

PROJECT REQUIREMENTS

BOOK 2

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 GENERAL

1.1 General

The Contractor shall conduct all Work necessary to meet the requirements of the Contract.

1.2 Introduction to Books 2 and 3

This introduction is intended to provide instructions to the Contractor on the relationship between Books 2 and 3. It does not replace the order of precedence set forth in Book 1. Book 1, Section 1.3 defines the order of precedence for the Contract Documents. If there are any conflicts between this introduction and Book 1, Book 1 shall control.

Book 3 sets forth the standards applicable to the Project. Book 3 includes modifications that apply to the standards listed in Book 3. In some instances, only specific sections of the given standard apply. These sections are specified in Book 2. The MDOT Frequently Used Special Provisions, MDOT Supplemental Specifications, MDOT Traffic and Safety Special Provisions, and certain other special provisions are included as standards in Book 3. Other special provisions not included in Book 3 shall not be used by the Contractor without prior Approval of MDOT.

Book 2 sets forth requirements that are intended to apply to this Project. Book 2 incorporates the standards in Book 3 by reference. In many cases, Book 2 will modify, supplement, or replace the standards in Book 3.

The text of Book 2 shall take higher precedence than the exhibits of Book 2, unless otherwise specified.

1.3 Project Description

1.3.1 Project Location

The Project is located in the City of Detroit, Wayne County, Michigan, primarily in the Ambassador Bridge Plaza of the Bridge to Canada, which is generally bounded by I-75, Fort Street, West Grand Boulevard, and St. Anne Street..

1.3.2 General Description

The Project includes the following:

- Construction of the following roadways:
 - Truck Road connecting I-75 and the Cargo Inspection Facility
 - 4/3 Roadway connecting I-75 and the existing plaza roadway, which connects to the Ambassador Bridge
 - Access Drive connecting the 4/3 Roadway and Fort Street
 - Southern Special Return Route connecting the 4/3 Roadway and Fort Street
 - Northern Special Return Route connecting the 4/3 Roadway and the Cargo Inspection Facility
 - Truck Return to Canada Lane connecting the Cargo Inspection Facility and the 4/3 Roadway
- Removal of Pier 19 and Span 19 of structure S01 of Detroit International Bridge Company (DIBC)
- Construction of permanent concrete barrier along west side of Bridge to Canada adjacent to Span 19 of structure S01 of DIBC and on top of deck along Pier 18
- Reconstruction of Piers 12 and 13 of structure S01 of DIBC
- Toll booth relocation
- Installation and modification of drainage facilities
- Utility relocation
- Signing and pavement markings
- Lighting, electrical, and security facilities

- Maintenance of traffic
- Maintenance during construction
- Fencing, including access gates

The Contractor shall not rely on the physical description contained in this Section 1 to identify all Project components. The Contractor shall determine the full scope of the Project through thorough examination of the Contract Documents and the Project Site, or as may be reasonably inferred from such examination.

1.3.3 Basic Configuration

The Preliminary Design Drawings provided in the RID convey the general intent of the Project. The Basic Configuration means those portions of the Preliminary Design Drawings that depict:

1. The horizontal alignment for the Truck Road connecting I-75 and the Cargo Inspection Facility, except that this alignment may be modified up to one foot.
2. Number and width of lanes (indicated widths are minimums) of roadways
3. Names of roadways

Approval by MDOT is required prior to commencing any Work that would necessitate a modification in the Basic Configuration.

1.3.4 Other Projects Within the Corridor

The Contractor shall coordinate its Work and cooperate with the holders of separate contracts, both present and future, and their forces.

The Contractor shall conduct operations so as to cooperate with and interfere as little as possible with activities of other contractors, Utilities, or any public authority on or near the Work, and as directed by MDOT. MDOT may perform other work and permit public Utility companies and others to do work on or near the Project.

MDOT maintenance crews and/or contract maintenance agencies, including the DIBC, may perform maintenance work within or adjacent to this Project. The Maintenance Division of MDOT and/or contract maintenance agency will coordinate their operations with the MDOT Project Manager to minimize interference to the Contractor. No additional payment will be made to the Contractor for joint use of the traffic control items.

The following projects are known or anticipated at this time and are listed per the year construction is to begin. Some projects extend for more than one construction season.

2012 Construction

- CS 82194, JN 110565: This project consists of construction of pier 7 and erection of the span 7 superstructure of the SB I-75 Ramp from Truck Plaza over I-75/I-96 Exit Ramps (S32 of 82194) in the City of Detroit, Wayne County.

2 PROJECT MANAGEMENT

This Project will be managed with a document control Web site (<https://mdot-dbf.com/MDOTGateway/>). All Project deliverables and submittals shall be submitted in electronic format to a secure Project Web site, unless otherwise noted. The Contractor is not responsible for providing a Project Web site. If a submittal is too large to submit to the Project Web site or is submitted to MDOT by other means other than the Project Web site, the Contractor shall submit a cover letter for this submittal to the Project Web site providing submittal information and how the submittal will be submitted to MDOT.

The Contractor shall be prepared to work within the parameters of the Project Web site to receive Project information notifications via e-mail and download Project information from the Project Web site. The Contractor shall submit a MDOT Project Web site User Log-In Request form (See Exhibit 2-2-A) for personnel the Contractor would like to have access to the Project Web site. MDOT reserves the right to limit security levels. The Contractor is responsible for information provided to MDOT by the Contractor's personnel via the Project Web site.

Deliverables submitted to the Project Web site shall be in Adobe Acrobat (PDF) format, version 8.0 or a version compatible with version 8.0, unless noted otherwise.

2.1 Scope Management

2.1.1 General

The Contractor shall conduct all Work necessary to meet the requirements of scope management, including preparing, documenting, revising, and submitting information that details the Work and changes to the Work.

2.1.2 Concept Meetings

The Contractor shall schedule and facilitate Concept Meetings with MDOT to confirm the scope for the various parts of the Project. These Concept Meetings may coincide with meetings discussed elsewhere in the Contract Documents, including Over-the-Shoulder Review meetings; however, meetings may not be limited to those listed. At a minimum, Concept Meetings shall be held for all concept submittals required in the Contract Documents.

The Contractor shall hold these meetings concurrently when possible. The Contractor shall schedule the meetings after the Contractor has done its due diligence to understand the Contract Document requirements and how they pertain to the Project. The Contractor shall be prepared to ask MDOT staff and representatives specific questions regarding the Work and provide meeting materials (e.g., roll plots, handouts, and sample plan sheets) to attendees, as needed, to explain the question for efficient resolution. Supplying meeting materials and items for discussion to attendees prior to the meeting is encouraged but not required.

2.1.3 Administrative Requirements

Following Notice to Proceed (NTP), the Contractor shall incorporate any changes to the Work into its progress reports, schedule management, quality management, and human resources management for the Project.

2.1.4 Meeting Minute Requirements

The Contractor shall provide meeting minutes in electronic format to all meeting attendees for all meetings the Contractor attends to document decisions made on the Project. Meeting minutes shall include the meeting title, date of the meeting, meeting purpose, list of attendees (name, company, e-mail address and telephone), outline or overview of topics discussed, decisions made and action items as a result of the meeting. Action items shall include the task, person responsible for completing the task, and the completion date or timeframe in which the task shall be completed.

Draft meeting minutes shall be completed and submitted to meeting attendees for review. MDOT will review the minutes and return comments within five Working Days.

2.1.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Draft Meeting Minutes	Review	0	1 (PDF)	Within five Days of the meeting	2.1.4
Final Meeting Minutes	Acceptance	0	1 (PDF)	Within five Days of receiving MDOT comments	2.1.4
MDOT Project Web site User Log-In Request	Approval	0	1	At or prior to Preconstruction Meeting	2.0

2.2 Cost and Progress Management

2.2.1 General

The Contractor shall conduct all Work necessary to meet the requirements of cost and progress management, including the preparing, processing, revising, and submitting of invoices and progress reports.

