</i>	IS

Organization	Standard	Availability
US Access Board	ADA Guidelines and Standards http://www.access-board.gov/gs.htm	W
Aluminum Association for Alloy	Number 319.0	IS
American Congress on Surveying and Mapping and the American Society of Civil Engineers	<i>Definitions of Surveying and Associated Terms</i>	IS
ANSI	B2.1	IS
ANSI	<i>American Standard for Nursery Stock, ANSI Z60.1</i>	IS
AREMA	<i>Manual for Railway Engineering</i>	IS
ASCE	<i>Practical Highway Esthetics</i>	IS
ASCE	<i>Recommended Practice for Plugging Soil Borings, 1969</i>	E
ASCE/SEI	<i>Minimum Design Loads for Buildings and Other Structures (7-10)</i>	IS
ASTM	Standards	IS
ATSSA	<i>Quality Guidelines for Temporary Traffic Control Devices & Features</i>	IS
AWWA	Standards	IS
Telcordia	Document No. GR-326, Issue 4, Generic Requirements for Single-Mode Optical Fiber Connectors and Jumper Assemblies	IS
Code of Federal Regulations	<i>Title 23 (Highways), Chapter 1, Part 752 Landscape and Roadside Development</i> http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr;sid=3434685b889da5fc6fa13777da977c3c;rgn=div5;view=text;node=23%3A1.0.1.8.42;idno=23;cc=ecfr	W
EIA/TIA Collaboration	TIA/EIA-455-171-A FOTP-171	IS
EIA/TIA Collaboration	TIA/EIA – 455-203 Fiber Optic Test Procedure (FOTP) Standards	IS
Electronics Industries Alliance (EIA)	Standards	IS

Organization	Standard	Availability
FHWA	<i>Design and Construction of Driven Pile Foundations, Volumes I and II</i> , (FHWA-HI-97-013 and HI-97-014) http://www.fhwa.dot.gov/engineering/geotech/library_arc.cfm?pub_number=42	W
FHWA	<i>Flexibility in Highway Design</i> http://www.fhwa.dot.gov/environment/flex/index.htm	W
FHWA	<i>Geotechnical Engineering Circular Number 4, Ground Anchors and Anchored Systems</i> , (FHWA-IF-99-015), June 1999 http://www.fhwa.dot.gov/engineering/geotech/library_listing.cfm	W
FHWA	<i>Handbook on Design and Construction of Drilled Shafts under Lateral Load</i> , (FHWA-IP-84-11)	IS
FHWA	<i>Highway Traffic Noise Analysis and Abatement, Policy and Guidance</i> , June 1995 http://environment.fhwa.dot.gov/guidebook/vol1/doc81.pdf	W
FHWA	Hydraulic Engineering Circular Number 14 (HEC-14), <i>Hydraulic Design of Energy Dissipaters for Culverts and Channels</i> , (FHWA-EPD-86-110)), September 1983 http://www.fhwa.dot.gov/engineering/hydraulics/library_listing.cfm	W
FHWA	Hydraulic Engineering Circular Number 22 (HEC-22), <i>Urban Drainage Design Manual</i> , (FHWA-NHI-01-021), August 2001 http://www.fhwa.dot.gov/engineering/hydraulics/library_listing.cfm	W
FHWA	<i>Manual for Design & Construction Monitoring of Soil Nail Walls</i> , (FHWA-SA-96-069R), August 1999 http://www.fhwa.dot.gov/engineering/geotech/library_arc.cfm?pub_number=160	W
FHWA	<i>Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines</i> , (FHWA-NHI-00-043), March 2001 http://www.fhwa.dot.gov/engineering/geotech/library_listing.cfm	W
FHWA	<i>Micropile Design and Construction Reference Manual</i>	IS
FHWA	National Bridge Inspection Standards	IS

Organization	Standard	Availability
FHWA	<i>Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects</i> http://www.fhwa.dot.gov/reports/utilguid/if03014.pdf	W
FHWA	<i>Public Involvement Techniques for Transportation Decision-Making</i> http://www.fhwa.dot.gov/REPORTS/PITTD/COVER.HTM	W
FHWA	The Cone Penetration Test	IS
FHWA	The Pressuremeter Test for Highway Applications	IS
FHWA	<i>Subsurface Investigations – Geotechnical Site Characterization</i> , (FHWA-NHI-01-031), May 2002 http://isddc.dot.gov/OLPFiles/FHWA/012546.pdf	W
Great Lakes –Upper Mississippi River Board (GLUMRB)	<i>Recommended Standards for Water Works</i> http://10statesstandards.com/	W
Great Lakes –Upper Mississippi River Board (GLUMRB)	<i>Recommended Standards for Wastewater Facilities</i> http://10statesstandards.com/	W
Illuminating Engineering Society of North America	<i>Roadway Lighting, ANSI Approved</i>	IS
Institute of Electrical and Electronic Engineers (IEEE)	<i>National Electrical Safety Code</i>	IS
Institute of Transportation Engineers (ITE)	<i>Standards</i>	IS
International Code Council (ICC)	<i>International Building Code</i>	IS
International Municipal Signal Association	<i>Specification No. 50-2</i>	IS
International Society of Arboriculture (ISA)	<i>Guide for Plant Appraisal</i>	IS
ISO	ISO 8402, 1994 Revision	IS
ISO	ISO 9001, 2008 Revision	IS

Organization	Standard	Availability
MDEQ	<i>Stratigraphic Lexicon for Michigan 2001</i> http://www.michigan.gov/documents/deq/GIMDL-BU08_216121_7.pdf	W
MDNR	<i>A Guide to the Control and Management Invasive Phragmites</i> http://www.michigan.gov/documents/dnr/PhragBook_Email_216473_7.pdf	W
MDOT	<i>Administrative Rules regulating Driveways, Banners and Parades</i> http://www.michigan.gov/documents/mdot/Admin_Rules_booklet_186108_7.pdf	W
MDOT	<i>Bridge Analysis Guide</i> http://www.michigan.gov/mdot/0,1607,7-151-9625_24768_24773-132786--,00.html	W
MDOT	<i>Bridge Boring Sample Plan</i> (This file is available in Microstation format on a DVD. DVDs may be obtained by contacting Tia Klein, MDOT Project Manager at – schneet@michigan.gov)	E
MDOT	<i>Bridge Design Manual</i> http://mdotwas1.mdot.state.mi.us/public/design/englishbridgemanual/	W
MDOT	<i>Bridge Design Guides</i> http://mdotwas1.mdot.state.mi.us/public/design/englishbridgeguides/	W
MDOT	Bureau of Highways Instructional Memos http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_20469--,00.html	W
MDOT	<i>Context Sensitive Solutions Awareness Training Manual</i> http://www.michigan.gov/mdot/0,1607,7-151-9621_41446-143910--,00.html	W
MDOT	Construction & Technology Research Reports http://www.michigan.gov/mdot/0,1607,7-151-9622_11045_24249--,00.html	W

Organization	Standard	Availability
MDOT	C&T Research Records and MATES http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_25626--00.html	W
MDOT	<i>Certified Payroll Status Record</i> http://www.michigan.gov/documents/mdot/MDOT_CertifiedPayrollStatusRecord_229186_7.xls	W
MDOT	CAD Standards http://mdotwas1.mdot.state.mi.us/public/design/files/englishroadmanual/V8planprep.pdf	W
MDOT	<i>Design Survey Manual</i> http://mdotwas1.mdot.state.mi.us/public/design/surveymanual/	W
MDOT	<i>Drainage Manual</i> http://www.michigan.gov/stormwatermgt/0,1607,7-205--93193--00.html	W
MDOT	<i>Density Control Handbook</i> http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_39444--00.html	W
MDOT	Frequently Used Special Provisions http://mdotwas1.mdot.state.mi.us/public/dessssp/spss/gotoview.cfm?ds=3 The following Frequently Used Special Provisions shall be excluded from the Project: 03SP104A , 03SP303A, 03SP404A, 03SP501D, 03SP501E , 03SP502C, 03SP502G, 03SP502H, 03SP502M, 03SP502N, 03SP502P, 03SP602D, 03SP807A	W
MDOT	<i>Geometric Design Guides</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Geotechnical Investigation And Analysis Requirements For Structures March 2004</i> http://www.michigan.gov/documents/GeotechnicalInvestigationsAnalysis_116819_7.pdf	W

Organization	Standard	Availability
MDOT	Guidelines for Plan Preparation, Road Sample Plans http://www.michigan.gov/mdot/0,1607,7-151-9625_21540_36037-171026--,00.html	W
MDOT	Guidelines for Plan Preparation, Bridge Sample Plans http://www.michigan.gov/mdot/0,1607,7-151-9625_21540_36037-171399--,00.html	W
MDOT	MDOT <i>Guidelines for Stakeholder Engagement</i> http://www.michigan.gov/documents/mdot/MDOT_Guidelines_For_Stakeholder_Engagement_264850_7.pdf	W
MDOT	MDOT High-Tension Cable Barrier Spare Part Quantities Guidelines	E
MDOT	<i>HMA Production Manual</i> http://www.michigan.gov/documents/mdot_HMA_ProductionManual_79005_7.pdf	W
MDOT	<i>Maintaining Traffic Typical</i> s http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Manual for the Michigan Test Methods (MTM'S)</i> http://www.michigan.gov/documents/mdot_MTM_CombinedManual_83501_7.pdf	W
MDOT	<i>Materials Quality Assurance Procedures Manual</i> http://www.michigan.gov/mdot/0,4616,7-151-9622_11044_11367-207980--,00.html	W
MDOT	<i>Materials Source Guide</i> http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_11367-22505--,00.html	W
MDOT	<i>MDOT Uniform Field Soil Classification System (Modified Unified Description)</i> http://www.michigan.gov/documents/mdot/MDOT_SoilClassification_189904_7.pdf	W
MDOT FHWA Michigan State Police	<i>Michigan Manual on Uniform Traffic Control Devices (MMUTCD Correspondence/Guidelines)</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W

Organization	Standard	Availability
MDOT	<i>Michigan Structure Inventory and Appraisal Coding Guide</i> http://www.michigan.gov/documents/MDOT-Bridge-SIAMANUAL-2_87989_7.pdf	W
MDOT	MDOT Traffic and Safety Special Provisions http://mdotwas1.mdot.state.mi.us/public/dessssp/spss/gotoview.cfm?ds=25 The following Traffic and Safety Special Provisions shall be excluded from the Project: 03T803(016), 03T804(026), 03T810(136), 03T810(A70), 03T810(A80), 03T810(A90), 03T811(A20), 03T811(A70), 03T820(015), 03T820(017), 03T820(021), 03T820(071), 03T820(073), 03T820(123), 03T820(183), 03T820(415), 03T820(E30), 03T820(E40), 03T820(E50),	W
MDOT	<i>MDOT Standards of Practice- Design Surveys (March, 2009)</i> ftp://survcons:\$urvcon\$@ftp.michtrans.net/Standards_of_Practice/standard%202009.doc	W
MDOT	<i>Pavement Design and Selection Manual, February 2012</i> http://www.michigan.gov/documents/mdot/MDOT_Pavement_Design_and_Selection_Manual_257723_7.pdf	W
MDOT	<i>Pavement Marking Standards and Special Details</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Percent Within Limits (PWL) Spreadsheet</i> http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_11367-124538--,00.html	W
MDOT	<i>Phase II Storm Water Management Plan Permit No. MI0057364</i> http://www.michigan.gov/stormwatermgmt/0,1607,7-205--114322--,00.html	W
MDOT	<i>Procedures for Aggregate Inspection</i> http://www.michigan.gov/mdot/0,1607,7-151-9622_11044_39444--,00.html	IS
MDOT	<i>Program/Project Management System Task Manual</i> http://www.michigan.gov/mdot/0,1607,7-151-9625_21540_36037_54503---,00.html	W
MDOT	MDOT PTR Typical Installation	E

Organization	Standard	Availability
MDOT	<p><i>Road Boring Sample Plan</i></p> <p>(This file is available in Microstation format on a DVD. DVDs may be obtained by contacting Tia Klein, MDOT Project Manager at – schneet@michigan.gov)</p>	E
MDOT	<p><i>Road Design Manual</i></p> <p>http://mdotwas1.mdot.state.mi.us/public/design/englishroadmanual/</p>	W
MDOT	<p><i>Construction Soil Erosion & Pollution Prevention Pocket Guide</i></p> <p>http://www.michigan.gov/documents/stormwatermgt/2007_SESC_Pocket_Flip_Guide_192393_7.pdf</p>	W
MDOT	<p>Special Details</p> <p>http://mdotwas1.mdot.state.mi.us/public/design/englishstandardplans/spdetails/index.htm</p>	W
MDOT	<p>Special Provisions</p> <ul style="list-style-type: none"> • Audio-Visual Filming • Bentonite Plugs • Concrete Base Course, Reinforced, 4 inch • Dewatering System for Petroleum Contaminated Groundwater • Expansive Waterstop • Geotextile Separator • Geotextile, Stabilization • High Performance Biaxial Geogrid • High Performance Portland Cement Concrete Grade P1(Modified) • Lime Stabilized Subgrade • Managing Diamond Grinding Slurry From Ride Quality Concrete • Managing Diamond Grinding Slurry From Ride Quality HMA • NTCIP-Compliant Portable Changeable Message Sign (11-18-09) • Steel Sheet Piling, Temporary, Special • Structural Steel Foundation Piling Material 	E

Organization	Standard	Availability
MDOT	<ul style="list-style-type: none"> • Temporary Concrete Barrier Ending, Detail • The Preservation and Perpetuation of Public Land Survey Corners, Property Controlling Corners, Alignment Control Points and Horizontal Control Points • Turf Establishment, Performance • Underdrain Remove 	E
MDOT	Standard Highway Signs http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	Standard Plans http://mdotwas1.mdot.state.mi.us/public/design/englishstandardplans/index.htm	W
MDOT	<i>2003 Standard Specifications for Construction</i> http://mdotwas1.mdot.state.mi.us/public/specbook/	W
MDOT	Supplemental Specifications, 2003 http://mdotwas1.mdot.state.mi.us/public/dessssp/spss/gotoview.cfm?ds=4 The following Supplemental Specifications shall be excluded from the Project: N/A	W
MDOT	<i>Commission Policy on Context Sensitive Solutions (May 2005)</i> http://www.michigan.gov/documents/MDOT_CSS_Policy_159545_7.pdf	W
MDOT	<i>Traffic and Safety Notes</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Traffic Signal Guides and Special Details</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Traffic Signing Standards and Special Details</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Traffic Standards, Typicals, Guides and Guidelines</i> http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W

Organization	Standard	Availability
MDOT	Work Zones - Correspondence/Guidelines http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	Work Zone Device Special Details http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm	W
MDOT	<i>Work Zone Safety and Mobility Manual</i> http://www.michigan.gov/documents/mdot/MDOT_WorkZoneSafetyAndMobilityManual_233891_7.pdf	W
MDOT	<i>Work Zone Safety and Mobility Policy</i>	E
Michigan Department of Energy, Labor and Economic Growth	<i>MIOSHA</i> http://www.michigan.gov/dleg/0,1607,7-154-11407_15368---.00.html	W
Military Specifications	<i>MIL-A-8625C</i>	IS
National Cooperative Highway Research Program (NCHRP)	Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features http://www.trb.org/publications/nchrp/nchrp_rpt_350-a.pdf	W
National Electrical Manufacturers Association (NEMA)	Standards	IS
National Fire Protection Agency (NFPA)	<i>National Electrical Code</i>	IS
National Fire Protection Agency (NFPA)	<i>NFPA 502: Standard for Road Tunnels, Bridges, and Other Limited Access Highways, 2011 Edition</i>	IS
National Spatial Data Infrastructure (NSDI)	<i>Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy, FGDC-STD-007.3-1998</i> http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3	W
National Transportation Communications for ITS Protocol Standards (NTCIP)	Standards	IS

Organization	Standard	Availability
NEMA Joint Publication/ Insulated Cable Engineers Association (ICEA)	NEMA WC70-99	IS
NEMA Joint Publication / Insulated Cable Engineers Association (ICEA)	NEMA WC71	IS
NEMA Joint Publication / Insulated Cable Engineers Association (ICEA)	NEMA WC74-00	IS
NEMA Joint Publication / Insulated Cable Engineers Association (ICEA)	NEMA WC57-2004	IS
The Society for Protective Coatings	<i>SSPC-QP 2, Standard Procedure for the Qualification of Painting Contractors (Field Removal of Hazardous Coatings from Complex Structures)</i> http://www.sspc.org/standards/scopes.html	W
Telecommunications Industries Association (TIA)	Standards	IS
TIA	455-59-FOTP-59	IS
TIA	492AAAA	IS
TIA	526-14-A-OFSTP-14	IS
TRB	<i>Highway Capacity Manual</i>	IS
US National Archives and Records Administration	<i>Code of Federal Regulations</i> http://www.archives.gov/federal-register/cfr/	W
US Army Corps of Engineers (COE)	<i>Corps of Engineers Wetlands Delineation Manual, January 1987</i> http://www.mvn.usace.army.mil/ops/regulatory/wlman87.pdf	W

Organization	Standard	Availability
US Department of Transportation	National ITS Architecture http://itsarch.iteris.com/itsarch/html/entity/paents.htm	W
USDA	Rural Utilities Service (RUS) Specifications	IS
USDA	RUS 7 CFR 1755.900 http://www.usda.gov/rus/telecom/publications/publications.htm	W
USDA	RUS Splicing Standard PC-2, Section 3.3 http://www.usda.gov/rus/telecom/publications/pdf_files/1753f401.pdf	W
US General Services Administration	Federal Color Standard, 595, Rev B	IS

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
AUDIO-VISUAL FILMING

[SOURCE]

1 of 3

C&T:APPR:JAR:GEN 06-23-03

a. Description. Provide a film record of physical, structural and aesthetic conditions of the area described in Appendix A of this special provision as it exists prior to the beginning of any construction activities. The film must be professional quality, providing a clear and accurate visual record of existing conditions.

Complete filming, under the supervision of the Engineer, before any construction activity is started. Furnish the completed tape to the Engineer one week prior to placement of any materials or equipment in the construction area. Any portion of the tape determined by the Engineer to be unacceptable for the documentation of existing conditions must be re-filmed prior to the start of any construction activity. All costs associated with the need to re-film will be borne by the Contractor.

b. Audio-Video Production. Provide the name of the videotaping services company to the Engineer a minimum of 5 work days prior to the start of taping.

Use color VHS tape and equipment which allows audio and video information to be recorded. Do not splice or edit the tape. Speed and electronics of the video taping equipment and cassettes must conform to video taping industry standards. Film in the general direction of vehicular travel and do not exceed 45 feet per minute (approximately 0.5 miles per hour). Control pan and zoom rates to ensure playback clarity of the subject matter being filmed.

Use audio and video cues to identify location, relative to project limits and landmarks, at intervals of not more than 100 feet along the filming route. Provide audio commentary as necessary during filming to describe streets, buildings, landmarks and other details which will enhance the documentation of existing conditions.

Conduct filming during a time of good visibility and not during periods of precipitation, or when snow, leaves, or other natural debris obstruct the area being filmed.

Use video equipment with date/time stamp and digital annotation capabilities. The final video recording must display the date (month, day and year) and the time (hours, minutes, and seconds). This transparent information is to appear on the upper left hand corner of the frame.

The project station numbers must appear in the lower half of the frame. This stationing must use MDOT standard engineering symbols (i.e., 3+50). If there is no project stationing in an area being filmed, assign assumed stationing to each street or other discrete area being filmed. Start the assumed stationing at 0+00 and increase from west to east or from south to north. Include periodic, transparent alpha/numeric information below the station numbers consisting of the name of the project, name of area shown, direction of travel, viewing direction, etc.

c. Area to be Filmed. Film all existing driveways, sidewalks, fences, trees, shrubbery and other structures and landscaping located up to 50 feet outside of the proposed right-of-way line

shown on the plans and within the limits described in Attachment A. The tape coverage must include the interior and exterior of all buildings listed in Attachment A.

d. Measurement and Payment. The completed work as documented by the video tape(s) will be paid for at the contract unit price for the following contract item.

Contract Item (Pay Item)	Pay Unit
Audio-Visual Filming	Lump Sum

Payment for the item **Audio-Visual Filming** includes all labor, equipment and materials required to perform the filming and to provide the finished tape(s) to the Engineer.

ATTACHMENT A

LIMITS OF AUDIO-VIDEO FILMING

**ATTACHMENT A MUST DESCRIBE
THE PROJECT SPECIFIC AREAS
AND/OR BUILDINGS TO BE FILMED**

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
BENTONITE PLUGS

DES:JI

1 of 1

C&T:APPR:DMG:JW:03-19-04

a. Description. This work shall consist of all labor, equipment and materials required to place bentonite plugs at the end of sewer trenches in the area of the proposed trench excavation in contaminated areas, as shown on the design plans. Backfilling of sewer trenches that are not contaminated shall be constructed in accordance with Section 402 of the Standard Specifications for Construction and as shown on Standard Plan R-83 Series.

b. Materials. Bentonite shall be manufactured from high quality high swelling sodium montmorillonite clay. Bentonite chips in the 3/8 inch size range shall be used to construct the bentonite plugs in accordance with this special provision.

c. Construction. The methods and materials required to accomplish this work shall be determined by the Contractor, subject to approval of the Engineer before initiation or installation of any bentonite plugs for the contaminated sewer trench. The bentonite shall be placed in the sewer trench or water main trench as per the manufacturer's specifications.

Bentonite plugs shall be independent of other backfilling operations by a separate installation. Appropriate precautions shall be taken to prevent contamination of clean areas.

The Engineer may order corrections any time due to deficiencies. The bentonite plugs must fill the ending points of the trenches in the contaminated areas. The plugs must begin at the bottom of the excavation, and continue to within one foot of the ground surface. The plugs are to be three feet in the longitudinal direction. The plugs will vary in the vertical and transverse directions as required to completely fill the trench as shown on the plans, standard plans/details, or as directed by the Engineer. Hydration of the bentonite may be required, depending on the depth to groundwater.

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

Contract Item (Pay Item)	Pay Unit
Bentonite Plugs.....	Each

Payment for **Bentonite Plugs** shall include all labor, equipment, and materials to complete the work as specified in this special provision.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CONCRETE BASE COURSE, REINFORCED, 4 INCH

DES:PAG

1 of 1

C&T:APPR:LT:JAR:12-04-02

a. Description. This work shall consist of furnishing and installing a Concrete Base Course, Reinforced, 4 Inch according to Section 602 of the Standard Specifications for Construction, the plans and this specification.

b. Materials. The Concrete Base Course, Reinforced, 4 Inch shall meet the material requirements of subsections 601, 903, and 905 of the Standard Specifications for Construction.

c. Construction Methods. The pavement reinforcement shall be in accordance with Standard Plan R-45 Series, Conventional Pavement Reinforcement, with the following exception. The location of steel reinforcement shall be at the 2 inch depth below the top of the surface of the base course.

d. Measurement and Payment.

Contract Item (Pay Item)	Pay Unit
Conc Base Cse, Reinf, 4 Inch	Square Yard

Payment for **Conc Base Cse, Reinf, 4 Inch** shall be in accordance with subsection 602.04 of the Standard Specifications for Construction.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
DEWATERING SYSTEM FOR PETROLEUM CONTAMINATED GROUNDWATER

OAK:JJB

1 of 4

06-03-08

a. Description. This work shall consist of all labor, materials, power, equipment, tools, etc. required to lower the groundwater table in the area of the proposed trench excavation, pretreat the contaminated groundwater removed during the dewatering process, and discharge the pretreated water to the sanitary sewer system or a surface water discharge will be allowed if an NPDES permit is secured. It shall also include the operation and monitoring of the pretreatment system and all sampling analysis required for this purpose.

This work will involve the use of well points, deep wells, or other measures that are usually established, or accomplished from the ground surface before excavation.

Dewatering of groundwater that is not contaminated shall be included in the Contractor's Price Proposal for the Project.

b. Well Points and Deep Wells. Should groundwater control be performed by deep well and/or well point pumping systems, it shall be done without damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors. Any pumping methods used for dewatering and control of groundwater and seepage shall have properly designed filters to ensure that adjacent soil will not be pumped with the water, thus creating voids in the ground and around the face of the excavation or under existing structures. Such filter design shall be reviewed and accepted by the Department before placement.

Deep wells and/or well points in the area of contamination shall discharge into header or collection pipes. All wells and piping required for this system shall be considered included in the Contractor's Price Proposal for the Project.

The dewatering operations shall be performed in a proper and predetermined sequence with the trenching operations such that the circumference and face of the excavation are stable. Dewatering well diameter, pumping rate, and well spacing shall provide adequate drawdown of the water level. Wells shall be properly located to intercept groundwater that otherwise would enter the excavation and interfere with the work. The Contractor shall install observation wells at key locations for observation of groundwater levels to provide a forewarning of deficiencies, if any, which might be developing with the dewatering system. The observation wells anticipated are, but will not be limited to, one per each two-hundred foot of Dewatering System for Petroleum Contaminated Groundwater. The Contractor is to submit his plan for locations and monitoring frequency of the observation wells to MDOT a minimum of seven Working days in advance of placement of the dewatering system.

c. Pre-treatment System. Following pretreatment, discharge of contaminated water shall be

to the existing sanitary sewer system or a surface water discharge will be allowed if an NPDES permit is secured. Filters or settling devices will be required before pretreatment to ensure that both the pretreatment and sanitary sewer systems or surface waters are not adversely affected by construction debris or increased sediment load. The disposal of this sediment shall be included in the Contractor's Price Proposal for the Project.

Before discharging to a sanitary sewer system or to the surface, contaminated water must be pretreated by use of carbon filters. These filters shall be sized based upon concentrations of contaminants found in the groundwater, the flow required to adequately dewater the trench as specified above, and an effluent concentration that meets the Michigan Department of Environmental Quality (MDEQ) surface water discharge requirements. The surface water discharge requirement is for a concentration of less than 20 parts per billion (ppb) for total Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), unless higher concentration levels are allowed by MDEQ permit.

The system shall consist of two banks of carbon canisters in series. Sampling ports shall be placed at three locations within the system: the influent line, the lines between the carbon canisters, and the effluent line. Samples shall be collected from all three sampling port locations at intervals close enough to insure that breakthrough on the second bank of canisters will not occur.

If sampling shows that breakthrough has occurred on the first bank of carbon canisters, the carbon canisters in the second bank shall be moved to the first bank and fresh carbon shall replace the spent carbon. The canisters with the fresh carbon shall then be placed in the second bank. It is the responsibility of the Contractor to legally dispose of, and/or regenerate the spent carbon.

MDOT may sample all three ports intermittently to assure that the system is being operated properly. Breakthrough of the contaminants from the carbon treatment system will not be allowed. If it is found any time, that the breakthrough of the second bank has occurred, it will be the sole responsibility of the Contractor to pay all additional costs, fees, and/or environmental fines that would result.

Carbon filters must be sized large enough so that the flow from the trench is not impeded, or a temporary storage tank may be used. The sizing and design of the carbon filter system shall be by a qualified professional engineer and shall be reviewed and approved of by the Department before placement. A qualified professional engineer shall also be responsible for overseeing the operation of the pretreatment system.

d. Sanitary Sewer or Surface Discharge. The volume of pre-treated water discharged to the sanitary sewer system or as surface discharge shall be monitored by using a totalizing turbine type flow meter. The flow meter shall be placed on the carbon system effluent line, shall be an in-line meter designed for high flow applications, and shall have a flow totalizing register that is adequately sealed to eliminate fogging and condensation. The type of meter used shall be reviewed and accepted by the Department before placement.

An NPDES permit will be required to discharge the pretreated water as surface water. All requirements of the NPDES permit must be met by the Contractor. Written permission from the wastewater treatment plant authority will be necessary if the effluent is to be discharged to the sanitary sewer system. A copy of the written authorization shall be provided to MDOT prior to discharging any water to the system.

The amount of flow being discharged to the sanitary sewer or the surface will be monitored periodically by reading the register on the flow meter.

e. Hazardous\Nonhazardous Material Handling. All hazardous and nonhazardous waste shall be loaded and transported using properly trained personnel and placarded vehicles, and shall have a hazardous or liquid industrial waste manifest, as required. All manifests are to be signed by the Department or their representative. The terms hazardous and nonhazardous, as used in this document, are defined in Parts 111 and 121 of Act 451, the Natural Resources and Environmental Protection Act.

f. Accidents. The Contractor shall hold MDOT harmless and indemnify the State against all claims or acts for which the Contractor is responsible. Any accident that occurs during the work must be reported immediately to MDOT.

g. Construction. The methods and materials required to accomplish this work shall be determined by the Contractor, subject to approval of MDOT before initiation or installation of any Dewatering System for Petroleum Contaminated Groundwater.

Dewatering System for Petroleum Contaminated Groundwater shall be independent of other dewatering operations by a separate installation. The system shall be in use for as short of time as necessary. Appropriate precautions shall be taken to prevent contamination of clean areas.

The Department or their representative may order corrections in the system any time due to deficiencies in the system used to control the groundwater at no additional cost to the Contractor.

h. Measurement and Payment. The completed work as described will be included in the Contractor's Price Proposal for the Project.

The work shall include all materials, supplies, labor, equipment, power, and fuel necessary for the installation, operation, maintenance, and removal of the Dewatering System for Petroleum Contaminated Groundwater and the disposal of all surplus materials. All costs associated with obtaining an NPDES permit shall be considered included with this work.

The installation, maintenance, and removal of observation wells shall be included with this work.

Any cost for treatment of the water at the local wastewater treatment facility shall be considered to be included. There shall be no compensation for idled personnel or equipment due to any system corrections ordered by the Department or their representative to remedy any deficiencies.

Test pits will be considered included with this work.

Disposal of contaminated soil, excavated or displaced during the installation of this system, will be considered included in the Contractor's Price Proposal for the Project.

This special provision is to be used when there is petroleum contaminated groundwater that needs to be dewatered. Petroleum contamination includes gasoline, diesel fuel, heating oil, kerosene, etc. Aromatic hydrocarbons such as benzene, toluene, ethylbenzene, and xylene fall into this category. If the groundwater is contaminated with other constituents such as chlorinated solvents (such as trichloroethylene and vinyl chloride) or heavy metals (such as chromium, arsenic and lead), another pre-treatment technology may be necessary. For assistance in this matter, Contact Jim Woodruff at (517) 322-1205, Construction and Technology Support Area, Secondary Complex, Lansing.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
EXPANSIVE WATERSTOP

C&T:JFS

1 of 2

C&T:APPR:DEB:TES:05-17-06

a. Description. This specification covers requirements for and installation of expansive waterstop to be used for cast-in-place watertight seal at construction joints in Portland cement concrete structure applications as specified on the plans. The Standard Specifications for Construction shall apply except as modified herein.

b. Materials. Expansive bentonite/butyl rubber-based waterstop or expansive butyl rubber waterstop will be one of the following products:

Volclay Waterstop – RX101T

Greenstreak Swellstop

Hydro-flex Waterstop

The waterstop materials shall not be prehydrated by being in contact with water at any time prior to concrete placement. Waterstop materials that are damaged, deformed, or exhibit volumetric expansion due to moisture shall not be used.

c. Construction. The waterstop shall be installed at locations as shown on the plans. The minimum concrete cover from the edge of the waterstop to the exposed face of finished concrete shall not be less than 4 inches.

Surface Preparation - All surfaces to receive waterstop shall be clean and dry. Curing compound, oils, grease, and other debris shall be removed prior to application of adhesives or primers. Surface imperfections, excluding tining, shall be removed prior to application of adhesives or primers.

The expansive waterstop systems will be installed in accordance with the manufacturer's installation procedures/guidelines. Provide the installation procedures/guidelines to the Engineer prior to installation.

The concrete shall be placed and consolidated so as to prevent damage or dislocation of the waterstop from the substrate concrete surface.

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

Contract Item (Pay Item)	Pay Unit
Expansive Waterstop.....	Foot

Payment for **Expansive Waterstop** includes all labor, equipment, and materials required to prepare the substrate concrete surface and install the waterstop according to this specification.

Measurement of **Expansive Waterstop** is based on the actual length of installed waterstop material, with no additional compensation for surplus materials. Payment for the adhesive and/or primer is included in the pay item for **Expansive Waterstop**, with no additional compensation allowed.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
GEOTEXTILE SEPARATOR

C&T:TRC

1 of 1

C&T:APPR:JAR:RBE 04-04-03
REVISED:02-17-05

a. Description. This work consists of furnishing and installing geotextile separator as detailed on the plans and in the proposal. Complete this work in accordance with the manufacturer's installation guidelines, the Standard Specifications for Construction, and as detailed herein.

b. Materials. Materials must meet the following requirements.

Geotextile Separator.....910

c. Construction. Install the geotextile separator on prepared grades in accordance with the manufacturer's recommendations. Do not operate equipment required to place backfill or cover materials directly on the geotextile. Eliminate wrinkles or waves which may develop in the geotextile during placement. Either shingle-lap (minimum of 2 feet) or seam all longitudinal and transverse joints in the geotextile. Field or factory seams, sewn or sealed, must meet specified grab tensile strength. Install seams facing upward to facilitate inspection.

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

Contract Item (Pay Item)	Pay Unit
Geotextile Separator.....	Square Yard

Payment for **Geotextile Separator** will be measured in place to the limits as shown on the plans.

Payment for **Geotextile Separator** includes all material, labor, and equipment necessary to complete the work as described.

Payment for backfill materials will be measured and paid for separately.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
GEOTEXTILE, STABILIZATION

C&T:LDT

1 of 1

C&T:APPR:DMG:DBP:12-19-05

a. Description. This work consists of furnishing and installing Stabilization Geotextile as detailed on the Plans and in the proposal. Complete this work in accordance with the manufacturer's installation guidelines, the Standard Specifications for Construction, and as detailed herein.

b. Materials. The materials must meet the following requirements:

Stabilization Geotextile..... 910

c. Construction. Install Stabilization Geotextile on prepared grades in accordance with the manufacturer's recommendations prior to placing backfill or cover materials. Do not operate equipment required to place backfill or cover materials directly on the geotextile. Eliminate wrinkles or waves, which develop in the geotextile during placement. Either shingle-lap (minimum of 2 feet) or seam all longitudinal and transverse joints in the geotextile. Field or factory seams, sewn or sealed, must meet specified grab tensile strength. Install seams facing upward to facilitate inspection.