2.2.2 Administrative Requirements

2.2.2.1 Schedule of Values

Following NTP, the Contractor shall develop a Schedule of Values that summarizes the Work and the price for the Work. The Schedule of Values shall include all items identified on Form 3 of the ITP. The cost-loaded Activities in the cost-loaded CPM Schedule shall roll up to equal the price of the items in the Schedule of Values. During the course of the Project, the Contractor shall incorporate any Approved changes to the Schedule of Values and document these changes by submitting a Revised Schedule of Values in PDF format. The items in the Revised Schedule of Values shall add up to the revised Contract Price. MDOT will respond within five Working Days of receipt of the Revised Schedule of Values.

The Contractor shall be entitled to a maximum mobilization of five percent of the Contract Price.

2.2.2.2 Invoices

2.2.2.2.1 General

MDOT reserves the right to withhold processing of an invoice if the requirements of this Section 2 are not met.

The Contractor shall structure the billing periods to start on the first day of the month and end on the last day of the month. MDOT will pay invoices on a two-week cycle at the request of the Contractor. If a two-week invoice cycle is used, invoice requirements must be met for each two-week cycle. The Contractor shall include the following on the invoice cover sheet:

1. Project numbers (federal and State) and title
2. Invoice number (numbered consecutively starting with “01”)
3. Period covered by the invoice (specific Days)
4. Total earned to date for the Project (as shown on the most recent Approved Schedule of Values)
5. Authorized signature and title of signatory
6. Date that invoice was signed

The Contractor shall include the Progress Report, for the period being billed, with the invoice. If a two-week cycle is used for invoicing, the Progress Report does not need to be submitted with each mid-month invoice.

On a monthly basis, at a minimum, the Contractor shall meet with MDOT to review the following prior to submitting invoices:

- Activity percent completes, which are based on physical percent complete estimated by the field personnel relating to a cost-loaded schedule activity in the cost-loaded CPM Schedule
- Incorporation of Approved Change Orders as individual activities with proper title, coding by Change Order number, associated logic, duration, as well as cost loading
- Verification of any unit price items
- Status of outstanding Nonconforming Work and Warranties
- Backup documentation for cost reimbursable procurement and Change Order schedule activities

The Contractor shall include with the monthly or bi-monthly invoice a copy of the updated cost-loaded CPM Schedule showing percent complete for each activity and an updated Schedule of Values showing the total cost for each item, the cost for the billing period for each item, and the total cost to date for each item. MDOT shall issue payment of the Schedule of Values submitted by the Contractor once Approved by MDOT.

2.2.2.2.2 Invoice Calculations

MDOT will base payments on MDOT's estimate of physical percent complete of the Work for each cost-loaded schedule activity, not on measured quantities (except where specifically stated in the Contract).

The payment to the Contractor will be the amount shown on the Contractor's Approved invoice less deductions made by MDOT.

The following Project Management items from ITP Form 3 will be paid by prorating any unpaid balances by the amount of time remaining until Substantial Completion:

- Contract Management (includes Scope Management, Cost Management, and Schedule Management)
- Safety Management
- Environmental Management
- Maintenance During Construction
- Insurances (no payment will be made for insurance until insurance invoices are provided)
- Bonds

Payment for mobilization will be paid according to the following provisions:

- 50 percent when 5 percent of the original Contract amount has been earned. Earned value does not include the costs of bonds, insurance, and prior mobilization payments.
- An additional 25 percent when 10 percent of the original Contract amount has been earned. Earned value does not include the costs of bonds, insurance, and prior mobilization payments.
- The remaining 25 percent when 25 percent of the original Contract amount has been earned. Earned value does not include the costs of bonds, insurance, and prior mobilization payments.

MDOT will base payments for design based on estimated percentage complete for each Released for Construction (RFC) package with the following limitations:

- A maximum 90 percent will be paid when Accepted RFC Documents have been issued.
- A maximum of 95 percent will be paid when all construction Work associated with each RFC package is complete.
- A maximum of 100 percent will be paid when all As-Built Documents have been Accepted.

2.2.2.3 Progress Report

The Contractor shall include the following in a bi-weekly Progress Report:

1. Summary of work performed during the previous month broken down into the items in the Schedule of Values.
2. A certificate signed by its Design Quality Manager certifying that all design Work has been checked in accordance with the requirements of the Approved DQM and that all design Work, except as specifically noted in the certification, conforms to the requirements of the Contract. This certification shall include a list of the design items or submittals the Design Quality Manager is certifying for the given month.
3. A certificate signed by its Construction Quality Control Manager certifying that all construction Work performed through the date of the Progress Report has been performed in a prudent manner and in compliance with the requirements of the Contract. This certificate must also certify that all necessary

materials to perform such Work have been provided by Contractor or its Subcontractors or Vendors in accordance with the provisions of this Contract, and that it holds title to all such materials included in the invoices issued during the month.

4. An updated submittal log that tracks, at a minimum, when an item was submitted by the Contractor and when it was returned to the Contractor. The submittal log shall also show the status of the submittal (e.g., No exceptions taken; Make corrections noted; Resubmit; Rejected; Accepted). This shall also include a schedule report for submittals that will be submitted in the coming month.
5. A summary of items the Contractor or MDOT needs or any outstanding issues that need to be resolved and who the responsible party is.
6. Quality updates
 - Summary of quality audits and quality control processes performed
 - Listing on non-conformances and resolutions
 - Summary of Design Quality Manual (described in Section 2.4) updates
7. Environmental compliance
 - Summary and copies of environmental monitoring reports
 - Summary of non-compliance issues and resolution
8. Geotechnical
 - Summary of geotechnical instrumentation monitoring activities and issues
 - Copies of geotechnical instrumentation monitoring reports
9. Maintenance of traffic
 - Summary of traffic switches and projections of future traffic switches
 - Summary of known traffic incidents within the work zone
 - Updates to emergency services access points to the Project site
 - Updates to work area access points
 - Mobility reporting per Book 2, Section 18 and the Contractor's Transportation Management Plan
10. Utility Reporting per Book 2, Section 6
11. Change Orders
 - Summary of outstanding Change Orders
 - Summary of items where Contractor is aware of claim, dispute, circumstance, or fact that may give rise to a claim, if applicable

2.2.2.4 Weekly Labor Hours Report

This submittal shall include the total weekly labor hours for construction/maintenance and non-construction/design personnel by classification of management, engineering, and other technical personnel used on the Project.

2.2.3 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Original Schedule of Values	Approval	0	1	Prior to first invoice	2.2.2.1
Revised Schedule of Values	Approval	0	1	Within five Days of changes to the Contract being Approved	2.2.2.1
Invoices	Approval	1	1 (PDF)	Monthly or bi-weekly	2.2.2.2
Progress Reports	Acceptance	0	1 (PDF)	Bi-Weekly	2.2.2.3
Weekly Labor Hours Report	Acceptance	0	1	Monthly	2.2.2.4

2.3 Schedule Management

2.3.1 General

The Contractor shall complete and update a computerized Critical Path Method (CPM) Schedule as described herein. Whenever the term “Schedule” is used in the Contract Documents, it shall mean the cost-loaded CPM Schedule. The Work under this Contract shall be planned, reported, and accomplished using CPM.

2.3.2 Definitions

The terms used in this Section 2 shall have the following meanings:

CPM Schedule: The as-planned schedule that represents the Contractor's best judgment and intended plan for completion of the Work in compliance with Contract Documents. The CPM Schedule shall show all planned activities, including activities by any separate contractors, interface dates with Utility owners/municipalities/agencies, all submittal requirements, and submittal review periods.

Critical Activity: An activity with zero or negative Float.

Critical Path(s): The chain of continuous activities controlling the last activity of the Schedule and/or Milestone(s).

Milestone: A contractually obligated Project Start or deadline that shall be designated with an activity type of Milestone. Milestones are the only activities allowed a Start and Finish date constraint. The Contractor may use activity coding to designate other activities of interest.

Float: Number of Days by which a part of the Work in the Schedule may be delayed without extending the Contract Time or Milestone.

Cost-Loaded CPM Schedule (or Schedule): A schedule that has a cost associated with each defined activity.