Spread and grade the first lift of aggregate on the geotextile to create a stable work platform prior to compaction. Place additional aggregate as required, in 8-inch maximum lifts and compact as directed by the Engineer. If surface ruts exceed 6 inches during construction, reduce construction vehicle loads and/or increase lift thickness. Fill ruts with new material prior to placement of subsequent lifts. Do not blade down these ruts.

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

Contract Item (Pay Item)	Pay Unit
Geotextile, Stabilization.....	Square Yard

Payment for **Geotextile, Stabilization** includes all material, labor, and equipment necessary to complete the work as described, except that backfill materials, including additional materials required to fill ruts, will be measured and paid for separately.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
HIGH PERFORMANCE BIAXIAL GEOGRID

C&T:LDT

1 of 2

C&T:APPR:RBE:PWO:05-10-04

a. Description. The geogrid shall be a regular grid structure and shall have aperture geometry, and rib and junction cross-section sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have significant dimensional stability through all ribs and junctions of the grid structure. The geogrid shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service. The geogrid shall also be resistant to ultraviolet degradation, to damage under normal construction practices, and to all forms of biological or chemical degradation normally encountered in highway construction.

b. Materials. The geogrid shall be composed of polypropylene, high-density polyethylene, or polyester virgin resins. The protective coatings of polyester geogrids shall contain less than 5 percent filler content. Damaged coating shall be repaired prior to backfilling. The high performance biaxial geogrid shall meet the following physical property requirements:

Property	Test Method	Minimum Value
Interlock Open Area	COE Method ¹	60 %
Ultimate Strength	- MD ⁴ - CMD ⁴ ASTM D6637 ²	1200 lb/ft 2000 lb/ft
Individual Junction Strength	- MD ⁴ - CMD ⁴ GRI GG2-87 ³ (mod. 1988) (Revised 2000)	130 lb 170 lb
Tensile Modulus (2%)	- MD ⁴ - CMD ⁴ ASTM D6637 ²	18000 lb/ft 30000 lb/ft

TESTING NOTES:

1. Percent open area measured without magnification by means of Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November, 1977.
2. Ultimate Strength and Tensile Modulus at 2 percent elongation measured by means of ASTM D6637 "Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method". No offset allowances or specimen pretensioning are made in calculating tensile modulus.
3. Individual junction strength measured by means of Geosynthetic Research Institute Testing Method GG2 "Individual Geogrid Junction Strength."

- 4. "MD" and "CMD" represent 'machine' and 'cross-machine' directions, referring to the principle directions of the manufacturing process.

c. Acceptance. Acceptance of high performance biaxial geogrid will be based upon testing by the Construction and Technology Support Area for conformance to the physical requirements. It should be anticipated that the Department will require up to 16 calendar days to sample and test the geogrid. At least one material sample shall be selected at random for each lot of material delivered. A lot shall be defined as all geotextile material of the same product name in a single shipment (truckload). The sample size required shall be a minimum of 6 feet wide with a 4 square yard minimum area and shipped rolled, not folded. At the time of installation, the geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

d. Construction. All areas immediately beneath the installation area for the geogrid shall be properly prepared as shown on the plans, as specified, or as directed by the Engineer. The geogrid shall be installed in accordance with the manufacturer's recommendations.

Only that amount of geogrid required for immediately pending work shall be placed to prevent undue exposure or damage to the geogrid. After a layer of geogrid has been placed, the succeeding layer of backfill shall be placed and compacted in accordance with Section 205 of the 2003 Standard Specifications for Construction. To minimize ultraviolet degradation, the direct exposure of geogrid between placement and cover shall be a maximum of 5 calendar days.

The geogrid shall be placed with the highest tensile strength perpendicular to the centerline of the embankment. The geogrid shall be placed taut prior to backfill placement. After a layer of geogrid has been placed, suitable means shall be used to anchor the geogrid in position until the subsequent backfill layer can be placed. Adjacent rolls of geogrid shall be overlapped 2 feet minimum. Whenever possible the backfill placement shall proceed from the centerline of the embankment out, to assist in tensioning the geogrids. Construction vehicles will not be permitted on the geogrid until at least 6 inches of backfill has been placed on the geogrid.

e. Measurement and Payment. This work will be measured and paid for by the square yard, completed in place. **No allowance will be made for overlap, splices or material cut off or wasted.** Payment for **High Performance Biaxial Geogrid** will include furnishing the material, labor, and equipment required to furnish, place and anchor the geogrid, and any hand work necessary to establish grades, make geogrid splices, and repairs to protective coatings.

Contract Item (Pay Item)	Pay Unit
High Performance Biaxial Geogrid.....	Square Yard

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**HIGH PERFORMANCE
PORTLAND CEMENT CONCRETE
GRADE P1 (MODIFIED)**

C&T:JFS

1 of 6

C&T:APPR:ACR:CJB:09-13-04
REVISED:08-05-05

a. Description. This special provision sets forth requirements for furnishing Portland cement concrete, Grade P1 (Modified), for mainline, shoulder, and miscellaneous pavement applications. The Contractor does not have the option of using other concrete Grades or Types in lieu of Grade P1 (Modified), as described in this special provision. All work shall be according to the Standard Specifications for Construction and this special provision.

b. Materials.

1. **Aggregates.** Coarse aggregate classification shall meet the grading and physical requirements described herein. Intermediate aggregate classification shall be either a Michigan Class 26A or 29A. The fine aggregate classification shall meet the requirements for natural sand Number 2NS. All aggregates shall originate only from natural geological sources. The following specified material values include any standard bias or precision based on laboratory or operator results. A listing of aggregate sources meeting the following specified values for dilation and absorption is available from the Engineer.

Provide a detailed stockpile management plan, describing process controls for shipping, handling, and storage of each aggregate (including the use of radial stackers with elevating conveyors) to minimize segregation and contamination, including proposed method(s) for aggregate quality control and quality assurance verification sampling and testing.

Grading Requirements for Coarse Aggregate

Classification	Sieve Analysis (b) (MTM 109) Total Percent Passing						Loss by Washing (MTM 108) % Passing No. 200 (b)
	2 "	1-1/2 "	1 "	3/4 "	1/2 "	3/8 "	
Coarse Aggregate	100	90 - 100	60 - 85	30 - 60	10 - 30	0 - 8	1.0 max.

Note: (b) References footnote included in Table 902-1.

The physical requirements for the coarse aggregate shall be as specified for Class 6AAA coarse aggregate according to Table 902-2 of the Standard Specifications for Construction with the following additions:

Absorption (24-hour soak method), percent max. (a)	2.50
Freeze-Thaw Dilation, percent per 100 cycles, max. (b)	0.040
Flat and Elongated Pieces, 3:1 ratio, percent max. (c)	15.0

- Note: (a) Based on most current Department laboratory test results for oven-dried Class 6 aggregate.
 (b) Based on most current Department laboratory test results for Class 6 aggregate.
 (c) ASTM D 4791. Section 8.4 will be followed. The test will be performed on the material down to and including the 3/4 inch sieve.

The grading requirements for the Class 26A and 29A intermediate aggregates shall be according to Table 902-1 of the Standard Specifications for Construction.

The physical requirements for the Class 26A and 29A intermediate aggregates shall be as specified in Table 902-2 of the Standard Specifications for Construction with the following addition:

Freeze-Thaw Dilation, percent per 100 cycles, max. (a)	0.067
Sum of Soft Particles and Chert, % max. (MTM 110)	4.0
Loss by Washing (MTM 108) % Passing No. 200, percent max. (b)	2.0

- Note: (a) Based on most current Department laboratory test results for Class 6 aggregate.
 (b) References footnote included in Table 902-1.

The freeze-thaw dilation per 100 cycles for the coarse and intermediate aggregates shall be based on the most current department test results using Class 6A/6AA coarse aggregate.

The bulk dry specific gravity of the coarse and intermediate aggregates shall not be more than 0.04 below the most current Department test results using Class 6A/6AA coarse aggregate.

All coarse and intermediate aggregates shall be maintained in a saturated surface-dry condition prior to batching concrete.

The Contractor shall provide the Engineer with written verification from the aggregate supplier(s) that the coarse and intermediate aggregates meet the specified physical requirements. Acceptable verification will include records of the supplier=s quality control testing.

The on-site blend of the coarse, intermediate, and fine aggregates shall be based on the gradation of each individual aggregate classification, as received. The Contractor shall determine the on-site gradation for each aggregate prior to developing the initial concrete mixture proportions (mix design).

All on-site aggregate gradation testing records and reports shall be maintained, as required in Section 604 of the Standard Specifications of Construction.

The Contractor may propose an alternative composite gradation of coarse, intermediate, and fine aggregates provided the following criteria are met:

- A. Aggregate particles retained on the 3/4 - inch sieve and greater must conform to the physical requirements for coarse aggregate included in this special provision.

- B. Aggregate particles passing the 3/4 - inch sieve through those retained on the No. 4 sieve must conform to the physical requirements for intermediate aggregate included in this special provision.
- C. Aggregate particles passing the No. 4 sieve must conform to the physical requirements for natural sand Number 2NS.
- D. Source selection for the coarse, intermediate, and fine aggregates to be used in the concrete mixture shall be submitted to the Engineer at the Pre-Construction meeting. The Contractor's proposed alternative composite gradation shall also be submitted at this time. The Contractor's proposal shall include the target gradation values, in terms of the percent retained on each individual sieve size for each aggregate classification. Production tolerances applied to each individual sieve size will be those specified for the respective standard aggregate classifications. The proposal shall also include the percentage proportions for each aggregate classification to be used in the concrete mixture.
- E. The proposal shall include documentation verifying that the final proposed composite gradation blend conforms to the grading requirements specified in subsection b.1.G, and shall produce an on-site optimization of the concrete mixture, as described in subsection b.3, Concrete Mixture Requirements.
- F. A representative production stockpile of each aggregate classification shall be available and accessible to the Engineer for sampling at each aggregate production facility.
- G. The Engineer may sample each of the coarse, intermediate, and fine aggregate production stockpiles at each aggregate production facility, blend the aggregates at the percentage proportions proposed by the Contractor, and compare the percent retained on any individual sieve for conformance to the following requirements:

Grading Requirements for Composite Gradation

Sieve Size	% Retained
2 inch	0
1-1/2 inch	0 – 15
1 inch	5 – 15
3/4 inch	5 – 15
1/2 inch	5 – 15
3/8 inch	5 – 15
No. 4	5 – 15
No. 8	5 – 15
No. 16	5 – 15
No. 30	5 – 15
No.50	0 - 15
No. 100	< 8
No. 200	< 3

- H. The Engineer will have 14 calendar days to review the Contractor's alternative composite gradation proposal, including sampling of materials at each aggregate production facility and laboratory testing for conformance to final proposed blend.

- I. Alternative composite gradation submittals that do not include all required documentation will be considered incomplete and the Engineer will return them without review.
 - J. Aggregates shall not be shipped to the project site until the Engineer has approved the Contractor's alternative composite gradation proposal.
 - K. If the aggregate producer is a Prequalified Aggregate Source, the producer may request (by letter to the Department) that the project-specific aggregate classification(s) be included on their current list of prequalified aggregates for this project.
2. **Cementitious Materials.** All materials used in the concrete mixture shall be from MDOT approved sources.

Fly ash shall be Class F according to subsection 901.07 of the Standard Specifications for Construction. Class C fly ash is not permitted.

The cementitious material content given in Table 605-1 of the Standard Specifications for Construction does not apply. The cementitious material content shall be between 470 and 564 lbs/yd³.

If GGBFS is added to the concrete mixture, the maximum substitution amount, based on 1.0 times the weight of Portland cement reduced, shall not exceed 40 percent by weight of the total cementitious material. A ternary blend of Portland cement, fly ash, and GGBFS is allowable, provided the maximum individual substitution amounts are not exceeded and the combined total does not exceed 40 percent.

The combined weight of Portland cement, fly ash and GGBFS shall be used to determine compliance with the water-cement ratio and minimum and maximum cementitious material contents. The maximum water-cement ratio for Grade P1 concrete included in Table 605-1 of the Standard Specifications for Construction does not apply. The water-cement ratio shall not exceed 0.45. A water reducing or water reducing retarding admixture is permitted.

3. **Concrete Mixture Requirements.** Except as modified herein, the Contractor shall be responsible for determining the concrete mixture proportions (mix design) according to Section 605 of the Standard Specifications for Construction. Strength requirements shall be as specified for Grade P1 concrete.

Individual(s) performing sampling and testing of aggregates must possess current certification as a Michigan Certified Aggregate technician (MCAT).

The current Shilstone concrete mixture design and analysis method shall be used to produce and monitor on-site aggregate gradations to maintain continual optimization of the concrete mixture proportions. The on-site proportioned blend of coarse, intermediate, and fine aggregates shall produce a Coarseness Factor (CF) of 50 to 72 and a Workability Factor (WF) of 32 to 40, as defined by the Shilstone Company, Inc.

All concrete mixture proportion records and reports shall be maintained, as required in Section 604 of the Standard Specifications of Construction.

c. Construction. Construction of Portland cement concrete pavement shall be according to subsection 602.03 of the Standard Specifications for Construction with the following additions:

The Contractor shall verify the composite aggregate gradation prior to initial startup of paving.

The Contractor shall sample coarse, intermediate, and fine aggregates for gradation testing prior to each days paving. At least one additional sample blend shall be tested by the Contractor at random during daily paving to verify ongoing gradation uniformity. The frequency of the Contractor's on-site gradation testing shall be maintained to provide representative gradation information necessary to make appropriate adjustments to the concrete mixture proportions. If the moving average of four tests falls outside the grading requirements for composite gradation, specified in Subsection b.1.G, and the Coarseness Factor (CF) and Workability Factor (WF) do not meet the requirements specified in Subsection b.3, production will be suspended until the appropriate adjustments are made to the composite gradation blend, as approved by the Engineer.

The Contractor shall notify the Engineer of any proposed modification to the concrete mixture proportions necessary to maintain continual optimization of the concrete mixture, as described above.

The Engineer will notify the Contractor when a quality assurance verification test is required. Using the concrete batch plant, produce a minimum four cubic yard dry batch of the normal production composite aggregate blend. Construct a mini-stockpile of the dry batched composite aggregate blend according to the method(s) described in the stockpile management plan. Provide a representative split sample to the Engineer for verification testing by the department. A minimum of four quality assurance verification tests will be required for the project, as directed by the Engineer.

Handling and proportioning equipment at the batching facility shall be capable of simultaneously and separately controlling each aggregate classification according to NRMCA requirements. Additional equipment to assure proper handling and proportioning may be required to prevent segregation and contamination with foreign material.

The Contractor shall assure that the spacing and operating frequency of the paver vibrators are within manufacturer tolerances. If requested by the Engineer, the Contractor shall be prepared to provide written documentation that the paver vibrators are operating according to manufacturer requirements.

The Contractor shall monitor the project site environmental conditions for air temperature, wind speed, and relative humidity to avoid any adverse conditions that would cause uncontrolled/random cracking of the pavement. In addition, the Contractor shall continually monitor concrete mixture properties to minimize the increased potential for shrinkage cracking to occur.

The Contractor shall apply both applications of curing compound within 30 minutes of finishing the pavement. The Contractor shall supply the Engineer with verification that the specified application rates were attained.

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

**Contract Item (Pay Item)
Pay Unit**

Conc Pavt, Nonreinf, ____ inch, High Performance.....	Square Yard
Conc Pavt, Misc, Nonreinf, ____ inch, High Performance.....	Square Yard
Conc Pavt, Reinf, ____ inch, High Performance.....	Square Yard
Conc Pavt, Misc, Reinf, ____ inch, High Performance.....	Square Yard
Shoulder, Nonreinf Conc, High Performance.....	Square Yard
Shoulder, Reinf Conc, High Performance.....	Square Yard

Conc Pavt, Nonreinf, ____ inch, High Performance, Conc Pavt, Misc, Nonreinf, ____ inch, High Performance, Conc Pavt, Reinf, ____ inch, High Performance, and Conc Pavt, Misc, Reinf, ____ inch, High Performance will be measured and paid for by area in square yards based on plan quantities. The pay items used will be based on whether or not reinforcement is required, the thickness specified, and the type of pavement specified. **Shoulder, Nonreinf Conc, High Performance** and **Shoulder, Reinf Conc, High Performance** will be measured and paid for by area in square yards based on plan quantities.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
LIME STABILIZED SUBGRADE

METRO:AP

1 of 7

C&T:APPR:DMG:EMB:02-02-07

a. Description. This work consists of all material including water, equipment, labor and testing for constructing a 12 inch compacted uniform layer of lime stabilized subgrade and determining the minimum amount of lime, or lime and fly ash combination required for the soil. The work shall be performed in accordance with this specification, Standard Specifications for Construction, as directed by the Engineer, and shall conform to the lines, grades, notes, and typical sections shown on the plans. **For the bidding purpose only, minimum rate of quicklime application is 5% on a dry weight basis of the soil. Fly Ash may or may not be required as determined by the Contractor Design Tests. For bidding purpose only, the estimated quantity of Fly Ash is 1,200 tons.**

b. Materials.

Lime. Lime shall be quicklime conforming to the requirements of ASTM C 977 specifications with the modification that all quicklime shall pass the 3/8 inch size sieve. A lime shall be certified by "Test Data Certification" method as per the MDOT Material Source Guide and shall represent each lot of lime delivered on the project.

Fly ash. Fly ash shall conform to ASTM C 618 for Class F. Bulk fly ash may be transported dry in bulk trucks and stored in tanks or may be transported in dampened condition (15 percent moisture, maximum). The fly ash Class F must be selected from current MDOT Material Source Guide Approved Manufacturer's list. A proper documentation must be supplied from the manufacturer to meet the ASTM C 618 requirements.

Water. Water for mixing and curing shall meet the requirements of subsection 911.02 of the Standard Specifications for Construction.

Soil. Soil for the lime stabilization as used in this specification is the in-place subgrade soil material. The soil shall be uniform in quality and gradation, be free of roots, sod, weeds, and stones larger than 2-1/2 inches, and shall be approved by the Engineer.

c. Contractor Designed Lime or Lime-Fly ash, and Soil Mix. The Contractor shall develop and submit, for approval, a mix design specifying percent of lime, or lime and fly ash in the soil to be stabilized. The Contractor's qualified representative or geotechnical engineer shall collect representative soil samples that are evenly distributed along the project length under the direction of the Engineer. Take one sample for every 20,000 square yard area of soil to be treated, one per major type of soil, or a minimum of 5 samples per project, whichever is greater, and submit to an AASHTO or ASTM accredited geotechnical laboratory to determine the recommended percentage of lime, or lime and fly ash for each soil sample taken. The station elevation, offset and the depth of these soil borings shall be recorded and submitted to the

Engineer. Prior to sampling, the Contractor shall submit the sampling location plan to the Engineer for review.

The AASHTO or ASTM accredited geotechnical laboratory shall perform the following tests and services for the untreated soil and lime-treated soil. Samples must be prepared with the same stabilizing material(s) that will be supplied to the job.

1. Soil Classification per AASHTO M145 and ASTM D2487 for the untreated soil and lime-treated soil.
2. Moisture and density testing per AASHTO T99 for the untreated soil and lime-treated soil.
3. California Bearing Ratio (CBR) laboratory test of uncured soil-lime mixture as per ASTM D 1883.
4. Perform Liquid, Plastic, and Plasticity Index of soil samples as per ASTM D 4318.
5. Perform unconfined compressive strength test as per ASTM 5102. Prepare sample cylinders according to ASTM, Method B with the following modification: Revise Section 12 to read: Cure compacted specimens in a plastic air tight moisture proof container at 40 degrees Celsius temperature for 7 days.
6. Determine the minimum amount of lime, or lime and fly ash using each sample of untreated soil as per ASTM D 6276 that results in a soil-lime pH of 12.4, CBR of 10 for uncured soil-lime mixture, and a minimum unconfined compressive strength of 125 psi. Note: Fly Ash is not required if lime alone can meet these pH, CBR, and unconfined compressive strength requirements.
7. Submit copies of test reports from the geotechnical lab with all of the data to the Engineer for review and approval a minimum of 10 days prior to the commencement of the test strip construction.

Upon the Department's acceptance of the lime or lime-fly ash combination percentages, the contractor shall make moisture density curves for the chosen percentages of lime, or lime-and-fly ash combination and soil mix according to AASHTO T 99 for each soil sample taken above. Thoroughly mix the lime or lime-fly ash combination with the soil, and allow the mixtures to mellow for at least 24 hours before making the curves. Plot the wet and dry weight on a graph. Submit this data to the Engineer a minimum of 10 working days before the work begins. Engineer will use these curves or MDOT Typical Density Curves for compaction acceptance.

d. Equipment, Machines and Tools. The equipment, machines and tools used in the work shall be subject to approval and shall be maintained in satisfactory condition at all times. Other compacting equipment may be used in lieu of that specified where it could be demonstrated that the results are equivalent. Protective equipment, apparel and barriers shall be provided to protect the eyes, respiratory system and the skin of workers who are exposed to lime or lime dust.

1. Sheeps-foot or Vibratory pad foot roller. Self propelled type with a minimum weight of 15 tons or greater as needed for compaction.
2. Steel-Wheeled Smooth Rollers. Steel-Wheeled rollers shall be the self-propelled type with a total weight of not less than 10 tons, and a minimum weight of 300 pounds per inch width of rear wheel. Wheels of the rollers shall be equipped with adjustable scrapers. The use of vibratory rollers is optional.

3. Pneumatic-Tired Rollers. Pneumatic-tired rollers shall be self-propelled and weigh when ballasted at least 8 tons but not more than 30 tons. It shall be equipped with a minimum of 7 wheels situated on axles in such a way that the rear group of tires will not follow in the tracks of forward group of tires.
4. Mechanical Spreader. Mechanical spreader shall be cyclone, screw-type box, pressure manifold, or other approved equipment. A motor grader shall not be used to spread lime.
5. Watering Equipment. Watering equipment shall consist of tank trucks fitted with pressure distributors, or other approved equipment designed to apply controlled quantities of water uniformly over variable widths of surface without the truck adversely affecting the quality of the subgrade.
6. Tampers. Tampers shall be of an approved mechanical type, operated by either pneumatic pressure or internal combustion, and shall have sufficient weight and striking power to produce the compaction required.
7. Rotary Pulvamixer. A rotary pulvamixer shall be used for all mixing. Pulvamixer shall utilize a direct hydraulic drive and be capable of mixing the full 12 inch depth in one lift.

e. Construction.

1. General. Perform subgrade stabilization work when the air temperature is 40 degrees Fahrenheit or above and rising. Do not apply lime, or lime-fly ash combination to frosted subgrade under any circumstances. All work must be performed between April 1st and October 31st. **The depth of subgrade to be stabilized is 12 (twelve) inches.** Uniformly mix the approved proportion of the stabilizing materials through the entire 12-inch stabilized depth, and compact subgrade to the minimum 95% of required density. The Engineer will verify that a minimum of 12 inches of uniformly stabilized and compacted subgrade is achieved by digging 12-inch deep test holes at representative intervals. Adequate drainage shall be provided during the entire construction period to prevent water from collecting or standing on the area to be modified or on pulverized, mixed, or partially mixed material. Finished and completed lime stabilized subgrade shall conform to the lines, grades, and cross sections, and dimensions indicated in the plans.
2. Lime Stabilization Omission Locations. If during construction, the Engineer determines that certain locations have soils that are unsuitable for lime, or lime-and-fly ash stabilization, the Engineer may request for a modification of the lime stabilization procedure, or the use of other methods as necessary or cost effective. These soil types include, but not limited to granular soils and cohesive soils with excessive moisture content.
3. Contractor's Quality Control (QC) Plan. The Contractor shall submit a QC plan, for the approval of the Engineer, a minimum of 5 days prior to starting the construction of the test strip. The QC plan shall include, but not limited to, name and description of the equipment to be used, personnel responsible for monitoring application rates, methods of determining and adjusting moisture content.

4. Test Section. Upon the Engineer's approval of the Contractor's QC plan, a 600 linear foot test section comprising of either one or more lane widths (depending upon construction staging) will be selected (with the approval of the Engineer) to implement the details of lime stabilization. The contractor shall submit a work plan for the test strip a minimum of 5 working days in advance of construction of the test strip. The work for this test section will be in accordance with this special provision. The Contractor can proceed with the stabilization of roadway subgrade if the test section meets the approval of the Engineer. At the Engineer's discretion, the test section may be accepted as part of the total required lime stabilized area.
5. Subgrade Preparation. Prior to adding the stabilizing materials, remove all deleterious materials such as topsoil, roots, organic material and rock fragments larger than 2-1/2 inches. The subgrade treatment area shall be graded to conform to the lines, grades, and cross sections shown in the plans prior to being processed for stabilization. All the deleterious material removed as part of subgrade preparation will be the property of the Contractor and its removal and disposal shall be considered included in the payment for lime stabilized subgrade.
6. Lime or lime-and-fly ash Application. Apply the contractor designed lime, or lime-and-fly ash combination on a dry weight basis. Submit verification testing to show that the required application rate is utilized, and provide the results to the Engineer at the end of each workday. Spread the lime, or lime-and-fly ash combination uniformly on the scarified subgrade by means of distributors or equipment approved by the Engineer. Place a canvas shroud on the distribution bar and extend to the subgrade. Do not apply lime or lime-and-fly ash when the wind conditions are such that blowing material would become objectionable to the adjacent property owners or create potential hazards to traffic. In order to enhance dust control, the Contractor may use moisture-conditioned fly ash (if the fly ash is determined necessary as per the Contractor design mix). Lime and fly ash can be spread as individual components.
7. Spreading. The spreading of stabilizing material shall be limited to an area that can be incorporated and mixed, within the same working day. While spreading lime, or lime-and-fly ash combination, minimize dusting and impact to the traffic by periodic water sprinkling at no cost to the Department.
8. Mixing. Initial Mixing: Immediately after the lime or lime-and-fly ash combination has been spread, thoroughly mix the lime or lime-and-fly ash into the subgrade by using an approved rotary mixer to a depth of 12 inches. Add enough water to raise the moisture content of the soil mixture to 3% to 5% above the optimum moisture content. Continue mixing until lime, or lime-and-fly ash combination has been uniformly incorporated into the subgrade to the required depth with the mixture being homogeneous and friable. Complete this initial mixing within 4 hours of spreading the lime. A waiting period after initial mixing of 1 to 24 hours or longer may be required or necessary for all lime particles to hydrate.

Final Mixing: After the waiting period, soil shall be remixed, adding water as needed to raise the moisture content to 2% to 3% above optimum. Continue mixing until the quicklime has been uniformly incorporated into the subgrade to the required depth and with soil clods broken down to pass a 2-inch screen and at least 60% passing No. 4

sieve, exclusive of rock particles. Final mixing shall be accomplished within 5 days of initial mixing. There shall be no unhydrated lime pebbles present before compaction operations start. The Engineer may verify that any visible particles are not unhydrated lime before compaction begins.

It is the Contractor's responsibility to determine the in-situ moisture content of the soil or soil-lime mixture in order to determine the quantity of water required to raise the moisture content to the required level above the optimum moisture content.

The Engineer may run the field gradation testing to determine the adequacy of mixing. In order to determine the adequacy of the mixing, two control sieves, 2-inch and No. 4, shall be used. All of soil clods during the mixing must pass 2-inch sieve and at least 60% pass a No. 4 sieve, exclusive of rock particles.

9. Compaction. Begin compaction immediately after final mixing. Add water or aerate the subgrade to bring the soil-lime mixture to optimum moisture content, plus or minus 2%. Continue final compaction until the stabilized subgrade has a density of not less than 95% of maximum density established as above for the soil-lime, or soil-lime-and-fly ash combination mixture. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half width of the roller, or as determined by the Engineer based upon construction staging. At all times, the speed of the roller shall not cause displacement of the mixture to occur. Areas inaccessible to the rollers shall be compacted with mechanical tampers, and shall be shaped and finished by hand methods. Final compaction shall be done with steel wheel smooth drum rollers. **The Engineer will perform the density and moisture testing for the compacted subgrade for acceptance as per this special provision and 2003 Standard Specifications for Construction.**
10. Curing and protection. Immediately after the stabilized subgrade has been compacted and finished as specified above, the surface shall be protected against rapid drying, for 7 days by periodic sprinkling and shall be kept moist for 7-day curing period, unless covered by subsequent layers of pavement section (sand subbase or aggregate base). Other suitable methods of curing the compacted lime-soil mix may be approved by the Engineer.
11. Re-stabilization. If an approved stabilized area shows failure, tenderness or damage after curing, the Engineer shall require re-stabilization to be performed, where appropriate at no additional cost to the Department.

f. Use of Moisture Conditioned Fly Ash. The use of moisture-conditioned fly ash for lime-and-fly ash combination of soil treatment is acceptable (only Class F fly ash is permitted). Moisture conditioned fly ash shall contain no more than 15% moisture by dry weight of fly ash. When moisture-conditioned fly ash is used, the lime and fly ash shall be spread in two separate applications and the following additional construction procedures shall apply:

The lime shall be added to the subgrade and mixed in accordance with the above mixing procedure outlined in subsection 8 of section "e". After the lime is thoroughly mixed, the subgrade shall be compacted with a steel wheel roller to achieve the surface strength and smoothness required to spread the moisture-conditioned fly ash.

Within 72 hours of mixing the lime and soil, the moisture-conditioned fly-ash shall be uniformly spread onto the lime treated soil to provide the equivalent dry weight basis content of fly ash as determined by the contractor designed mix. The soil shall be remixed to blend the moisture-conditioned fly ash homogeneously with the lime treated soil.

g. Construction Traffic. Completed portion of lime stabilized subgrade may be opened immediately to light construction traffic at the Contractor's own risk and option, provided the curing is not impaired. After 7-day curing period has elapsed, completed areas may be opened to construction traffic. Placement of subsequent pavement section layers may begin the day following completion of lime stabilization, provided the lime-stabilized completed area has strengthened sufficiently to prevent marring or distorting of the surface by equipment or traffic. Lime and water may be hauled over the completed area with pneumatic-tired equipment if approved by the Engineer. Finished portions of lime-modified subgrade that are traveled on by the equipment used in construction of adjoining section shall be protected in a manner to prevent equipment from marring and damaging the completed work. The Contractor is responsible for correcting and restabilizing the damaged areas at no cost to the Department.

h. Field Quality Control and Assurance. Results of field quality control testing shall verify that the materials comply with this special provision and the Standard Specifications for Construction. When a material source is changed, the new material shall be tested for compliance. When deficiencies are found, the initial analysis shall be repeated and the material already placed shall be retested to determine the extent of unacceptable material. All in-place unacceptable material shall be replaced or repaired, as directed by the Engineer at no additional cost to the Department.

Completed thickness of the lime stabilized subgrade soil layer shall be within $\frac{1}{2}$ inch of specified thickness of 12 inches. When the measured thickness of the lime stabilized subgrade soil is more than $\frac{1}{2}$ inch deficient, such areas shall be corrected by scarifying, adding additional lime, remixing and recompacting as directed by the Engineer. Where the measured thickness of the lime stabilized subgrade layer is more than $\frac{1}{2}$ inch thicker than required, it shall be considered conforming to the specified thickness requirement, provided the elevation of finished subgrade is within the tolerance as per the Standard Specifications for Construction. Thickness of lime stabilized subgrade layer shall be measured for each 4000 square yards, at least one per day, or as determined by the Engineer. Measurements shall be made in 3 inch diameter or larger test holes penetrating the lime stabilized subgrade.

Lime content of uncured lime, or lime-and-fly ash and soil mixture shall be determined in accordance with ASTM D 3155. Samples for testing shall be obtained from mid-depth of the lime stabilized subgrade layer. Sampling and testing shall be conducted at the rate of one test per 4000 square yards, at least one per day, or as determined by the Engineer. Lime content shall not be less than 1% below the Contractor designed lime-soil mix design.

At least one field density test shall be performed for each 4,000 square yards of lime stabilized subgrade, but at least one per day.

i. Contractor Warranty and Maintenance. Perform the following work at no cost to the Department. Repeat this work as often as necessary to keep the lime stabilized subgrade intact.

1. Maintain the lime or lime-fly ash stabilized subgrade in good condition until the work is completed and accepted.
2. Maintain a smooth surface of the lime stabilized subgrade by blading.
3. Immediately repair any defects that occur.

j. Measurement and Payment. Actual area of the Lime Stabilized Subgrade as ordered and completed to the 12 inch thickness and cross sections shown on the plans, and accepted, will be measured in square yards. All calculations of areas measured for payment shall be based on measurements made to the nearest 0.1 yard with area calculated to the nearest square yard. The length will be measured along the surface of the completed roadbed at its centerline. The width will be the top surface width of the completed roadbed specified on the plans, measured perpendicular to the center line of roadbed. Additional areas required for tapers, etc shall be measured by length and width along the surface area stabilized.

Lime and fly-ash actually incorporated in the work will be measured by the ton. Certified delivery tickets shall be furnished to the Engineer for lime and fly ash used in the construction of lime stabilized subgrade.

k. Basis of Payment. The completed work as described shall be paid for at the contract unit price for the following contract items (pay items):

Contract Item (Pay Item)	Pay Unit
Lime Stabilized Subgrade.....	Square Yard
Lime.....	Ton
Fly Ash.....	Ton

The ordered and accepted area of **Lime Stabilized Subgrade**, measured as noted above, will be paid for at the contract unit price bid per square yard. Said unit price bid shall be full compensation for all the sampling, design of lime or lime-fly ash soil mix, scarifying, pulverizing, mixing, shaping, water, curing, compacting, and application of lime, testing; and for all equipment, tools, labor, and incidentals needed for completion of the work as described herein.