2.3.3 Software

The Contractor shall use Microsoft Project or other software as Approved by the MDOT Project Manager for schedule management.

2.3.4 General Requirements

The Contractor shall manage and work with each Subcontractor and Supplier to obtain information on activities for implementation and sequencing of the Work. The Schedules shall reflect Contract requirements and known limitations.

Errors or omissions within cost-loaded CPM Schedules shall not relieve the Contractor from finishing all Work within the time limit specified for completion of the Contract. Once the cost-loaded Initial CPM Schedule is Accepted by MDOT, the cost-loaded CPM Schedule becomes part of the Contract and replaces and becomes the progress schedule typically used on MDOT projects. The cost-loaded CPM Schedule shall meet the requirements of MDOT Frequently Used Special Provision 102C – Critical Path Method Network Schedule and this Section 2.3. If conflict occurs between requirements of this Section 2 and the MDOT Frequently Used Special Provision 102C – Critical Path Method Network Schedule, this Section 2 shall govern. If, after a cost-loaded CPM Schedule has been Accepted by MDOT, and either the Contractor or MDOT discovers that any aspect of the cost-loaded CPM Schedule has an error or omission, the cost-loaded CPM Schedule shall be corrected.

MDOT will respond with comments or Acceptance within five Working Days of receipt of this cost-loaded Initial CPM Schedule.

2.3.5 *Schedule Updates*

At a minimum, the Contractor shall prepare a monthly cost-loaded Updated CPM Schedule that accurately reflects the status of Work completed and Work remaining. This submittal shall be readable when printed on 24-inch x36-inch paper. The Contractor shall meet with MDOT to review each update. Cost-loaded CPM Schedule updates shall be made to the most recently Accepted cost-loaded CPM Schedule. Cost-loaded CPM Schedule updates shall be named to denote the date of submittal. MDOT reserves the right to request hardcopy or Microsoft Project copies of cost-loaded Updated CPM Schedules. If requested, MDOT shall receive the item within five Days of the request.

2.3.6 *Acceptance of Schedule*

MDOT's review and Acceptance of cost-loaded CPM Schedules will not waive any Contract requirements and shall not relieve the Contractor of any obligation or responsibility for submitting complete and accurate information. By review and Acceptance of the cost-loaded CPM Schedule, MDOT does not endorse or otherwise certify the validity or accuracy of any part of the cost-loaded CPM Schedules. The responsibility for validity and accuracy of all cost-loaded CPM Schedules is the sole responsibility of the Contractor.

2.3.7 *Use of Float*

The Contractor acknowledges that all Float is a shared commodity available to the Project and is not for the exclusive benefit of any party. Use of any Float-suppressing techniques will be cause for rejection of a cost-loaded CPM Schedule submittal.

2.3.8 *Level of Detail*

The cost-loaded CPM Schedule shall be cost-loaded and will be used to administer the payments to the Contractor. If the Contractor intends to bill for materials on hand, all procurement Activities must be scheduled and cost-loaded separate from the installation Activities.

The costs assigned to schedule Activities shall roll up to equal the price for the items identified in the Schedule of Values. The total cost of all schedule activities shall equal the Contract Price. The cost assigned to individual schedule Activities shall reflect the Contractor's cost for each activity, and shall not artificially inflate, imbalance, or front-load the items. Each activity shall identify a reasonable estimate of either a commodity or labor upon which the activity value is based.

At a minimum, each activity shall: (1) have a unique activity description and contain a verb; (2) be a duration of not more than 20 Working Days nor less than five Days unless otherwise authorized by MDOT; (3) have at least one predecessor and one successor activity, except for Project start and finish respectively; and (4) express activity durations in days.

The cost-loaded CPM Schedule shall be sufficiently detailed to accurately reflect the complexity and numerous construction operations of this Project to the satisfaction of MDOT. The level of detail described below is the minimum level of detail required for schedule activities. The Contractor is encouraged to further develop the activities to reflect the Work.

Administration

- Schedule milestones
- Mobilization
- All Submittals (broken down by each deliverable)
- All design (broken down by each design package, Released For Construction Document package, etc.)
- MDOT review periods
- Utility notification and relocation, by Utility

- Material on hand (procured items) requests and payments
- Substantial completion
- Punch list
- Final Acceptance

General

- Soil erosion and sediment control measures
- Permit preparation and reviews
- Weather restrictions
- Open to traffic dates

Bridges

- Test piling
- Test holes
- Excavation for each substructure location
- Fabrication and delivery of piling
- Structural steel fabrication and delivery, per structure
- Pile installation, per bent, per structure
- Drilled shaft installation, per pier, per structure
- Pile caps, per bent, per structure
- Footings, per pier, per structure
- Columns, per pier, per structure
- Caps, per pier, per structure
- Abutments, per structure
- Beam or girder erection, per structure
- Diaphragms
- Deck placement, per structure
- Deck hydrodemolition, per structure
- Joint repair, per structure
- Concrete repairs, per structure
- Parapets, per structure
- Painting of existing structural steel
- Erection and removal of falsework and shoring

Roadway and Traffic

- Work zone signing and striping
- Traffic switches
- Submission of job mix formula for asphalt pavement
- Delivery of materials such as drainage pipe, guardrail, sign structures and signs, permanent lighting facilities, and permanent traffic signals
- Internal access and haul roads (location and duration in-place)
- Clearing and grubbing by stationing and roadway

- Excavation
- Embankment placed for each roadway
- Drainage – by run with structures for each roadway
- Retaining walls per location
- Subgrade for each roadway
- Base for roadway
- Curb, barrier wall, and sidewalks for each roadway
- Pavement (asphalt and/or concrete) for each roadway
- Bridge approach slabs per location
- Guardrail for each roadway
- Slope pavement or riprap
- Roadway lighting for each roadway
- Signing for each sign structure location and for each roadway
- Striping for each roadway
- Traffic signals per location
- Topsoil, sodding, seeding, and mulching for each roadway
- Landscaping
- Guardrail
- Fencing
- Crossover and temporary pavement removals
- Finishing roadway and final cleanup

2.3.9 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. The Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Initial CPM Schedule	Acceptance	3	2 (one PDF and one MS Project)	At or prior to Preconstruction Meeting	2.3.4
Updated CPM Schedule	Acceptance	0	2 (one PDF and one MS Project)	Monthly or bi-monthly with Invoice	2.3.5

2.4 Quality Management

2.4.1 Responsibilities

Contractor Responsibility: The Contractor shall be responsible for providing all administration, design, and construction Work in accordance with the Contract Documents. The Contractor shall not be relieved of its obligation to perform the Work in accordance with the Contract Documents, or any of its other obligations under the Contract Documents, by oversight, spot checks, audits, reviews, tests, inspections, acceptances, or approvals by any Persons, or by any failure of any Person to take such action.

The Contractor shall be responsible for providing and following a Design Quality Manual (DQM) in accordance with this Section 2.4.

MDOT Role: MDOT will review design submittals as described in this Section 2. During construction, MDOT will perform construction engineering, testing, and inspection duties similar to the standard approach used on traditional MDOT design-bid-build projects.

2.4.2 Quality Management Goals

Design: The Contractor shall develop and implement a design quality management approach that:

- Exhibits sound design Quality Control and Quality Assurance review processes
- Ensures the Released for Construction Documents meet the requirements of the Contract
- Provides quality measures and encourages continuous improvement of the design deliverable products
- Involves MDOT weekly, at a minimum, throughout the design development process
- Integrates regulatory agencies in the design review comment process

Construction: The Contractor shall develop and implement a quality management approach during construction that:

- Promotes quality in the work product
- Coordinates the design with the construction and promotes communication between Key Personnel and MDOT throughout the process
- Ensures changes during construction to Released for Construction Documents are reviewed by the Project designers and are appropriately recorded

Continuous Improvement: MDOT expects design quality program improvements throughout the delivery of the entire Project. It is of the utmost importance that the Contractor involves its staff and partners with MDOT to ensure overall Project satisfaction. MDOT will strive for an oversight role in the design quality management program for the Project; however, this will only be possible if the Contractor's design quality program exhibits sound processes and practices that place quality design and workmanship above production and/or cost by all team members.