The accepted quantity of **Lime** and **Fly Ash** actually incorporated in the work except as noted herein, measured as provided above, will be paid for at the contract unit price per ton of lime, or fly ash, which price shall be payment in full for furnishing, transporting, storing, handling, and spreading; and for all equipment, tools, labor, and incidentals needed for completion of the work as described herein.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MANAGING DIAMOND GRINDING SLURRY FROM RIDE QUALITY CONCRETE

C&T:EMB

1 of 8

C&T:APPR:CJB:KPK:11-26-03
REVISED:03-02-07

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. The Contractor shall perform the work as per the Special Provision for Ride Quality except as modified herein.

c. PH Control Plan. The Contractor shall sample, test, monitor, manage and if necessary neutralize the diamond grinding residue or slurry prior to disposing or discharging of the slurry. The contractor shall provide a written ph control plan to the Engineer prior to diamond grinding. The plan shall include the method of sampling, testing, monitoring, managing, and the neutralizing of the grinding residue. The ph control plan shall list all personnel, equipment, supplies necessary to obtain samples, testing methods, method of monitoring, management, and neutralization of the pH if required. The pH control plan shall be administered by a qualified employee of the Contractor. The individual shall have full authority to take all actions for the successful implementation of the pH neutralization. The plan shall specify what actions will be taken in order for the slurry to meet the pH requirements. All costs associated with the sampling, testing, monitoring, managing, neutralizing the pH, collecting, hauling, and disposing of the residue or slurry will be borne by the Contractor.

- 1. Sampling and Testing -** The residue shall 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 four separate representative samples per day shall be split and tested by a Michigan Department of Environmental Quality (MDEQ) certified laboratory as well as by the field method. The pH control plan shall specify what actions will be taken if laboratory results are not consistent with the field results. The Contractor shall also 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. The Contractor shall 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 the Contractor may submit an approved equal. The Contractor shall 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 sample tests 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, the Contractor shall sample and test all material that appears inconsistent with similar material being sampled. The Engineer shall retain the right to sample and test the slurry at any time during the

project.

2. **Monitoring** - The Contractor shall continuously monitor the residue throughout the diamond grinding process to ensure that the pH levels are maintained below 12.5 or more than 2 prior to disposal or discharge. The pH control plan shall specify what actions will be taken in order to meet the requirements of a pH lower than 12.5 or more than 2.
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 the Contractor shall neutralize the pH prior to discharging or contain the slurry and manage the slurry as a hazardous waste. The Contractor shall 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 before, during, or after generation. If the Contractor elects to neutralize the pH after generation, the neutralization must occur in a container, tank or a transport vehicle. The Contractor shall follow the subsection 715.A of the Standard Specifications for Construction for worker training, training program, contingency plan, records, etc. The contingency plan shall address how accidental spills or releases of hazardous waste will be contained and cleaned up.
4. **Managing** – The Contractor shall 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 subsection 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 shall transport the material. See subsection f for disposal options.

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/deg 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 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 shall not allow the discharge of the diamond grinding residue or slurry to enter a closed drainage system. In these areas, the residue or slurry shall be collected, hauled, and managed as specified under subsection f.
2. The Contractor shall obtain approval for the spreading method from the Engineer prior to the beginning of the diamond grinding operation. The Contractor shall apply the slurry at a uniform rate not to exceed five 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 to approximately three times the amount of area being diamond ground. The Contractor may spread the non hazardous grinding residue or slurry along the shoulders or slopes of the roadway, a minimum of five 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 shall collect, haul, and manage the residue or slurry per as specified under subsection f.

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 shall be according to the "MDEQ 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 shall transport the diamond grinding slurry from the diamond grinder to the approved site within MDOT right-of-way. The slurry shall be covered so as to prevent loss to the environment during transport and delivery to the application site.

B. Manifests - A waste disposal manifest shall be prepared by the Contractor 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 - The Contractor shall apply the slurry at a uniform rate not to exceed five 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 shall not be applied in a manner that adversely restricts soil permeability or causes ponding, pooling, or runoff in the area. The site of application shall be designated by the Engineer in the plans and meet the requirements in subsection e in this special provision. The application of the slurry shall 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 October 30, 2003 MDEQ WHMD Part 115 Concrete Grinding Slurry Exemption, and according to this special provision, has been determined by MDEQ to be authorized in accordance with to an applicable statute and therefore exempt from the Part 121, Liquid Industrial Waste of the Natural Resources and Environmental Protection Act, 1994 PA 45, 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 shall be according to the "MDEQ Grinding Slurry Exemption" as 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 shall transport the diamond grinding slurry from the diamond grinder to a licensed Type II municipal landfill or a licensed liquid wastewater facility. The slurry shall be covered so as to prevent loss to the environment during transport and delivery to the licensed facility.

B. Manifests - A waste disposal manifest shall be prepared by the Contractor or the licensed liquid industrial waste hauler 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 Part 115 of Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), 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 Part 121 Liquid Industrial Waste, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), facility 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 shall be located within MDOT right-of-way or with a site associated with the project. All work shall be according to the Standard Specifications for Construction, Section 603 except as modified herein and the "MDEQ Dewatered Grinding Slurry Exemption".

A. Transporting - The diamond grinding Contractor with a generator or transport identification number or a licensed liquid industrial waste hauler shall transport the diamond grinding slurry from the diamond grinder to the dewatering site. The slurry shall be covered so as to prevent loss to the environment during transport and delivery to the application site. MDEQ requires that all slurry from a diamond grinding operation going to a dewatering site must be tracked on an approved, Diamond Grinding Slurry Tracking Log (see page 7).

B. Dewatering - The diamond grinding slurry shall be separated into solid and liquid phases at the dewatering site. The Contractor shall 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.

C. Dewatering Site Location - The dewatering site shall either be located within the project limits on MDOT right-of-way or right-of-way 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 shall 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. Copies of the notification shall be provided to the Engineer.

D. Solid - The solid material from the separation facility shall 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 "MDOT Dewatered Grinding Slurry Exemption." The MDEQ shall be notified of the location of any stockpiles of dewatered solid material. See notification information as listed in subsection f.3.C.

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

F. Manifests for Decant Liquid - The decant liquid shall 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 shall transport the decant water. The decant liquid shall 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 specification 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 specification and all federal, state and local laws.

h. Records. Maintain a copy of all manifests for a period of three years and make 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. All costs associated with full compliance with applicable laws regardless of whether or not all applicable laws are cited in this special provision or in the Standard Specifications for Construction will be borne by the Contractor.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MANAGING DIAMOND GRINDING SLURRY FROM RIDE QUALITY HMA

C&T:EMB

1 of 2

C&T:APPR:DBP:CJB:10-29-04
REVISED:03-02-07

a. Description. Collect, haul, manage, and dispose of diamond grinding slurry or residue for ride quality on hot mix asphalt pavements.

b. Construction. Perform this work according to the contract documents for Ride Quality except as modified herein.

c. Generator or Transporter Identification Number. A generator or transporter identification number is required prior to collecting 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 Michigan Department of Environmental Quality (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/deg 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 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.

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

- 1. Transporting** - Transport the diamond grinding slurry from the diamond grinder to a licensed Type II municipal landfill for solidification or to a licensed liquid industrial waste disposal facility. Cover and contain to prevent loss to the environment during transport and delivery to the licensed facility.
- 2. Manifests** – Furnish a complete waste disposal manifest for each load. Use Uniform Hazardous Waste Manifest, EPA Form 8700-22. The manifest(s) must be prepared by the Contractor with copies to the Engineer containing information on the point of generation including roadway, roadway direction, and mile points, the volume transported, and the name of licensed disposal facility.
- 3. Solid Waste Facility** - Dispose of the diamond grinding slurry in a licensed, Type II municipal landfill pursuant to Part 115 of Solid Waste Management, of the Natural

Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). The disposal shall be consistent with the landfill's waste acceptance policies and the slurry shall be solidified sufficiently to pass the paint filter test.

4. **Licensed Liquid Industrial Waste Disposal Facility** - The diamond grinding slurry may also be processed as a liquid industrial waste at a licensed liquid industrial waste facility pursuant to Part 121 of the Liquid Industrial Waste, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), provided the disposal is consistent with the licensed liquid waste facility processor acceptance policies.

e. Contractor Responsibility for Method of Operations. This specification sets forth minimum steps to avoid violating environmental laws. It remains the responsibility of the Contractor to determine whether more than those minimum steps are required and to perform the work required by this contract in whatever manner may be required to comply with applicable laws. The Contractor shall be 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 specification and all federal, state and local laws.

f. Records. Maintain a copy of all manifests for a period of three years and make available to the MDEQ upon request.

g. Measurement and Payment. All costs associated with the collecting, handling, transporting by contractor or licensed industrial waste hauler, manifesting the waste, managing the diamond grinding slurry, and disposing will not be paid for separately but will be included in the payment for other items of work. All costs associated with full compliance with applicable laws regardless of whether or not all applicable laws are cited in this special provision or in the Standard Specification for Construction will be borne by the Contractor.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
NTCIP COMPLIANT PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

ITS:LAN

1 of 5

ITS:APPR:JAJ:DBP:11-18-09

a. Description. This work consists of furnishing, installing, maintaining, and operation of a National Transportation Communications for ITS Protocol (NTCIP) compliant PCMS and control software for the PCMS. The PCMS will be capable of communication via a cellular network with software installed on a State-owned computer, as noted within this special provision. The PCMS will meet all requirements of sections 812 and 922 of the Standard Specifications for Construction and the latest versions of the MMUTCD and MDOT Portable Changeable Message Sign Guidelines - BOH IM 2004-19 except as modified herein.

1. General.

A. Procure a PCMS that meets all requirements as stated in this special provision; place the PCMS at the location depicted within the plan set, or as directed by the Engineer; provide software capable of controlling the PCMS; commission the PCMS into the provided software; relocate and/or temporary remove the PCMS for construction phasing; and decommission and remove the PCMS upon completion of the project.

B. Comply with working clearances and dedicated spaces per NEC Articles 110, 384 and 800-5, as well as all current NEC articles, and Federal, State and Local regulations.

C. All equipment and equipment service and any appurtenances to the PCMS are the full responsibility of the Contractor.

D. Provide at minimum, one classroom style training session of 2 hours, on PCMS operator interface software and field equipment, including but not limited to, posting and removal of messages, diagnosing field equipment malfunctions including messaging and communications errors. All training schedules, syllabus and materials to be supplied by the Contractor and approved by MDOT prior to delivery of training.

2. Requirements of Regulatory Agencies. Comply with the latest edition of the following codes or standards:

A. *Institute of Electrical and Electronic Engineers (IEEE).*

B. *American Association of State Highway and Transportation Officials (AASHTO).*

C. *American Society of Testing and Materials (ASTM).*

D. *American Society of Civil Engineers (ASCE).*

E. *Institute of Electrical and Electronic Engineers (IEEE) 802.3.*

- F. *National Electrical Manufacturers Association (NEMA).*
 - G. *National Fire Protection Association (NFPA) 780 - Lightning Protection Code.*
 - H. *Lightning Protection Institute (L.P.I.) Standards 175.*
 - I. *Underwriters' Laboratories Standards 96 and 96A (UL).*
 - J. *American National Standards Institute Standard C2 (ANSI).*
 - K. *National Transportation Communications for ITS Protocol (NTCIP).*
3. Portable Changeable Message Sign (PCMS) Submittals and Documentation.
- A. Submit the following:
 - (1) Product data for the PCMS and control software.
 - (2) An electronic version and at least one printed version of the user manuals for both the PCMS and control software.
 - (3) Training materials for both the PCMS and control software to be distributed during training.
4. National Transportation Communications for ITS Protocol (NTCIP).
- A. The PCMS will communicate using the latest accepted NTCIP standards at the time of bidding, including all accepted amendments.
 - B. The PCMS will conform to NTCIP Standard 2101 for direct communication and NTCIP Standard 2104 for Ethernet communication.
 - C. All mandatory objects that are required by NTCIP 1203, whether or not they are specifically noted within this special provision, will be required.

b. Materials.

1. Portable Changeable Message Sign (PCMS).
- A. Provide a PCMS consisting of a Light Emitting Diode (LED) message board, controller, solar/battery equipment and power supply, all mounted on a heavy duty towable trailer in accordance with subsections 922.05.C.5 and 922.05.C.6 of the Standard Specifications for Construction.
 - B. Portable Changeable Message Sign (PCMS) Display.
 - (1) The display must be capable of displaying at least three lines of text, with at least eight characters on each line. The display may be a full-matrix, line-matrix, or character-matrix design.

(2) The display board must be at least 75 inches high by 114 inches wide.

(3) When displaying 18 inch characters, the display must be legible between the distances of 200 to 1,000 feet, with a 20 degree LED viewing angle for both day and night operations. All 20 degree LEDs will have a nominal viewing cone angle of 20 degrees with a half-power angle of 10 degrees measured from the longitudinal axis of the LED.

(4) The display will be rainproof and use materials that resist degradation due to exposure to ultraviolet light.

(5) Fonts.

(a) The PCMS will be pre-loaded with at least the following four fonts:

(i) 12 inches standard.

(ii) 18 inches standard.

(iii) 18 inches narrow.

(iv) 18 inches bold.

(b) The PCMS will display:

(i) All upper case letters.

(ii) The following punctuation marks: . , : ; ' ' " " / | \ ?

(iii) All numerals 0 to 9.

(iv) The following special characters: # @ & * + < > ← → ↑ ↓ ↖ ↗ ↘ ↙

(c) The standard fonts will closely resemble those shown in Figure 7-1 of Federal Highway Administration publication # FHWA-TS-90-043.

(6) Display brightness. The PCMS will have a photocell to sense ambient light and will automatically adjust the display brightness based on lighting conditions to maintain legibility to motorists at all times.

(7) In the event of a malfunction, the PCMS will default to the message "Drive Safely" or as directed by the Engineer.

C. Power.

(1) The PCMS will utilize a power source in accordance with subsection 922.05.C.5 of the Standard Specifications for Construction and that is pre-approved by the Engineer.

(2) The power source will be able to continuously display a message of at least 24 characters, 24 hours per day, 7 days per week, for the duration that the PCMS is deployed in the field.

2. Software.

A. Provide MDOT with computer software that will allow control of the PCMS from a remote location. The control software must, at a minimum, allow a trained user to display a message on the PCMS, clear a message, schedule messages for a specific date and time, observe the current message and PCMS status, and alert the user of any detected errors.

B. The software will be installed on a computer at a state-owned facility that is connected to the State of Michigan computer network. The software must be able to function properly using the version of Windows Operating System that is installed on the State of Michigan computer network at the time of PCMS deployment. If the software is web-based, it must be able to function properly in the version of Internet Explorer that is installed on the State of Michigan computer network at the time of PCMS deployment.

C. The software and devices must implement reasonable security measures that prevent unauthorized users from accessing the devices. This includes protection against "hacking" into the system via the Internet, and may require encrypted communication, Virtual Private Networks (VPNs), or other measures to ensure security of the PCMSs and the software.

c. Construction.

1. Technical Assistance. Provide training and support for the PCMS and control software via telephone and e-mail, and must be able to provide on-site technical assistance as needed. Assistance may include, but may not be limited to, additional training, bug fixes, correction of installation problems, and correction of communication errors.

2. Installation.

A. Furnish materials that meet or exceed all applicable specifications, standards, and requirements before the PCMS is considered for acceptance. Ensure that all features, functions, and performance measures detailed herein, within the plan set, and/or in the Contract are provided.

B. The materials, equipment, and components will be commercial off-the-shelf (COTS) products.

3. Test Requirements.

A. Develop a detailed test plan for the PCMS and control software, and make revisions as needed until it is approved by the Engineer. This may include, but is not necessarily limited to:

(1) Tests for defects in the PCMS, such as leaks, faulty wiring, faulty display modules, faulty batteries, firmware bugs, etc.

(2) Tests that demonstrate properly functioning communications between the PCMS and the control software. The test procedure should demonstrate successful control of the PCMS from the location where the software has been installed.

B. Conduct all testing in the presence of the Engineer or an approved representative. Any problems should be fixed and testing repeated until all elements of the PCMS and control software are accepted.

4. Warranty.

A. Warrant that the PCMS will be serviced and fully operational at all times during the life of the related project, with a maximum down time of 4 hours. If the PCMS is not fully operational in any way, the Contractor will be allowed 4 hours, once notified by the Engineer, to either repair any problems or replace the PCMS with another qualified PCMS. If the repair/replacement is not made within 4 hours of notice, a five percent reduction in unit price bid will be applied to the pay item Sign Portable, Changeable Message, NTCIP-Compliant, Oper.

B. This reduction will be applied to the actual field count of devices in need of repair/replacement or directly affected by the malfunctions at the time of the inspection. This five percent reduction of bid unit prices will be assessed for each 4-hour period in which the repair/replacement of the PCMS has not been performed, starting at the end of the initial 4-hour repair/replacement time.

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

Contract Item (Pay Item)	Pay Unit
Sign, Portable, Changeable Message, NTCIP-Compliant, Furn.....	Each
Sign, Portable, Changeable Message, NTCIP-Compliant, Oper	Each

Sign, Portable, Changeable Message, NTCIP-Compliant, Furn includes all material, communication devices, equipment and labor required to furnish a PCMS and install at the location as depicted on the plans or as directed by the Engineer. The work for furnishing includes site delivery and setup, including initial testing and training, and the removal of the PCMS upon completion of the project.