2.4.3 Standards

In the event of a conflict among the standards set forth in Book 3 relating to quality requirements, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT CAD Standards
- MDOT Guidelines for Plan Preparation, Road Sample Plans
- MDOT Guidelines for Plan Preparation, Bridge Sample Plans
- MDOT *Bridge Design Guides*
- MDOT Standard Plans
- MDOT Special Details

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- MDOT *Materials Source Guide*
 - MDOT *Road Boring Sample Plan*
 - MDOT *Bridge Boring Sample Plan*
 - MDOT *Road Design Manual*
 - MDOT *Bridge Design Manual*
 - AASHTO/NSBA Steel Bridge Collaboration—*Shop Detail Drawing Review/Approval Guidelines*
 - AASHTO/NSBA Steel Bridge Collaboration—*Shop Detail Drawing Presentation Guidelines*
 - AASHTO/NSBA Steel Bridge Collaboration—*Steel Bridge Fabrication QC/QA Guide Specification*
 - Remaining standards set forth in Book 3

The standards listed above will be used to evaluate quality of plans and submittals.

2.4.4 Design Quality Manual (DQM)

2.4.4.1 General

The Contractor shall prepare a Design Quality Manual (DQM) that shows how design processes will be managed to achieve quality. The DQM shall be organized by functional areas of Quality Control and Quality Assurance. Staffing of the functional areas shall be at the Contractor's discretion, unless otherwise dictated by the Contract requirements.

The DQM shall graphically depict the lines of responsibility and interfaces to describe the Contractor's organization.

The DQM shall describe all verification resources, such as design verifiers and checkers that the Contractor will use.

The DQM shall depict how the Contractor's design technical experts are incorporated into the construction phase of the Project. At a minimum, the Contractor shall maintain a log of construction field changes to document all changes to Accepted RFC Documents, including the following:

- Description of change
- Reason for change
- Type of change (major or minor, as described below):
 - Major: Those that affect roadway/ramp alignment (horizontal or vertical), Contractor or public safety, structure integrity or capacity, significant flow characteristics of drainage facilities, environmental resources or impacts, or significant construction safety issues. Contractor field personnel shall notify the Design Manager and MDOT as soon as a major change is deemed necessary.
 - Minor: Those that do not constitute major changes and can be handled in the field by the Contractor's Project Superintendent with concurrence of the Design Manager and MDOT.
- Plan of action and resolution
- Designer involvement
- Documentation
- Inclusion on As-Built Documents

Quality Personnel

Quality Assurance personnel shall have no responsibilities in the production of the Work. Quality Control personnel shall remain independent of the Quality Assurance personnel.

Quality Assurance personnel shall be responsible for verifying and providing confidence that Work meets or will meet the contractual requirements and that the requirements of the DQM are met.

Quality Control personnel shall be responsible for verifying compliance of the Work with the Contract requirements.

Quality Assurance personnel shall have the authority to stop Work.

Quality Control includes the activities undertaken by production staff to ensure suitability of inputs, processes, and outputs, such as work planning, reviews, inspection, tests, and checks. Quality assurance includes the activities undertaken by non-production staff to provide confidence that Work will meet requirements, such as establishing quality and policy, defining authority and responsibility, assessing effectiveness of the quality system, training, verification of quality control, and measures to improve quality.

Quality Control and Quality Assurance personnel do not have the authority to deviate from Project requirements or to interpret Project specifications. Their roles are solely to ensure the finished Work meets the requirements of the Contract.

Quality System Procedures

The DQM shall contain written procedures for each quality process outlining the steps to be followed to produce a quality product. These processes could include plan checking, calculation checking, nonconforming work identification and resolution, requests for information, or specification checking. All written procedures shall clearly describe the purpose of the process, overview of the process, responsibilities, steps of the process, lines of communication, and records resulting from the process.

2.4.4.2 Quality Systems – Construction

The Contractor shall provide information to MDOT that documents Project quantities for quantity verification of testing rates and materials certifications.

2.4.4.3 Design Quality Manual Contents

General

All design (including design by Subcontractors) must meet the requirements of the DQM and the Contract Documents.

The DQM shall identify the personnel involved in the quality process and describe their roles on the Project. At a minimum, the Key Personnel listed in Book 2, Section 2.5 shall be included in this group of personnel.

Design and Development Planning

The DQM shall describe how the design team schedules the design efforts, including design reviews, checking, and back-checking stages, and issue dates of design deliverables.

The DQM shall include details as to the level of involvement of MDOT in the design development process. The Contractor is encouraged to involve MDOT in all design development processes, including independent technical reviews and constructability reviews.

The DQM shall define the frequency, timing, content, and format of the Over-The-Shoulder review meetings and the In-Progress Submittals.

Organizational and Technical Interfaces

The Contractor shall promote the organizational and technical interface between design and construction.

The DQM shall describe the coordination of the design with construction, including the methods for ensuring that the designs detailed in the Released for Construction Documents are constructed in the field. In addition, the DQM shall describe how the final constructed product is reflected in the As-Built Documents. The DQM shall describe the method of communicating changes or revisions made in the field.

Design Input

The DQM shall describe how all design criteria, Contract requirements, and other design inputs are defined, reviewed, and approved.

The Contractor shall maintain an accessible, centrally controlled design criteria manual, database, or list that contains all relevant design inputs or reference to design inputs to be used by design personnel to incorporate into the design.

The Contractor shall ensure that the design inputs are communicated to, and accessible by, the relevant designers responsible for incorporating design inputs into the design outputs.

If any changes to the inputs must be made, the DQM shall describe how these changes are identified, reviewed, and approved by appropriate personnel prior to their implementation.

The DQM shall describe the method of communicating design input changes or revisions to the design and construction staff.

Design Output

The DQM shall define the design outputs (i.e., the specific plans and specifications) to be produced and the checking and review processes that will be followed.

If any changes to the outputs must be made, the DQM shall describe how these changes are identified, implemented, and reviewed. The method of communicating field changes or revisions back to the designers or changes made by the designers back to the field shall be described. The DQM shall also describe how any of these changes are relayed to MDOT in writing.

Document and Data Control

The DQM shall identify all records to be maintained and kept throughout the duration of the Project, and how they will be controlled by a unique document control number.

The DQM shall describe where and how records will be stored.

The DQM shall describe the routing, filing, control, and retrieval methods for all documents.

Review and Disposition of Nonconforming Product

The DQM shall describe how the Contractor plans to identify non-conformances, deal with non-conformances once discovered, and prevent the unintended use of non-conforming Work.

The DQM shall describe how non-conformances are tracked, resolutions to non-conformances are developed, and actions taken to correct non-conformances are documented and re-inspected.

These requirements shall apply to both design and construction of the Project.

Corrective and Preventative Action

The DQM shall describe the corrective and preventive actions the Contractor will take upon identification of actual or potential major and systemic non-conformances, identified internally or by MDOT. All resolutions of non-conformances that require design changes, repairs, or rework must be signed by the engineer who signed the applicable design documents.

These requirements shall apply to both design and construction of the Project.

2.4.4.4 Adherence to the DQM

If the Contractor begins design before Approval of the DQM, the Contractor shall do so at its sole risk. Once the DQM is Approved, the Contractor shall not revise any portion without Approval of MDOT.

Work Suspension: If there is evidence that the Contractor’s design quality procedures are not adequate (as evidenced by MDOT’s oversight reviews or problems during design or construction), MDOT may suspend ongoing design and construction Work represented by the deficient quality procedures and require correction of design and/or construction defects.

2.4.5 Design Deliverables and Review

The following items shall be submitted to MDOT:

- Released for Construction Documents
- Shop and working drawings
- Product Data
- As-Built Documents

Plan content requirements can be waived if the Project does not have that specific item.

All design deliverables or submittals shall include the following to communicate the state of the item:

- Cover or transmittal letter stating what is in the package
- Letter or documentation stating the Contractor’s quality program was following and certifying the following:
 1. The design meets all applicable requirements of the Contract Documents, applicable law, and the governmental approvals.
 2. The design has been checked in accordance with the Contractor’s Approved DQM.
- Any additional plan submittal information as it relates to completeness and its suitability for review
- Plans shall have an open area that measures 1 inch by 2 inch above the title block of each plan sheet. Special provisions or other 8.5 inch by 11 inch media shall have an open area in the header, footer, or outside margin. This open area shall be in the same location on all sheets in a submittal. Open area will be used by MDOT to place acceptance or approval stamps.

2.4.5.1 Released for Construction Documents

Released for Construction Documents shall constitute the documents issued for the purposes of construction and, at a minimum, shall contain the following:

- Design drawings (may be roll plots or plan sheets)
- Design calculations
- Design reports
- Specifications
- Electronic CADD files and/or PDF files, as required.
- Government and Utility Owner approvals

The Contractor shall ensure that the Released for Construction Documents for bridges meet, at a minimum, the design requirements for Preliminary Plans - Composition as stated in the MDOT *Bridge Design Manual*, as well as all other requirements for Released for Construction Documents.

The Contractor shall ensure that the Released for Construction Documents for roadways meet, at a minimum, the design requirements for Preliminary Plans as stated in the MDOT *Road Design Manual*, as well as all other requirements for Released for Construction Documents.

The Contractor does not have to provide pay items, or miscellaneous quantity tables in the Released for Construction Documents.

All Released for Construction Documents shall meet the following requirements:

- The Contractor shall ensure that no construction Work is undertaken without Released for Construction Documents Accepted by MDOT.
- The Contractor shall ensure that all Work, including modifications to the Work, is designed under the authority of a Michigan-licensed Professional Engineer and the plans shall be signed and stamped with a professional engineer stamp by a Michigan-licensed Professional Engineer who becomes the engineer of record.
- The Contractor shall ensure that the timing of submission of these documents is indicated in the cost-loaded CPM Schedule for the Project.
- The Contractor shall ensure that all drawing files are prepared in MicroStation V8.
- The Contractor shall ensure that GEOPAK™ is used for design, unless specified otherwise.
- The Contractor shall ensure that all deliverables containing CADD data shall be in MicroStation and GEOPAK™ format.
- The Contractor shall ensure that all CADD drawings, GEOPAK™ design files, and associated documents are organized in a logical manner, have a uniform and consistent appearance, and clearly depict the intention of the design and construction.
- The Contractor shall ensure that all designs and drawings are in English units.
- The Contractor shall identify the limits of excavation for all excavation work.
- The Contractor shall identify the limits of all stay-in-place elements of temporary works.
- The Contractor shall include quantities in all Released for Construction documents for all items which require inspection or testing in accordance with the MDOT *Materials Source Guide*.
- Structure calculations shall be submitted with each Released for Construction Document pertaining to structures.
- The Contractor shall submit product cut sheet information, as required, to define the Work
- The Contractor shall ensure that all special provisions, shop drawings, and other items necessary to construct the Work are submitted with the Released for Construction Documents pertaining to the Work item, or are identified for future receipt and review after the RFC submittal is submitted and returned (i.e., shop or working drawings and product data sheets).
- For all materials, the Contractor shall include material strength, type, grade, and ASTM or AASHTO designation on all Released for Construction Documents.
- Design cross sections - sheets at 1 inch = 10 feet scale, with sections shown at minimum 50-foot intervals and other critical locations along all roadways where Work occurs, showing existing ground, proposed finished grade and subgrade, existing and proposed Utilities, and existing and proposed ROW and easements. MDOT reserves the right to request cross sections at specific locations.

The Contractor shall provide MDOT with one set of each Released for Construction Document. Electronic PDF files shall be indexed with electronic bookmarks and have the pages consecutively numbered.

For structure plans, the Contractor shall prepare and include reinforcement tables for structure components in accordance with MDOT typical bridge design standard practices, except the weight of bars for each bar mark is not required to be shown.

2.4.5.2 Shop and Working Drawings

The Contractor shall generate shop drawings, working drawings, and material and equipment documentation as necessary to clearly define, control, construct, and inspect the Project. These working drawings shall be submitted to the Contractor's design team for review and internal approval. All such drawings shall be reviewed by qualified personnel, and shall be stamped "Approved for Construction" if the drawings meets the requirements of the design. After the Contractor's design team completes review of a shop or working

drawing, the drawing shall be submitted to MDOT and shall follow the review requirements for Released for Construction Documents. Shop or working drawings requiring signing and sealing per the Contract Documents shall be signed and sealed by a Michigan-licensed Professional Engineer, prior to being issued for construction.

Shop drawings for the Project shall include structural fabrication plans, anchor bolt layouts, shop details, erection plans, equipment lists, material identification and description, and any other information specifically required by MDOT, the Contract Documents, or other governmental entities.

Shop and working drawings and calculations for excavation shoring, cribs, cofferdams, falsework, overhead signs, temporary support systems, formwork, and other temporary Project elements shall be prepared by the Contractor in accordance with the Contractor's DQM. Shop and working drawings and calculations shall describe the methods of construction proposed to be used for the Project. Receipt of submittals for temporary Project elements by MDOT shall in no way constitute Approval of the planned Project element.

The Contractor shall make no changes to any approved shop or working drawing after the Contractor's design team has approved them. Any deviations from approved shop or working drawings shall require the fabricator to submit revised drawings to the Contractor's design team for approval, as outlined above.

Material and equipment submittals shall be provided for review in a complete and organized manner with no exceptions noted. All submittals required by the Contract Documents shall be scheduled and made as a group. Those submittals required to be resubmitted shall be resubmitted as noted and in a group referencing the applicable division or section in the Contract Documents.

2.4.5.3 Product Data

The Contractor shall submit to MDOT all manufacturers' warranties, guarantees, instruction sheets, parts lists, and other product data.

The Contractor shall ensure that the product data cited in this section are organized and indexed in a manner that allows easy retrieval of information.

2.4.5.4 As-Built Documents

The Contractor shall provide As-Built Documents that depict the final completed Project with the content of all Released for Construction Document plan sets integrated and combined into one As-Built Document for the entire Project. As-Built plans shall meet the MDOT Guidelines for Plan Preparation. As-Built Documents shall also include all changes and data showing all items such as electrical systems, drainage systems, lighting systems, underground Utilities, traffic controls, intelligent transportation systems, signing placement, highway alignment and grade revisions, bridge detail changes, bridge settlement reference elevations and joint seal measurements, typical sections, cross sections, and all other relevant data, including any operations and maintenance manuals for the mechanical and electrical systems.

The As-Built Documents relating to bridges shall show the actual profile grade elevations at each substructure centerline and the tip elevation of drilled shafts or pile foundations on the bridge layouts. The Contractor shall obtain and record actual beam seat elevations prior to placing beams or girders.

The Contractor shall ensure that the As-Built Documents meet the requirements of the Released for Construction Documents and the following additional requirements:

- The Contractor shall prepare plans that are similar in appearance and content to the MDOT standards applicable to the design being performed.
- As-Built Documents shall include all base mapping (topography), design plans (including shop drawings), design calculations, design reports, specifications, and electronic CADD data.

- As-Built Plans shall be prepared using CADD converted to .pdf format. The electronic CADD files that make up the As-Built plans and the combined .pdf format shall be submitted.
- The Contractor shall ensure that all title blocks of calculation sheets include the calculation title, file number, page number, initials of the designer, checker and back-checker, and dates of when design, checking, and back-checking occurred.
- The Contractor shall ensure that all calculations indicate the design requirement, the assumptions made, the methods used, the source of the information, and the cross-reference for the applicable design drawings.
- The Contractor shall ensure that all structure calculations and bridge rating calculations performed using software are independently checked by a Michigan-licensed Professional Engineer with ten years minimum experience. The Contractor shall ensure that hand calculations are verified.
- The Contractor shall ensure that all calculations include the final iteration and are readily accessible, clear, understandable, concise, complete, and accurate to the final design of an element is easily determined.
- The Contractor shall ensure that all calculations are bound and numbered with a table of contents.
- The Contractor shall ensure that all calculations identify the code or standard utilized and indicate the specific section referenced in the right hand column.
- In the calculations, the Contractor shall reference the computer programs and versions used.
- The Contractor shall ensure that all manual calculations are printed, neatly and legibly.
- All calculations, manual or computer generated, shall be on 8½-inch by 11-inch or 11-inch by 17-inch standard paper. Minimum allowable font size is 12 point.