Sign, Portable, Changeable Message, NTCIP-Compliant, Oper includes all material, communication devices, equipment, and labor required to operate, control, inspect, maintain, and relocate the PCMS throughout the life of the project.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
STEEL SHEET PILING, TEMPORARY, SPECIAL

DES:AM

1 of 2

C&T:APPR:SJW:EMB:04-01-08

a. Description. Design, furnish, install and maintain temporary steel sheet piling coordinated with the staged construction requirements at this site. Perform the work in accordance with section 704 of the Standard Specifications for Construction, the current AASHTO LRFD Bridge Design Specifications ("AASHTO" hereafter), the Plans and as contained herein.

The steel sheet piling, tie-backs, deadman, bracing sections, and adjacent excavations shall be designed to support traffic, and provide access for existing bridge abutment removal and replacement. Use a live load surcharge of 360 psf for design purposes. A maximum deflection of 2 inches will be allowed (measured at the roadway surface). The design shall be prepared by the Contractor's designer who shall be a professional Engineer licensed in the state of Michigan. The design and supporting calculations shall be submitted to the Engineer for review and approval not less than 21 calendar days prior to beginning of work.

Alternate temporary retaining wall design options will be considered for this project by the Engineer. Contractor shall prepare and submit alternate designs as outlined in this special provision.

b. Materials. Use materials according to subsections 704.02 and 707.02 of the Standard Specifications for Construction.

c. Construction. The design, installation and maintenance of the temporary steel sheet piling are the responsibility of the Contractor. The Contractor shall submit a proposed design with supporting calculations for the steel sheet piling including: sheeting, tie-backs, deadman, bracing sections, weld details, sheeting tip elevations, calculated deflection of sheeting sections, all connections and embedment depth.

The sheet piling for this project shall be installed in stages that match the stage construction of the structures. Conceptually, the limits and sequence of steel sheet piling construction are shown in the Plans. The actual steel sheet piling Working Drawings shall be designed by the Contractor's Designer.

When no longer needed, the sheet piling shall be removed or cut down during the phased construction as shown on the Plans or as approved by the Engineer.

Begin work only after the Engineer's acceptance of the steel sheet piling design.

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

Contract Item (Pay Item)

Pay Unit

Steel Sheet Piling, Temp Special	Square Foot
Steel Sheet Piling, Temp, Left in Place Special	Square Foot

Steel Sheet Piling, Temp Special & Steel Sheet Piling, Temp, Left in Place Special quantities will be computed on the area of required earth retention. The vertical dimension for computing areas will be the difference in ground elevation at the sheeting line or the planned foundation excavation limit at the sheeting line, whichever is less. Unless shown on the Plans, the lateral limits will be determined by the design. When earth is retained on both sides of the same steel sheet piling during different construction stages, the quantity will be computed from the stage requiring the largest area of earth retention and not the sum of the area of required earth retention for each stage.

All horizontal measurements will be made along the sheet piling alignment without allowance for the structural shapes of the separate sections.

The item **Steel Sheet Piling, Temp Special & Steel Sheet Piling, Temp, Left in Place Special** includes designing, furnishing, installing, maintaining, and cutting off the sheet piling and bracing, tie backs, deadman, walers, related materials, and equipment required to maintain support of the sheeting and adjacent embankment.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
STRUCTURAL STEEL FOUNDATION PILING MATERIAL

C&T:SJW

1 of 3

C&T:APPR:EMB:LDT:04-16-07

Delete the first sentence of Subsection 906.05.A on page 723 of the 2003 Standard Specifications for Construction, in its entirety and replace with the following:

Conform to AASHTO M 270 Grades 50, 50 W, or ASTM A 690.

Delete Subsection 906.05.B on page 724 of the 2003 Standard Specifications for Construction, in its entirety and replace with the following:

B. Steel Shells for Cast-in-Place Concrete Piles. Refer to plans for nominal outside diameter and minimum thickness of metal in the shells. Cylindrical pile shells must meet the requirements for welded and seamless pipe piles of ASTM A 252, Grade 3.

Use shells with an outside diameter and a minimum nominal wall thickness as shown in the contract documents. Furnish shells of greater thickness if necessary to provide sufficient strength and rigidity to permit driving with the equipment selected for use without damage and to prevent distortion caused by soil pressures or the driving of adjacent piles.

If steel shells other than the minimum gauge specified are required to obtain penetration, they will be paid as extra work. Use shells that are watertight to exclude water during the placing of concrete.

Delete Subsection 906.05.C on page 724 of the 2003 Standard Specifications for Construction, in its entirety and replace with the following:

C. Pile Points.

- 1. H-Piles.** When specified, steel H-piles shall be fitted with cast steel pile points. Cast the pile points in one piece steel as described, conforming to the dimensional requirements as shown on the plans. Furnish certification that the steel used in the fabrication of the pile points meets any one of the following specifications: ASTM A 148 Grade 90-60 or AASHTO M 103 Grade 65-35. The minimum weight of the pile points shall be 35 percent of the proposed pile weight, per 1.0 ft for AASHTO M 103 steel and 30 percent for ASTM A 148 steel.

Fasten the pile points to the steel H-piles using 5/16 inch continuous fillet weld along the flange contact areas. The pile points shall have sufficient flange and continuous web vertical back-ups to assure proper alignment and fitting to the pile. Slope the soil or rock bearing surfaces of the points, downward towards the web, a minimum of 15 degrees, but not to exceed 45 degrees, to the horizontal under the flanges. Terminate the sloped surfaces of the points in a manner to form a flat surface not exceeding one third of the flange width. For details see Figure 1.

Furnish pile points for steel H-Piles from the following manufacturers or approved equal:

**ASSOCIATED PILE AND FITTING
COMPANY**

262 Rutherford Blvd.
Clifton, NJ 07014
(800) 526-9047
Model: HP 77600 – B

**MID AMERICA FOUNDATION SUPPLY,
INC.**

P.O. Box 5198
Ft. Wayne, IN 46895
(800) 348-1890
Model: HPH – RB Series

PILING ACCESSORIES, INC.

3467 Gribble Road
Matthews, NC 28105
(704) 225-1566
Model PAR – T Series

VERSA-STEEL INC.

1618 NE First Ave
Portland, OR 97232-1136
(800) 678-0814
Model : VS- 300 Series

2. **CIP Concrete Pile Shells.** Close ends of pile shells with a flat plate welded to the pile or cast steel conical point as shown in the contract documents.
3. **Timber Piles.** Shod timber piles with metal shoes of a design satisfactory to the Engineer. Shape the points of timber piles to secure an even and uniform bearing on the shoes.

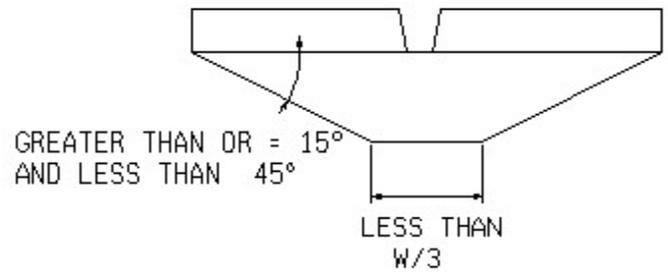
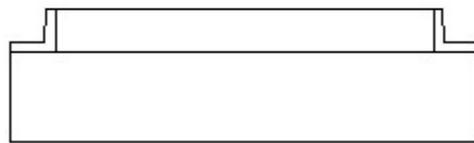
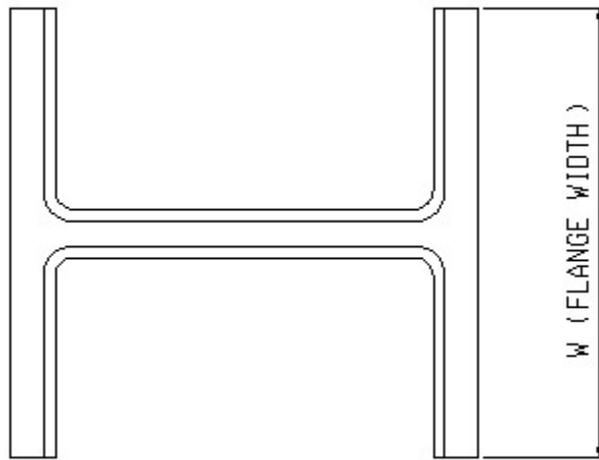


FIGURE 1

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY CONCRETE BARRIER ENDING, DETAIL

T&S:CT

1 of 7

C&T:APPR:MSB:DBP:08-20-07

a. Description. This work shall consist of furnishing, installing, operating, maintaining, repairing, and removing Temporary Concrete Barrier Ending, Detail 1 - 5 as indicated on the plans, proposal, and/or as directed by the Engineer. The type of Temporary Concrete Barrier Ending shall be as detailed in Standard Plan R-126 Series, Placement of Temporary Concrete Barrier.

b. Materials. The concrete end sections detailed in Standard Plan R-52 Series, Temporary Concrete Barrier, shall conform to the applicable specifications and requirements for Temporary Concrete Barrier as stated in Section 812 of the Standard Specifications for Construction.

Construct concrete attenuator base pads, foundations, anchor blocks, or backup units using Grade S1 concrete unless otherwise directed by the Engineer.

The following attenuation systems are approved for use on a temporary basis:

1. Sand Module Attenuator
2. Quad Guard
3. Quad Guard Elite
4. Quad Guard LMC
5. REACT 350
6. TAU-II
7. Absorb 350
8. TRACC
9. SCI 100 GM
10. Triton CET
11. Quest

Other attenuation systems which meet NCHRP 350, Test Level 3 (TL-3) criteria and have FHWA approval may be used as determined by the Engineer.

The 24 inch square attenuator object marker sign shall be made of 0.040 inch thick aluminum. The yellow stripes on the attenuator object marker sign shall meet ASTM D4956 specifications for Type IX retroreflective sheeting.

Attenuator transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper installation shall meet manufacturer's specifications.

Sand module attenuators shall be manufactured by Energy Absorption Systems or Traffix. Other sand module attenuators which meet NCHRP 350, TL-3 requirements and have FHWA approval may be acceptable as determined by the Engineer. All modules in any one installation shall be from the same manufacturer. Mixing of different types of modules will not be permitted.

The sand used for filling sand module attenuators shall conform to the gradation and moisture content specified by the manufacturer.

All impact attenuator devices must be constructed of materials specified by the manufacturer. Applicable criteria from Standard Plan Series R-49, R-52, R-54, and R-126 shall apply.

Use existing guardrail beam elements and guardrail approach terminals for reconstructing guardrail provided these materials are reusable in their present condition. Existing guardrail posts in good condition, as determined by the Engineer, may be re-used for reconstructing guardrail. New guardrail panels, posts, bolts, reflectorized washers, and other pertinent fittings must be furnished and installed by the Contractor if the existing materials are not reusable.

New guardrail beam elements and associated hardware shall conform to the requirements specified in subsection 908.12 of the Standard Specifications for Construction.

New guardrail posts furnished for the work must be the same type as existing posts, and shall meet the requirements of Section 912 (for wood) or 908 (for steel) of the Standard Specifications for Construction.

c. Design Information. The design speed for all details (Standard Plan R-126 Series) is equal to the posted work zone speed.

d. Construction. The Temporary Concrete Barrier Ending shall be placed according to the Standard Plan R-126 Series:

1. **Detail 1** - The Contractor shall place the sloped Temporary Concrete Barrier Ending Section the same as indicated for Temporary Concrete Barrier Placement.
2. **Detail 2** - Impact attenuation systems shall be installed according to manufacturer's specifications and requirements.

If the lateral offset from the edge of the approaching traffic lane to the toe (near edge) of the Temporary Concrete Barrier is 6 feet - 6 inches or more, any of the attenuation systems listed in Section (b) of this Special Provision may be used.

If the lateral offset from the edge of the approaching traffic lane to the toe (near edge) of the Temporary Concrete Barrier is less than 6 feet - 6 inches, a sand module attenuator can not be used. Instead, a narrow crash cushion attenuation system shall be used. The width of the crash cushion attenuator system shall be as narrow as possible while still shielding the blunt end of the Temporary Concrete Barrier.

Sand module attenuators shall consist of 12 individual sand modules arranged and oriented as shown on the layout diagram titled "Sand Module Impact Attenuator (Temporary)" dated 07/27/07, unless otherwise directed by the Engineer. Sand module attenuators are to be installed at specific sites as shown on the plans and/or as directed by the Engineer.

Attenuation systems shall be placed on a concrete, HMA, or compacted aggregate surface according to manufacturer's specifications. If necessary, construct the appropriate base

pad, foundation, anchor block, and backup unit per manufacturer's specifications.

Install the unit and connect the unit to the backup and to the front anchoring system as required for proper installation of the system.

Attachments to the attenuator (appurtenances) approved by the attenuator manufacturer may be installed per manufacturer's specifications. Do not attach unapproved appurtenances to the attenuator.

The Contractor shall furnish and install an object marker, with alternating black and yellow stripes, to the nose of the attenuator. The object marker shall be constructed as shown on the diagram titled "Impact Attenuator Object Marker" dated 12/14/05. The black 3 inch and yellow 3 inch stripes shall slope downward at a 45 degree angle. Attach object marker to the nose of the attenuator with two 5/16 inch diameter hex bolts, nuts, and washers (preferred method), or other method approved by the attenuator manufacturer.

At the time the attenuator is installed, an employee trained by the manufacturer in the proper installation of the impact attenuator system supplied for the project must be present.

Install attenuator transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper connection to concrete barrier. These items shall be installed per manufacturer's specifications.

The Contractor shall provide written certification that the attenuator was installed according to the plans, manufacturer's specifications and guidelines, and this Special Provision.

If temporary anchors are used in new pavement or existing pavement (which will remain in place), these anchors must be removed to a minimum of 1 inch below final pavement grade and backfilled with an epoxy material approved by the Engineer. Temporary anchors in temporary pavement may be removed flush with the paved surface.

Concrete pads may contain steel reinforcement. The Contractor is required to use equipment which can drill or core through steel reinforcement to obtain the proper depth for the concrete anchors used to attach the attenuator to the concrete surface.

Cable anchorages and backups shall be placed for proper attenuator alignment. The Contractor shall be required to respond within 24 hours of notification by the Engineer concerning replacement, repair, or realignment of the attenuator. If the Contractor fails to respond or the necessary work is not completed within 48 hours, the Engineer may have the work completed by others and charged to the Contractor.

3. **Detail 3** - The Temporary Concrete Barrier sections which extend through and make contact with the guardrail must be standard, full height sections. Sloped Temporary Concrete Barrier sections shall not be used.
4. **Detail 4** - Impact attenuation systems shall be installed according to manufacturer's specifications and requirements.

The offset between the toe of the existing concrete barrier wall and the attenuator shall be

as specified in Standard Plan R-126 Series, Detail 4.

If the lateral offset from the edge of the approaching traffic lane to the toe (near edge) of the existing concrete barrier is 8 feet or more, any of the attenuation systems listed in Section (b) of this Special Provision may be used.

If the lateral offset from the edge of the approaching traffic lane to the toe (near edge) of the existing concrete barrier is less than 8 feet, a sand module attenuator can not be used. Instead, a narrow crash cushion attenuation system shall be used. The width of the crash cushion attenuator system shall be as narrow as possible while still shielding the blunt end of the Temporary Concrete Barrier.

Sand module attenuators shall consist of 12 individual sand modules arranged and oriented as shown on the layout diagram titled "Sand Module Impact Attenuator (Temporary)" dated 07/27/07, unless otherwise directed by the Engineer. Sand module attenuators are to be installed at specific sites as shown on the plans and/or as directed by the Engineer.

Attenuation systems shall be placed on a concrete, HMA, or compacted aggregate surface according to manufacturer's specifications. If necessary, construct the appropriate base pad, foundation, anchor block, and backup unit per manufacturer's specifications.

Install the unit and connect the unit to the backup and to the front anchoring system as required for proper installation of the system.

Attachments to the attenuator (appurtenances) approved by the attenuator manufacturer may be installed per manufacturer's specifications. Do not attach unapproved appurtenances to the attenuator.

The Contractor shall furnish and install an object marker, with alternating black and yellow stripes, to the nose of the attenuator. The object marker shall be constructed as shown on the diagram titled "Impact Attenuator Object Marker" dated 12/14/05. The black 3 inch and yellow 3 inch stripes shall slope downward at a 45 degree angle. Attach object marker to the nose of the attenuator with two 5/16 inch diameter hex bolts, nuts, and washers (preferred method), or other method approved by the attenuator manufacturer.

At the time the attenuator is installed, an employee trained by the manufacturer in the proper installation of the impact attenuator system supplied for the project must be present.

Install attenuator transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper connection to concrete barrier. These items shall be installed per manufacturer's specifications.

The Contractor shall provide written certification that the attenuator was installed according to the plans, manufacturer's specifications and guidelines, and this Special Provision.

If temporary anchors are used in new pavement or existing pavement (which will remain in place), these anchors must be removed to a minimum of 1 inch below final pavement grade and backfilled with an epoxy material approved by the Engineer. Temporary anchors in temporary pavement may be removed flush with the paved surface.

Concrete pads may contain steel reinforcement. The Contractor is required to use equipment which can drill or core through steel reinforcement to obtain the proper depth for the concrete anchors used to attach the attenuator to the concrete surface.