For each bridge, an electronic Microstation as-built plan file is required. This plan shall be a coordinate-correct plan, in accordance with datum requirements included in Book 2, Section 9, representing the actual coordinates of the outside edge of deck, gutter lines, beam centerlines, substructure footings, abutment bridge seats, wing walls, and other items identified in the Preliminary Bridge Plans.

The Contractor shall ensure that the As-Built Documents reflect the actual condition of the constructed Work. The Contractor's Project Manager shall sign and date the title sheet of the As-Built Plans to certify that the Project was completed in accordance with the plans, the Contract Documents, the governmental approvals, and applicable law. The Contractor shall gather all applicable information as the Project is being completed in order to include such information in the As-Built Documents before it is covered or inaccessible.

The Contractor shall submit to MDOT for Acceptance one complete hardcopy of all As-Built Documents, one set of electronic PDF files and one set of Microstation V8 DGN format files on CD-ROM of all As-Built Documents available in a digital format. Microstation files shall have reference files collapsed so the sheet is a stand-alone item and all information for that sheet is contained within the file. MDOT will advise the Contractor of the status of their Acceptance of the As-Built Documents within five Working Days of receipt of same. As-Built Documents must be stamped AS-BUILT and signed by the engineer of record attesting that they are accurate and complete. Documents stamped AS-BUILT represent a warranty by the engineer that the information shown is an accurate representation of the installed condition of the work. Acceptance of the As-Built documents must be granted by MDOT as a condition of Final Acceptance.

2.4.5.5 Over-The-Shoulder Review Meetings

The Contractor shall schedule and facilitate Over-The-Shoulder (OTS) review meetings with MDOT at least once weekly, or as required by MDOT. The intent of the OTS meetings is to provide a continuous interface between the Contractor and MDOT to resolve Project items as soon as possible in an effort to reduce the number of resubmittals and review times. For OTS meetings the Contractor shall:

- Prior to the meeting, provide the MDOT PM an agenda for the meeting outlining topics they would like to discuss and any materials (handouts, drawings, RFC Documents, etc.) required to facilitate the meeting.
- Provide a meeting location or agree with MDOT on the location of the meeting.
- Schedule the meeting to fit best with its operations and submittal schedule.
- Have relevant staff present at the meeting in an effort to make effective and efficient decisions.
- Run or facilitate the meeting and keep the meeting under 2 hours in duration.

Upon receipt of the meeting agenda and discussion topics, MDOT will request the proper personnel attend the meeting to make effective and efficient decisions.

2.4.5.6 MDOT Design Review

The Contractor shall submit all design calculations for MDOT review with Released for Construction Documents and obtain MDOT's signature on all Released for Construction Documents prior to release of those documents for construction.

MDOT Review Procedures

MDOT will review as many design packages as it can within the limitations of its staff; however, at MDOT's sole discretion, it may limit the number of over-the-shoulder review meetings, in-progress submittals, design submittals, and design re-submittals in a given week.

After each review, the Contractor shall address all comments and concerns raised by MDOT by revising the design and/or plans to MDOT's satisfaction prior to resubmittal.

In-Progress Submittal Reviews

In-Progress Submittal reviews are informal examinations by MDOT of design documents during the Project design process. The reviews may, at MDOT's discretion, include review of design drawings, electronic files, calculations, reports, specifications, geotechnical data, progress prints, computer images, draft documents, draft specifications and reports, other design documents, and any other relevant design information as requested by MDOT.

It is the intent of these reviews to check for concept, level of detail, design criteria, and fatal flaws. It is the Contractor's responsibility to confirm conformance with the Contract requirements. These reviews will not routinely include detailed calculation or drawing reviews, although MDOT retains the right to perform detailed reviews of any item at any time.

The In-Progress Submittal reviews are not critical activity points that restrict the progress of design. They are simply reviews of the design as it progresses and provides opportunities for MDOT to offer comments and feedback on the design.

MDOT reserves the right to request In-Progress Submittals be submitted or to schedule In-Progress Submittal review meetings during the course of design package development, prior to issuance of Released for Construction Documents.

MDOT Review Time Requirements

MDOT will complete its review of the Contractor's plans and submittals within five Working Days, unless otherwise indicated elsewhere in these Contract Documents. Deliverables or submittals received after 3:30 p.m. Eastern Time will be considered as being received by MDOT the next Working Day. This review time depicts the maximum allowed time MDOT has to review the associated submittals and respond to the Contractor without impacting the overall Project schedule. Each design package may go through multiple iterations of review by MDOT before Acceptance. Each time a package is submitted, the timelines above will be the maximum amount of time allotted for MDOT to complete its review. The actual MDOT review timeline may be directly related to the extent of involvement the Contractor allows MDOT during the design

development process by consistently engaging MDOT. More up-front MDOT involvement may shorten review timelines.

Design Submittals

Re-submittal Process

Re-submittals of Design Documents may be required if deemed necessary by the Contractor's Design Quality Assurance staff or MDOT. Each re-submittal must address all comments received from a prior submittal in a manner satisfactory to the commenting party. A resolution of comments stating how the Contractor addressed MDOT's comments shall be included in the re-submitted package. The Contractor shall not be entitled to any additional compensation or time extension due to any re-submittal requirement by the review process or MDOT.

The Contractor shall resubmit the Design Document (as well as any other required design re-submittal) as many times as necessary to address the comments of the quality process and MDOT.

The Contractor may continue its design activities, at its sole risk, during the re-submittal process. Such continuation in no way relieves the Contractor of the responsibility to incorporate the comments of the re-submittal process into the Design Documents.

Released-for-Construction Submittals

The Contractor shall submit the Released for Construction (RFC) Documents to designer Quality Assurance staff for review and approval prior to submittal to MDOT. RFC Documents are intended to allow construction to begin on segments or elements of the Project as the design progresses and before final design is complete.

When the Contractor has completed the RFC Documents and wishes to submit a RFC Document of an item or element to obtain MDOT's Acceptance, the designer's Quality Assurance staff shall certify in a letter or from that:

- The design meets all applicable requirements of the Contract Documents, applicable law, and the governmental approvals.
- The design has been checked in accordance with the Contractor's approved DQM.
- The item or element is ready for construction.
- All required ROW has been secured, along with any and all approvals from governmental agencies, and Utility owners.
- All comments from MDOT and other reviewing agencies from previous submittals are resolved.

After certifying the above items, the Contractor may submit the RFC Document for said item or element.

The Contractor shall incorporate comments from the In-Progress Submittal reviews, and/or submittal reviews into its design and resolve all concerns and questions to the satisfaction of MDOT. The Contractor shall then submit to MDOT the RFC Package.

If MDOT determines that the RFC Package does not meet the requirements of the Contract Documents, applicable law, and the governmental approvals, MDOT will notify the Contractor in writing of any specific deficiencies in the RFC Package. The Contractor shall resolve and document resolution of comments.

The Contractor may proceed with construction of certain elements or portions of the Project in accordance with Released-for-Construction plans before the design of the entire Project has been completed at the Contractor's sole risk.

Design Changes

Either the Contractor or MDOT may initiate design changes for items or elements undergoing construction or after Final Design.

All design changes shall undergo the same design quality procedures specified in the DQM for the original design, and must be documented and approved by the engineer who signed the original design document. If this engineer is no longer available, then after notifying the original engineer and gaining MDOT's Acceptance, a Michigan-licensed Professional Engineer of equal or greater experience than the original engineer shall document and approve each design change.

For each design change, Design Quality Assurance shall certify in writing that the design change has been:

- Designed in accordance with the requirements of the Contract Documents, applicable law, and the governmental approvals
- Checked in accordance with the Contractor's Approved DQM
- Prepared consistently with other elements of the original design

The Contractor shall also document all changes made through the design change process in the As-Built Documents.

2.4.5.7 Document and Data Control

General

The Contractor shall establish and maintain its own document control system (DCS) to store and record all correspondence, design inputs, drawings, progress reports, technical reports, specifications, Contract Documents, submittals, calculations, test results, inspection reports, nonconformance reports, administrative documents, and other documents generated under the Contract.

Document Submittals to MDOT

Each sheet for a design submittal or shop drawing submittal shall have a unique identifier and will be referred to as a sheet number or drawing number, respectively. The Contractor shall submit an electronic spreadsheet table of contents for each submittal that contains multiple pages. The table of contents shall contain the following information:

- Discipline
- Drawing number
- Drawing title
- Sheet number (sequential number of submittal)
- Sheet title (e.g., Traffic Control)

Document and Data Changes

The Contractor shall ensure that all changes to documents provided to MDOT are in a format that can enable changes to be readily apparent and traceable (e.g., documents using the redline/strikeout method or plan revision bubbles).

Review and Disposition of Nonconforming Product

The Contractor shall ensure that non-conformances identified during the design verification and checking activities are recorded and corrected. Methods or procedures must be put in place by the Contractor to prevent the incorporation of non-conforming work into the final design product.

The Contractor is responsible for the resolution of all non-conformances, including those of Subcontractors or Suppliers.

2.4.5.8 Corrective and Preventative Action

General

The Contractor shall review the cause of major and systemic non-conformances and develop corrective action to prevent recurrence. The Contractor’s proposed corrective action shall be documented in a format and medium acceptable to MDOT.

The Contractor shall advise MDOT when the corrective action has been implemented so MDOT may verify the implementation, should MDOT so choose.

2.4.5.9 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Design Quality Manual	Approval	3	1	Within 15 Days of NTP. If the draft DQM is not Approved, MDOT’s comments shall be addressed and a new draft DQM submitted by the Contractor within five Days after MDOT has returned the comments. Following Approval, the Contractor shall provide MDOT one electronic copy of the DQM.	2.4
Log of Field Changes	Acceptance	3	1	Weekly	2.4
Released for Construction Documents	Acceptance	0	1	Before construction	2.4.5.3
Shop and working drawings	Acceptance	0	1	Before construction	2.4.5.5
Product Data	Acceptance	0	1	Within 20 Days of installation of the items to which the information relates, and in any event prior to Final Acceptance.	2.4.5.6
As-Built Documents	Acceptance	1	1 (PDF and Microstation V8 format)	After construction and before Final Acceptance	2.4.5.7

2.5 Human Resource Management

2.5.1 General

The Contractor shall conduct all Work necessary to meet the requirements of human resource management, including personnel, facilities, and equipment.

2.5.2 Administrative Requirements

2.5.2.1 General

All personnel performing Work on the Project shall have the experience, skill, and knowledge to perform the Work assigned to them. All personnel performing Work on the Project shall also have appropriate required professional licenses and certifications.

Key Personnel for the Project shall include the following:

- Contractor’s Project Manager
- Project Superintendent
- Construction Quality Control Manager
- Design Manager
- Design Quality Manager
- Design Lead Structures Engineer
- Design Lead Road Engineer

At least one of the Contractor’s key personnel shall be on-site at least 50 percent of the time during construction unless otherwise Approved by the MDOT Project Manager.

2.5.2.2 Minimum Requirements of Key Personnel

Key Personnel shall meet the requirements of the MDOT prequalification specific to their role on the Project.

2.5.2.2.1 Approval of Key Personnel

MDOT will have the right to Approve or reject the Contractor’s Key Personnel prior to their participation on the Project. Such Approval will be based on the qualification requirements set forth above and elsewhere in the Contract Documents for all Key Personnel.

2.5.2.2.2 Directory of Key Personnel

The Contractor shall submit an electronic copy of the directory of Approved Key Personnel that includes the following information for each individual: name, Project title, Project office address, Project office location, e-mail address, telephone numbers (office, mobile, pager), and fax number. The directory shall be kept current throughout the course of the Project. The Contractor shall identify a person and phone number that will be available at all times while Work is being performed.

2.5.3 Field Trailer

The Contractor shall supply a field trailer meeting the requirements of Section 809.03, 809.03.A, and 809.03.B.1 - Field Office-Class 1 except as noted below. The Contractor shall supply the field office for a minimum duration starting April 20, 2012 and ending when MDOT provides the Contractor a notice of Substantial Completion. The Contractor shall coordinate location of the trailer with MDOT. The field trailer shall also be equipped with a high-speed Internet connection via cable modem or DSL that emits a wireless signal that can be accessed by MDOT personnel inside the office and in the immediate vicinity of the office. The Contractor is responsible for providing the internet connection equipment and all Utilities to the trailer for the duration of time the field trailer is in use. All costs associated with the Utilities will be borne by the Contractor. An outdoor sanitary facility shall be substituted for the sanitary connection requirement in the

Standard Specifications. Standard Specification requirements for water facilities shall be waived except Contractor shall furnish a water cooler or other facility to provide drinking water.

2.5.4 Internet Access

This Project utilizes a Web site for transfer of information. Therefore, communication ability is critical. The Contractor shall provide four air cards for MDOT personnel to use for Internet access. The Contractor shall supply the air cards for a minimum duration starting April 20, 2012 and ending when MDOT provides the Contractor a notice of Substantial Completion.

2.5.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Directory of Key Personnel	Approval	0	1	Within 15 Days of Award but not less than five Days prior to the start of construction activities	2.5.2.2

EXHIBIT 2-2-A

MDOT Project Web Site User Log-In Request Form

3 PUBLIC INFORMATION

3.1 General

The Contractor shall conduct all Work necessary to meet the requirements of public information. This includes supporting MDOT and developing, implementing, and maintaining a Public Information Plan (PIP) that meets the requirements set forth in MDOT's *Work Zone Safety and Mobility Policy* and complies with specific maintenance of traffic (MOT) requirements for public information found elsewhere in the Contract Documents.

3.2 Administrative Requirements

3.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to public information, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT *Standard Specifications for Construction*
- MDOT *Work Zone Safety and Mobility Manual*
- MDOT *Work Zone Safety and Mobility Policy*
- MDOT *Traffic Standards, Typicals, Guides and Guidelines*
- MDOT Special Details
- MDOT Standard Plans
- *Michigan Manual on Uniform Traffic Control Devices (MMUTCD)*
- MDOT *Road Design Manual*
- MDOT *Context Sensitive Solutions Awareness Training Manual*
- MDOT *Commission Policy on Context Sensitive Solutions (May 2005)*
- FHWA *Public Involvement Techniques for Transportation Decision-Making*
- MDOT *Guidelines for Stakeholder Engagement*
- Remaining standards set forth in Book 3

3.2.2 General

The Contractor shall make MDOT Project staff aware of maintenance of traffic changes in the Project. The Contractor shall prepare Project information and forward items as required by the MDOT Project staff for their media/public dissemination. For this purpose, MDOT Project staff includes MDOT's Project Manager, resident engineer, assistant resident engineer, technicians, inspectors, and/or consultants acting in any of those capacities.

The Contractor shall give MDOT Project staff five Working Days advance notice for any action that requires advance communications for notifying the motoring public, Project stakeholders, City of Detroit, Detroit International Bridge Company (DIBC), area residents, and local businesses directly impacted by the Project. The MDOT Office of Communications will bear the responsibility of notifying the media. MDOT Project staff or its representatives will bear responsibility of notifying stakeholders and businesses impacted by the Work, although the Contractor will be required to hold and/or actively participate in informational meetings with stakeholders and businesses impacted by the work as outlined within this Section 3.