Cable anchorages and backups shall be placed for proper attenuator alignment. The Contractor shall be required to respond within 24 hours of notification by the Engineer concerning replacement, repair, or realignment of the attenuator. If the Contractor fails to respond or the necessary work is not completed within 48 hours, the Engineer may have the work completed by others and charged to the Contractor.

5. **Detail 5** - Impact attenuation systems shall be installed according to manufacturer's specifications and requirements.

Any of the attenuation systems listed in Section (b) of this Special Provision may be used.

Sand module attenuators shall consist of 12 individual sand modules arranged and oriented as shown on the layout diagram titled "Sand Module Impact Attenuator (Temporary)" dated 07/27/07, unless otherwise directed by the Engineer. Sand module attenuators are to be installed at specific sites as shown on the plans and/or as directed by the Engineer.

Attenuation systems shall be placed on a concrete, HMA, or compacted aggregate surface according to manufacturer's specifications. If necessary, construct the appropriate base pad, foundation, anchor block, and backup unit per manufacturer's specifications.

Install the unit and connect the unit to the backup and to the front anchoring system as required for proper installation of the system.

Attachments to the attenuator (appurtenances) approved by the attenuator manufacturer may be installed per manufacturer's specifications. Do not attach unapproved appurtenances to the attenuator.

An object marker, with alternating black and yellow stripes, shall be attached to the nose of the attenuator. The object marker shall be constructed as shown on the diagram titled "Impact Attenuator Object Marker" dated 12/14/05. The black 3 inch and yellow 3 inch stripes shall slope downward at a 45 degree angle. Attach object marker to the nose of the attenuator with two 5/16 inch diameter hex bolts, nuts, and washers (preferred method), or other method approved by the attenuator manufacturer.

Install attenuator transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper connection to concrete barrier. These items shall be installed per manufacturer's specifications.

At the time the attenuator is installed, an employee trained by the manufacturer in the proper installation of the impact attenuator system supplied for the project must be present. The Contractor shall also provide written certification that the attenuator was installed according to manufacturer's specifications.

If temporary anchors are used in new pavement or existing pavement (which will remain in place), these anchors must be removed to a minimum of 1 inch below final pavement grade and backfilled with an epoxy material approved by the Engineer. Temporary anchors in temporary pavement may be removed flush with the paved surface.

Concrete pads may contain steel reinforcement. The Contractor is required to use equipment which can drill or core through steel reinforcement to obtain the proper depth for the concrete anchors used to attach the attenuator to the concrete surface.

Cable anchorages and backups shall be placed for proper attenuator alignment.

The Contractor shall be required to respond within 24 hours of notification by the Engineer concerning replacement, repair, or realignment of the attenuator. If the Contractor fails to respond or the necessary work is not completed within 48 hours, the Engineer may have the work completed by others and charged to the Contractor.

e. Measurement and Payment. The completed work as described will be measured and paid for using the following contract items (pay items):

1. Temporary Concrete Barrier Ending, Details 1 and 3, will be paid for the same as "Temporary Concrete Barrier" as detailed in subsection 812.04 of the Standard Specifications for Construction.
2. Additional payment will not be provided for removing and replacing guardrail panels, posts, or associated hardware as specified in Temporary Concrete Barrier Ending, Detail 3.
3. Damage compensation will be paid for as detailed in subsection 812.04 of the Standard Specifications for Construction.
4. Temporary Concrete Barrier Ending, Details 2, 4, and 5 will be measured and paid for using the following contract item (pay item):

Contract Item (Pay Item)	PayUnit
Temp Attenuator, Furn.....	Each
Temp Attenuator, Oper.....	Each

Payment for **Temp Attenuator, Furn** includes all materials, labor, and equipment required to:

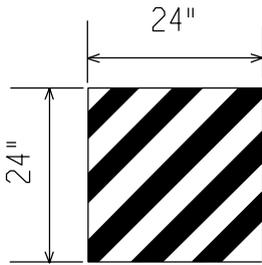
- A. Furnish and deliver an attenuator, as specified in Sections (b) and (d) of this Special Provision or as directed by the Engineer to the job site.
- B. Construct attenuator base pads, foundations, anchor blocks, and backup units as necessary.
- C. Install the attenuator (including all hardware and appurtenances).
- D. Connect the unit to the backup and to the front anchoring system as required. Furnish and install all necessary transition assemblies, transition panels, end panels, and other miscellaneous accessories required for proper connection to concrete barrier.
- E. Provide a trained installer on site during installation.
- F. Furnish and install an object marker to the nose of the attenuator.

Payment for **Temp Attenuator, Oper** includes all materials, labor, and equipment required to:

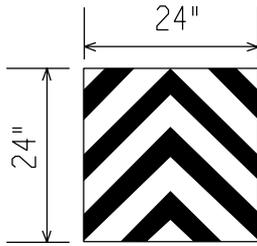
- G. Realign and/or repair the attenuator as required during construction.
- H. Relocate the attenuator as required during construction. This includes:
 - (1) Removing the attenuator from its existing location.
 - (2) Removing any attenuator base pads, foundations, anchor blocks and backups units from the existing location as determined by the Engineer.
 - (3) Constructing new attenuator base pads, foundations, anchor blocks, and backups as necessary at the new location.
 - (4) Transporting and reinstalling the attenuator per manufacturer's specifications at the new location.
 - (5) Providing a trained installer on site during attenuator removal and reinstallation.
- I. Remove and dispose the attenuator when no longer required or as directed by the Engineer.
- J. Remove and dispose attenuator base pads, foundations, anchor blocks, backups, and associated hardware as necessary.

All damage to Temporary Concrete Barrier Endings as a result of Contractor's equipment and/or operations shall be repaired or replaced at the Contractor's expense.

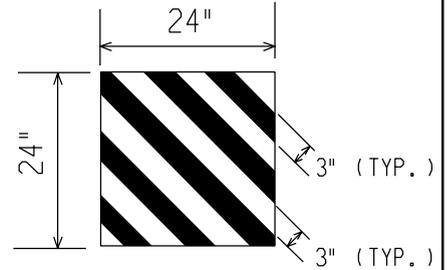
USE APPROPRIATE SIGN ACCORDING TO CONDITIONS



Traffic Passing
on Left



Traffic Passing
on Both Sides



Traffic Passing
on Right

NOTES:

1. ALTERNATE BLACK 3-INCH AND YELLOW 3-INCH STRIPES AT A 45-DEGREE ANGLE.
2. THE YELLOW STRIPES SHALL MEET ASTM D4956 SPECIFICATIONS FOR TYPE IX RETROREFLECTIVE SHEETING.
3. THE OBJECT MARKER SHALL BE MADE OF 0.040-INCH THICK ALUMINUM.
4. ATTACH OBJECT MARKER TO ATTENUATOR NOSE WITH TWO 5/16-INCH DIAMETER HEX BOLTS, NUTS AND WASHERS (PREFERRED METHOD) OR OTHER METHOD APPROVED BY THE ATTENUATOR MANUFACTURER.

PW:DOC/RD/TS/TYP/SIGNS/STD HWY SIGNS/SPECIAL PROJECTS.dgn 12/14/05 SCT



PREPARED
BY
TRAFFIC & SAFETY

DRAWN BY: SCT

CHECKED BY: CT

ENGINEER OF TRAFFIC AND SAFETY

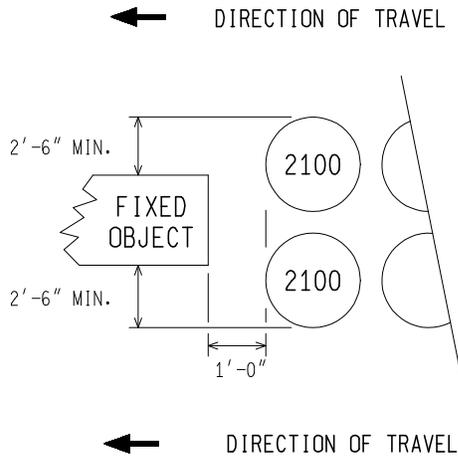
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS TYPICAL PLAN FOR

IMPACT ATTENUATOR OBJECT MARKER

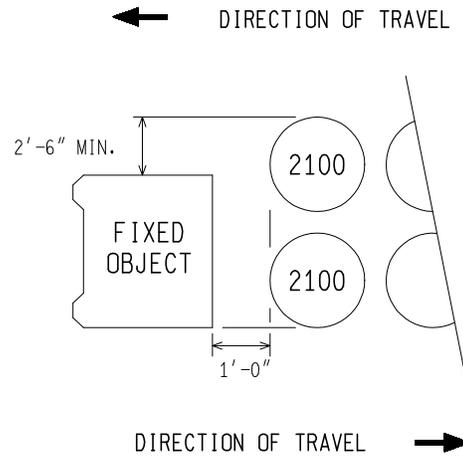
12/14/05
PLAN DATE

SHEET
1 of 1

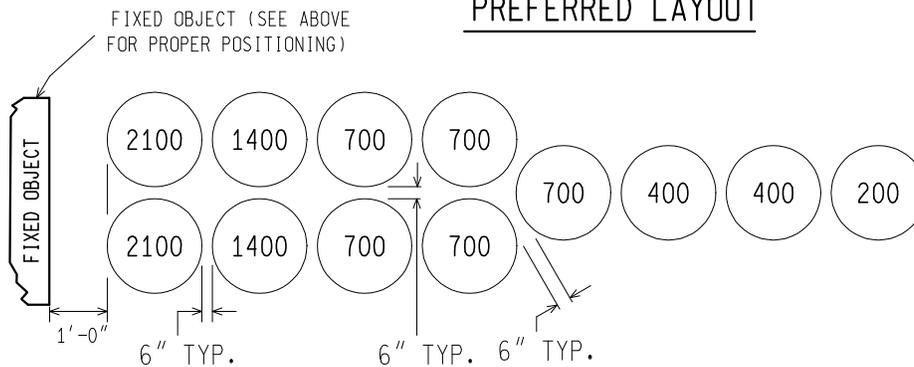
DIRECTIONAL TRAFFIC



BIDIRECTIONAL TRAFFIC



PREFERRED LAYOUT



NOTES:

1. (xxx) INDICATES MODULE LOCATION AND WEIGHT OF SAND IN POUNDS(LBS) FOR EACH MODULE.
2. EACH MODULE SHALL CONTAIN AMOUNT OF SAND INDICATED.
3. BIDIRECTIONAL ATTENUATOR ARRAYS MAY BE ANGLED TOWARD APPROACHING TRAFFIC AS INDICATED BY REGION TRAFFIC & SAFETY ENGINEER. AMOUNT OF ANGLE NOT TO EXCEED 10 DEGREES.

PW:DOC/RD/TS/TYP/GEOM/SAND MODULE IMPACT ATTENUATOR (TEMP).dgn 9/20/2006 JT



PREPARED
BY
TRAFFIC & SAFETY

DRAWN BY: JT
CHECKED BY: CT

ENGINEER OF TRAFFIC AND SAFETY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS TYPICAL PLAN FOR
**SAND MODULE IMPACT
ATTENUATOR (TEMPORARY)**

07/27/07
PLAN DATE

SHEET
1 of 1

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**THE PRESERVATION AND PERPETUATION OF PUBLIC LAND SURVEY
CORNERS, PROPERTY CONTROLLING CORNERS,
ALIGNMENT CONTROL POINTS AND HORIZONTAL CONTROL POINTS**

SUP:JB

1 of 5

C&T:APPR:DMG:DBP:01-18-07

a. Description. This work shall consist of perpetuating all existent Public Land Survey System Corners, Property Controlling Corners, Highway Alignment Control Points, and any Horizontal Control Points located within the construction area as shown on the plans, as identified in the Contract Documents, or as directed by the Engineer. Section 821 of the Standard Specifications for Construction shall apply except as modified by this Special Provision. For this Special Provision, the terms corner and point shall apply to all of the listed types of points above.

Definitions. For the purposes of this Special Provision:

1. Public Land Survey System Corners are Section Corners, 1/4 Section Corners, Center of Sections, and Meander Corners.
2. Property Controlling Corners are corners that control boundaries for several parcels of land and include 1/4-1/4 (1/16) Corners, Subdivision Corners and Subdivision Block Corners.
3. Alignment Control Points are P.C.'s (points of curvature), P.I.'s (points of tangent intersections), P.O.T.'s (points on tangents), P.O.C.T.'s (points on tangents in curve areas) and P.O.C.'s (points on curve centerline). Alignment Points may be Property Controlling Corners.
4. Horizontal Control Points are points with X-Y coordinate control or offset points relating to alignment or property lines.
5. The terms "Point" and "Corner" are considered synonymous for the requirements of remonumentation in this Special Provision.

b. Administrative Requirements. The following are the minimum requirements to comply with this Special Provision:

1. In accordance with Public Act 299 of 1980, work consisting of verifying the point position, evaluation, witnessing, point placement and reporting, shall be performed under the direct supervision of a Professional Surveyor licensed in the State of Michigan, and all persons utilized in the performance of this work shall be employees of the Professional Surveyor, or surveying firm.

2. It is the responsibility of the Contractor to coordinate the work under this Special Provision with the Licensed Professional Surveyor during the construction activities for the purpose of scheduling the work. This includes the preliminary position verification of the points, setting of temporary witnesses, installing monument boxes in paved areas, and final placement of all preservation points. The Contractor's Licensed Professional Surveyor must obtain the MDOT monument preservation survey package from MDOT at the preconstruction meeting. The Contractor's Licensed Professional Surveyor must contact and notify the MDOT Delivery Engineer of the completion of the required preliminary verification and witnessing work prior to commencing construction activities on the project.
3. All corners and points identified to be "Preserved" shall be witnessed with straight line witnesses prior to the commencement of construction. They shall then be re-established in accordance with this provision and Public Act 74 of 1970, as amended.
4. Upon the completion of the requirements of this provision and Public Act 74 of 1970, as amended, for all corners and points preserved, the Licensed Professional Surveyor shall submit, to MDOT, two copies of a *Land Corner Recordation Certificate*, approved by the Michigan State Board of Professional Surveyors for Section 5 of Act 74, for each corner or point preserved. (Only one survey point shall be documented on each form). One copy shall go to the Engineer and one shall be mailed to the appropriate MDOT Region Survey Manager.

The land corner recordation certificates provided for Alignment Control Points, Horizontal Control Points or Property Controlling Corners not previously recorded in County Register of Deeds Offices, are not required to be filed or recorded in the county offices.

5. In the case of Public Land Survey System Corners or previously recorded Property Controlling Corners preserved under this provision, a *Land Corner Recordation Certificate* shall be recorded by the Licensed Professional Surveyor in the Register of Deeds Office in the appropriate County, and the two copies transmitted shall include the Register of Deeds recording stamp with the Liber and Page or File Number where the certificate is recorded.
6. The position of corners near the construction limits identified as "Protect" on the plans, or in the MDOT monument preservation survey package shall be reviewed by the Contractor and the Licensed Professional Surveyor, and marked so they will not be disturbed. If any danger of the corner being disturbed exists, it shall be identified and witnessed with straight line witnesses prior to construction, as if it were a corner to be "Preserved."
7. Corners identified to "Protect" but witnessed and then left undisturbed, do not require remonumentation, but do require documentation of witnesses for payment purposes.
8. The Licensed Professional Surveyor shall submit, to MDOT, two copies of a list of all "Protect" identified corners, with the land corner certificates submitted for the project. The list of all "Protect" identified corners shall indicate what corners were witnessed by the Professional Surveyor to protect the corner position. Corners identified as "Protect"

that were determined to be well out of the construction area, and therefore not witnessed, shall be listed as "not witnessed." The list identifying "Protect" corners shall include a statement indicating that the corners were found undisturbed after construction, and this statement shall be signed, sealed, and dated by the Professional Surveyor.

9. All work shall be complete and all documentation submitted within four weeks from when the construction work was completed.

c. Field Methods.

1. All monuments shall possess a magnetic field, be at least ½ inch in diameter and a minimum of 18 inches in length, and be legibly capped, showing the license number of the Professional Surveyor.
2. The horizontal position of monuments shall be reestablished within 0.02 feet of the original position.
3. All points in paved surfaces shall be installed in monument boxes. Points located outside of paved surfaces, and within gravel roadways, including gravel shoulders, shall be installed at least 6 inches below the gravel surface. Points located outside of paved surfaces, and outside of unpaved roadways, shall be installed flush with the ground. Points located on rock outcropping shall be drilled and grouted into solid rock to a depth of at least 8 inches.
4. All installed monument boxes shall meet Standard Plan R-11 Series. Where an old monument box is removed, it may be re-installed only if it meets Standard Plan R-11 Series.
5. Placement of a new monument box in pavement areas shall be by coring after all paving operations have been completed. Coring equipment shall be approved by the Engineer prior to starting the work. Core diameter shall be a maximum of 1 inch diameter larger than the largest diameter of the monument box. The monument box shall be grouted in place by placing non-shrink grout as approved by the Engineer around the box at full depth. Grout shall not be placed, or remain within the monument box. Granular material shall not be placed or remain more than 0.1 feet above bottom of the monument box frame. Monument boxes shall be installed so that no part of the box or cover extends above the pavement surface and no part is more than 0.02 feet below the elevation of the pavement surface. Material at the base of the box shall be compacted so the box will not settle.
6. No part of the reset monument or cap shall touch the side of the monument box and the center of the monument shall be within 0.25 feet of the center of the monument box. The top of the monument shall be between 0.1 feet and 0.5 feet below the top of the monument box.
7. Preservation of existing points shall include verification that the corner identified for preservation is in the same position prior to construction as reported in the MDOT monument preservation package. Prior to construction, the distance to all existing

record witnesses provided will be accurately measured to +/- 0.01 feet to verify and/or establish the corner position that is to be preserved. Record and measured distances to existing witnesses shall be documented on the *Land Corner Recordation Certificate*.

8. Preservation of existing points shall include placement of temporary witnesses with straight line witnesses before construction begins. Minimum requirements are: 4 hubs with tacks, 2 on each side of the roadway, outside of potential construction activity limits, at approximately right angles to the centerline. Precise measurements shall be determined from the corner to all points on the temporary witness line. This information shall be documented in Section B of the *Land Corner Recordation Certificate*.
9. If the temporary witness points are not measured directly from the corner, then check measurements shall be made to assure the accuracy of the directly measured witness. A copy of the field notes for these check measurements shall be submitted to MDOT.
10. At the time of remonumentation, all straight line witnesses shall be checked and compared with the record measurements, and if any deviations from the record measurements are found, the new measurement and the record measurement, along with the method used for the resolution of the deviations in remonumentation of the point, shall be documented in Section B of the *Land Corner Recordation Certificate*.
11. Preservation of existing points shall include documentation of at least four permanent witnesses expected to remain for 5 years after construction that are either newly established or recovered record witness points. Witnesses shall be located in at least three separate quadrants from the corner monument. Witness points shall be oriented from the corner position by bearing reported to a minimum precision of the nearest 5 degrees, and distance reported to a minimum precision of 0.01 feet. Distances to witness points shall be accurate to 0.01 feet. Measurements to all remaining record witnesses shall be recorded. A detailed description of the monument, noting the monument box if required under this provision, the designation or what point the monument represents (i.e. P.C., P.I., P.T., P.O.T. and stationing), and a complete description of the remaining witnesses shall be noted in Section C of the *Land Corner Recordation Certificate*.
12. For Alignment Points and Horizontal Control Points, the MDOT project Control Section, Job Number, Route Name, Point Designation and Stationing shall be noted in item "3. Miscellaneous" on the *Land Corner Recordation Certificate*.

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

Contract Item (Pay Item)	Pay Unit
Monument Preservation – Special.....	Each
Monument Box – Special.....	Each
Protect Corners.....	Each
Monument Box Adjust- Special.....	Each

Monument Preservation - Special will be measured by the number of monuments, public land survey corners, property controlling corners and highway alignment control points preserved. This work shall include preliminary position verification, temporary witnessing, furnishing and installing new monument and permanent witnessing, recording of the Land Corner Record Certificate in accordance with the appropriate Public Acts, and furnishing all required documents. All preparation work, traffic maintenance, cleanup, restoration work and other items noted above shall be considered included in the item bid for **Monument Preservation - Special**.

Monument Box - Special will include the cost of the monument box and monument box cover and the installation of the castings as described in Sections (C.5) & (C.6) of this provision. Any costs associated with the removal of existing monument boxes shall be considered included in the item bid for **Monument Box – Special**.

Protect Corners shall include verification of point position before and after construction, witnessing prior to construction and documentation as described in Sections (B.6), (B.7) & (B.8) and Section (C.8) of this Special Provision.

Monument Box Adjust – Special shall include monument box adjusting rings, all labor, equipment and materials necessary to raise or lower a monument box so that it is flush with the final paved grade as described in Sections (C.5) & (C.6) of this Special Provision.

If the location of the monument will be disturbed as part of the adjustment process, this item will include preliminary position verification, temporary witnessing, permanent witnessing, recording of the Land Corner Record Certificate in accordance with the appropriate Public Acts and furnish all required documents.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TURF ESTABLISHMENT, PERFORMANCE

DES:JLB

1 of 5

C&T:APPR:DMG:DBP:10-25-07

a. Description. Section 816 of the Standard Specifications for Construction is deleted and replaced by this special provision. The Contractor shall be responsible for the performance and quality of turf growth in the areas indicated on the plans and as identified by the Engineer. The Contractor shall comply with all local, state and federal laws completing this work.

The Contractor shall establish a durable, permanent, weed-free, mature, perennial turf. The work consists of fundamental turf work, including but not limited to topsoiling, seeding, mulching, erosion control, maintenance, watering and repair of turf as described herein during the life of the contract and during the life of any supplemental performance bond which may ensue.

The Contractor shall choose and implement proven turf establishment industry practices; provide all necessary labor and equipment; select and provide all turf establishment materials; and control erosion and any subsequent sedimentation at all times.

The Contractor shall be responsible for a site analysis and its interpretation for their own use to ensure compliance with this specification. The site analysis will take into consideration topsoil needs, fertilizer and pH requirements, seed mix, existing and future soil moisture levels, slopes and grades, required erosion control items and devices, maintenance requirements, local highway snow deicing practices, and any other characteristics that influence and affect turf establishment.

Subsection 107.11 of the Standard Specifications for Construction is revised relative to the Contractor's responsibility for the repair of turf establishment work as follows. The Contractor shall be responsible, at no additional cost to the contract, for the repair of turf establishment work occasioned by storm events up to 3 inches of rain in a 24 hour period as documented by local meteorological data submitted to the Engineer for review and approval. All other portions of Subsection 107.11 remain unchanged.

1. Contractor Turf Establishment Experience Requirements. The Contractor shall possess a valid Michigan Department of Agriculture commercial pesticide applicator's certificate for Rights of Way category.

All herbicide applications shall be made by a commercial applicator licensed in the State of Michigan. All individuals applying pesticides shall possess a valid Michigan Department of Agriculture commercial pesticide applicator's certificate for the appropriate category. All application procedures and materials shall meet all federal, state and local regulations.

At least 10 days prior to start of turf establishment, the Contractor performing the turf establishment work shall provide the Engineer with documentation that they will meet one or both of the following requirements.

A. At least one person employed by the Contractor and assigned to the job site shall have a degree or certificate in Turf Management, Horticulture 1 or related field.

B. At least one person employed by the Contractor and assigned to the job site shall have at least 5 years of experience in roadside turf establishment.

b. Materials. The Contractor shall use topsoil, seed, mulch, pesticide, herbicide and/or mulch blankets and any other unique erosion control materials as necessary to fulfill this specification, as detailed in the plans and as indicated in the work plan. The Contractor may use additional materials as necessary to meet the standards set forth for turf establishment in this special provision. The use of any sod on the project requires the prior approval of the Engineer and if approved, may be used at limited site locations only.

Selection of all materials is the responsibility of the Contractor with the following minimum conditions.

1. **Soil.** The Contractor shall provide furnished or salvaged topsoil which may be blended compost that will support vigorous growth. It shall be humus bearing and of not less than 4 inches in depth. It shall be free of stones larger than 1 inch in diameter and other debris. The finished slope shall be trimmed and graded according to subsection 205.03.N of the standard specifications.

2. **Seed.** The Contractor shall use a seeding mixture that is composed of a blend of four or more species of perennial grass. All species and their cultivars or varieties shall be guaranteed hardy for Michigan.

The following is a list of recommended species of perennial grasses: Kentucky Bluegrass, Perennial Ryegrass, Hard Fescue, Creeping Red Fescue, Chewings Fescue, Turf-type Tall Fescue, Buffalo grass, and Alkaligrass-Fults Puccinellia distans. The cultivars or varieties of grasses selected shall be disease and insect resistant and good color. No one species in the blend shall be more than 25 percent of the mixture by weight. No one species in the blend shall be less than five percent of the mixture by weight. No grass species selected shall be considered noxious or objectionable, such as Quack Grass, Smooth Brome, Orchard Grass, Reed Canary Grass, and others.

A. The seed shall be legally saleable in Michigan. The seed product shall not contain more than 10 percent inert materials. The seed source shall be from an MDOT approved certified vender.

B. The species and varieties of seed shall be adapted to all site conditions, to the site use, and to the soils, moisture, and local climate. Site use may include but is not limited to detention pond, wildlife habitat, playground, wetlands, forested wetland, rural roadside, urban roadside and highly maintained front yard.

C. At least two of the species in the mixture proposed to be planted within 15 feet behind the curb or the shoulder shall be salt tolerant.

3. **Mulch.** Seeded areas shall be mulched with the appropriate materials for the site conditions, shall promote germination and growth of seed and to mitigate soil erosion and sedimentation.

4. **Herbicides.** The Contractor shall comply with all federal, state and local laws as noted in the standard specifications, Section 107. A weed control application will require the Contractor to make proper notifications and/or postings as per label and MDA requirements for all locations that will be sprayed. The Contractor will also notify selected MDOT staff 48 hours prior to any applications being made. The Contractor shall furnish and apply herbicide(s) as

needed. It shall be the Contractor's responsibility to select the herbicide(s) and the rate at which it will be used. The work and herbicide(s) shall be approved by the Engineer prior to the application of the material. A spray log will be required to be completed and submitted to the project office, each day an application is made.

No water shall be drawn from any waterway (i.e. river, ditch, creek, lake etc.) that is located on any state, county or municipal right-of-way, for mixing with herbicides.

5. **Fertilizers.** The Contractor shall furnish and apply fertilizer(s) as needed. It shall be the Contractor's responsibility to select the fertilizer(s) and the rate at which it will be used. The work and fertilizer(s) shall be approved by the Engineer prior to the application of the material.

6. **Water.** The Contractor shall furnish and apply water from an approved source as specified in the work plan at a rate to promote healthy growth.

c. Construction. The Contractor shall be responsible for all work and all construction methods used in completing this work. Any part of MDOT standard specifications or standard plans chosen to be implemented by the Contractor shall not imply responsibility on the part of MDOT for acceptability of the Contractor's construction methods or for the quality of the Contractor's work outcome at any time.

1. **Inspection of the work.** The Contractor shall be responsible for all inspection of turf establishment work.

The Contractor shall use a Contractor's Daily Report approved by the Engineer to report inspections made and to document turf establishment work performed on this project. The Contractor's Daily Report shall be completed and submitted to the Engineer when any work performed under this special provision is in progress.

The Contractor's Daily Report shall be accompanied by all necessary materials documentation including tests slips, certifications, etc.

The Engineer shall determine the acceptability of these reports in terms of their completeness and accuracy. The Engineer reserves the right to verify all submitted measurements and computations. Failure by the Contractor to submit acceptable and timely reports to the Engineer may result in withholding of progress pay estimates on turf-related items until such time as reports are submitted in an acceptable and timely fashion.

The Engineer reserves the right to inspect the project for any reason in accordance with subsection 104.01 of the standard specifications, including the fulfillment of other inspection requirements such as Soil Erosion And Sedimentation Control, NPDES, etc. These inspections made by the Engineer shall not relieve the Contractor of the inspections required by this special provision or the Contractor's responsibilities for erosion control and turf establishment.

2. **Erosion Control.** Erosion shall be controlled at all times according to Section 208 of the standard specifications. Control of soil erosion is the responsibility of the Contractor. However, sedimentation controls shall be placed as indicated on the plans or as directed by the Engineer. The site shall be continuously monitored by the Contractor for needed erosion repair from any cause as addressed in the contract documents. All eroded areas shall be returned to original grade as detailed in the contract documents.

If sedimentation occurs in drainage structures or any watercourse or water containment area, corrective action shall be taken immediately and all disturbed areas contributing to this

sedimentation shall be restored within 24 hours of erosion occurrence. Sediment deposited as a result of the Contractor's inability to control the soil erosion shall be removed at the Contractor's expense.

The Contractor shall reimburse the Department for any costs levied against the Department, such as fines, environmental costs, costs for remedies required, or any other costs as a result of the Contractor's failure to comply with this specification and with all federal, state and local laws.

3. Erosion Repair. The Contractor is responsible for all repair and liable for all consequences (legal, monetary, or other) associated with erosion or sedimentation damage to finished or unfinished work.

All erosion occurrences and the repairs made by the Contractor shall be reported to the Engineer in the format and at the frequency required by the Engineer. Any erosion, displacement or disturbance to ongoing or completed work by any cause shall be repaired by the Contractor at no additional cost to the contract unless otherwise noted herein.

The Contractor shall be responsible and liable for all traffic control and safety measures required to repair and protect damaged turf areas. Any eroded area that may affect the support of the roadbed or safety of the public shall be repaired within 24 hours of the erosion occurrence.

Protection devices such as barriers, directional signs/signals, temporary fence, or any other safety measures shall be placed by the Contractor immediately after any erosion damage occurs that has the potential of endangering the public. In these instances, the Contractor shall, within 24 hours of the occurrence of the damage, provide the Engineer with a written summary of the immediate action taken and describing the repairs made and the safety measures taken.

4. Final Acceptance and Supplemental Performance Bond.

A. Final Acceptance Parameters. Before final acceptance of the turf establishment work, all of the following minimum parameters shall be met throughout all exposed areas of the project designated on the plans or identified by the Engineer as turf establishment areas. There shall be no exposed bare soil and the turf shall be fully germinated, erosion free, weed free, disease free, dark green in color and in a vigorous growing condition.

The Engineer will notify the Contractor of the dates and times of all acceptance inspections. The Contractor may accompany the Engineer while these inspections are being made. If the Contractor does not agree with the decision made by the Engineer, the Contractor can request an inspection by a mutually agreed upon third party (Michigan State University Extension service or other). A joint inspection, including the Engineer, the Contractor, and the third party, will be scheduled. All expert fees and expenses charged by the third party will be paid by the Contractor.

Any and all claims for extra compensation shall be according to subsection 104.09 of the Standard Specifications.

B. Supplemental Performance Bond. In the event that all contract items of work are completed, including the placement of all turf establishment items of work, and the final acceptance of the project is delayed because the final acceptance parameters for the turf establishment work have not been fully met, the Contractor may propose to the Engineer the use of a supplemental performance bond.

The bond serves to secure the successful completion of turf establishment work and fulfillment of all final acceptance parameters for the turf establishment work. The supplemental performance bond must be in all respects satisfactory and acceptable to MDOT and executed by a surety company authorized to do business with the State of Michigan.

The bond shall be in an amount equal to 50 percent of the turf establishment work contract items covered by this special provision. The bond shall remain in place for two growing seasons. At the discretion of the Engineer, the bond may be reduced on a prorated basis as portions of the areas designated for turf establishment on the project meet the final acceptance parameters.

Prior to commencement of any work during the bonded period necessary to meet the acceptance parameters, the Contractor shall apply for a permit to work within MDOT right-of-way using Form 2205. The permit fee and an individual permit performance bond shall not be required. The permit insurance requirements, however, shall apply.

d. Measurement and Payment. The completed work as described will be measured and paid for using the following contract item (pay item):

Contract Item (Pay Item)	Pay Unit
Turf Establishment, Performance.....	Square Yard

1. **Turf Establishment, Performance** shall be measured in place by area in square yards. All materials, labor and equipment required or selected by the Contractor to install, maintain, inspect, repair and meet the acceptance parameters for turf establishment specified in this special provision, including preparation, updating and submittal of the Contractor's Daily Reports, will not be paid separately but will be considered included in the contract unit price bid for **Turf Establishment, Performance**.

Repairs made to damaged turf establishment areas as a result of a documented storm by local meteorological data resulting in rainfall amounts of more than 3 inches in a 24 hour period will be paid for as an increase to original quantities as described in subsection 109.07 of the Standard Specifications.

The following schedule of payment applies to work performed according to this special provision. Upon completion of topsoil surfacing stage, 50 percent of the authorized amount for **Turf Establishment, Performance** will be paid to the Contractor. The remaining authorized amount will be paid upon completion of all other work necessary to comply with this special provision and to meet all final acceptance parameters for **Turf Establishment, Performance** or at such time as the supplemental performance bond is accepted by the Department, 50 percent of the bid price for **Turf Establishment, Performance** will be paid.

The supplemental performance bond and all costs associated with turf establishment work performed during the bonded period mutually agreed upon with the Engineer, will not be paid for separately. These costs which may include, but are not limited to, mobilization, traffic control devices, and the required permit insurance are considered to be included in the unit price bid for **Turf Establishment, Performance**.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
UNDERDRAIN, REMOVE

COL:KFR

1 of 1

C&T:APPR:DMG:DBP:12-07-06

a. Description. This work consists of providing removal of existing underdrains within the limits of roadway reconstruction, in accordance with Section 204 of the Standard Specifications for Construction and as herein modified.

b. Construction. The existing underdrain pipe, geotextile blanket trench liner, 34R aggregate trench backfill, underdrain outlet pipe, and outlet endings shall be removed and the trenches resulting from the removal shall be backfilled to the top of proposed subbase elevation and compacted as required in subsection 301.02 and 301.03 of the Standard Specifications for Construction. Disposal of materials shall be in accordance with subsection 204.03.B of the Standard Specifications for Construction.

c. Measurement and Payment. The completed work as described will be measured by the length of pipe removed and will be paid for at the contract unit price for the following contract item (pay item):

Contract Item (Pay Item)	Pay Unit
Underdrain, Rem.....	Foot

Payment for **Underdrain, Rem** shall include all labor, equipment and materials necessary to complete the work as described.