3.2.3 Public Information Plan

The Contractor shall develop, implement, and maintain a Public Information Plan (PIP) that is referenced in the TMP described in Book 2, Section 18 (Maintenance of Traffic), but separate from the TMP. The Contractor shall include the following items in the PIP:

- The Contractor shall attend a minimum of two public information meetings, with a minimum of three Contractor representatives in attendance. These meetings will be scheduled by MDOT, at MDOT's sole discretion and be held on the second floor of the Detroit Mexicantown International Welcome Center. The Contractor is required to provide graphic and digital exhibits that convey the project staging and work schedule in conjunction with the MDOT Project staff. At a minimum, the Contractor shall provide five 3-foot x 4-foot, color, foam-backed information boards to be displayed at the meetings. Information contained on the boards shall be agreed to with MDOT in advance of the meeting.
- The Contractor shall provide information regarding upcoming traffic changes and project progress to MDOT, for distribution via the lane closure Web site, Project Web site, Facebook, Twitter, YouTube, and email to project stakeholders including local businesses and emergency responders.
- The Contractor shall provide MDOT with Project staging and work schedule data for inclusion in an MDOT-produced brochure for the Project Web site, Facebook, Twitter, YouTube, and emails.

The PIP shall be submitted to MDOT for Approval within 14 Days of NTP. The Contractor shall submit one electronic copy in PDF format of the final Public Information Plan.

3.2.4 Project Stakeholders

MDOT has identified a number of Project stakeholders that must be communicated with during the Project. The Contractor shall describe in its PIP its approach to supporting MDOT Project staff or their representatives in communicating with these stakeholders and coordinating with MDOT. The identified groups include:

- Area residents
- Property owners
- Commuters
- The traveling public
- Commercial vehicle operators
- Local and regional government officials
- State legislators
- MDOT employees
- Mass transit agencies/companies
- Business owners, employees, and customers
- Neighborhood and business associations
- News media
- Emergency response agencies, including police, fire, and ambulance agencies
- Utilities
- Local community organizations
- Delivery and courier services
- Water management organizations, environmental permitting agencies, and other local service districts

3.2.5 Commercial Vehicle Access and Restriction Information

The Contractor shall notify the MDOT Project Manager of any activity taking place in the work zone that may restrict or impede the movement of commercial vehicles due to reduced lane widths, reduced height clearances, or lower weight limits, including frost law limits, at least five Working Days prior to activity. This information shall be provided to the MDOT Project Staff.

3.2.6 Emergency Services and Return to Canada Access

Emergency services and return to Canada access requirements are described in Book 2, Section 18 (Maintenance of Traffic).

3.2.7 Non-motorized and Handicapped Mobility and Access

The Contractor shall clearly define and communicate to MDOT Project staff alternate routes, detours, and any other necessary accommodations for non-motorized access, including access for pedestrians, DIBC and AMMEX employees, and handicapped persons.

3.2.8 Special Events

The Contractor shall abide by special events and requirements described in Section 18 (Maintenance of Traffic). The Contractor shall inform the Project staff of any and all mitigation efforts to minimize conflicts for public events.

3.2.9 Media Relations

In the event of a news organization appearing on the Project Site, the Contractor shall not provide any opportunities for media interviews, unless otherwise directed and with prior Approval of MDOT. If a media outlet arrives on-Site without prior knowledge of the Project staff, region staff, or Office of Communications staff, the Contractor shall not discuss or provide any Project information with any media outlet. MDOT Project Manager contact information shall be provided to the media.

3.2.10 Public Information Dissemination Pieces

The Contractor shall submit specific public information dissemination pieces (i.e., faxes, e-mails, collateral materials, access maps, meeting boards) to MDOT on a schedule agreed to by the Contractor and MDOT, unless noted otherwise. MDOT will be responsible for reproduction and dissemination of these materials.

MDOT will supply the public meeting brochures or flyers, and reproduce and disseminate these to Project stakeholders prior to public meetings.

MDOT will provide reproduction services, as required, for dissemination pieces that print 8.5 inches by 11 inches or 11 inches by 17 inches. All other hardcopy reproduction will be the responsibility of the Contractor.

3.3 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Public Information Dissemination Pieces - Boards	Approval	1 – for the meeting	1 – PDF for review	Minimum of 10 Working Days prior to a public meeting	3.2.10
Public Information Dissemination Pieces – Other	Approval	0	1 – PDF	As required to obtain Approval prior to dissemination of	3.2.10

Deliverable	For Acceptance	Number of Copies		Submittal Schedule	Reference Section
				information by MDOT	

4 ENVIRONMENTAL COMPLIANCE

4.1 General

The Contractor shall conduct all Work necessary to meet the requirements for environmental compliance, including such areas as floodplains, contaminated properties, regulated materials, groundwater, noise, air quality, water quality and quantity, waterbodies, and wetlands. In order to maintain NEPA Environmental Classification, all conditions noted in this Section shall be adhered to during design and construction. If these conditions cannot be met at any point or Work is proposed outside of the limits described in the documents in Exhibit 2-4-B (MDEQ National Pollutant Discharge Elimination System Notice of Coverage Permit), the Contractor shall contact MDOT for additional environmental review and Approval. MDOT environmental re-evaluation and Approval can take up to 30 Days and must be completed prior to final design activities and construction. However, if additional agency coordination and approvals are required, the MDOT review timeline will be extended according to agency requirements. Additional mitigation items may be required.

4.2 Administrative Requirements

4.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 and the Project-specific requirements set forth in the exhibits relating to environmental compliance, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Special Provision for Dewatering System for Petroleum Contaminated Groundwater
- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT *Drainage Manual*
- MDOT *Phase II Storm Water Management Plan Permit No. MI0057364*
- MDOT *Bridge Design Manual*
- MDOT *Road Design Manual*
- MDOT *Standard Specifications for Construction*
- MDOT *Uniform Field Soil Classification System (Modified Unified Description)*
- MDOT *Geotechnical Investigation and Analysis Requirements for Structures*
- MDOT *HMA Production Manual*
- MDOT *Materials Source Guide*
- MDOT Special Details
- MDOT Standard Plans
- MDOT *Soil Erosion and Sedimentation Control Manual*
- MDOT *Construction Site Soil Erosion & Pollution Prevention Pocket Guide*
- Remaining standards set forth in Book 3

4.2.2 Mitigation Measures

The Contractor shall comply with all environmental avoidance, minimization, and mitigation measures, additional MDOT review requirements, and all modification follow-up as indicated in the following sections.

4.2.3 Permits

MDOT has obtained environmental clearance from the FHWA indicated in Exhibit 2-4-A (FHWA Environmental Document). MDEQ permits obtained by MDOT to date for the Project are included in Exhibit 2-4-B. If the Contractor determines that unavoidable impacts beyond those contained in the MDEQ permit are required, or if the Contractor determines that changes must be made to conditions or design requirements anticipated and contained in the MDEQ permit, the Contractor shall provide all permit application revision materials as required by each permitting agency. The information shall then be provided to MDOT, which will review the information, complete the associated revision cover letter, and submit the package(s). Modifications to the packages requested by MDOT or the regulating agencies will be the responsibility of the Contractor. All modifications shall be submitted to MDOT to resubmit to the regulatory agency. All federal and State application fees will be the responsibility of MDOT.

The following table identifies known environmental and water resource permits and agreements required for the Project.

Table of Environmental and Water Resource Permits

GOVERNMENT AGENCY	REGULATION/PERMIT
STATE Michigan Department of Environmental Quality (MDEQ)	State of Michigan Public Act 451, Parts 31, 91

Certified Erosion and Sediment Control and Stormwater Pollution Prevention Individual(s)

The Contractor shall assign an individual(s) who is responsible for the design, inspection, and maintenance of the soil erosion and sedimentation control measures. The individual(s) must hold a current Act 451, Part 91 Soil Erosion and Sedimentation Control certificate and a current Part 31, Stormwater (NPDES) Operator’s Certificate and have experience in each of the following:

- Permit requirements and application processes, design standards, specifications, and special provisions for stormwater facilities
- Selection, design, and implementation of best management practices
- Design of temporary and permanent erosion and sediment control
- Establishment of temporary and permanent vegetative cover
- Soil erodibility, channel stabilization techniques, and soil bioengineering methods

MDOT shall perform the required erosion control inspection. The Contractor’s Erosion Control Individual shall accompany the MDOT erosion control inspector. The MDOT erosion control inspector shall complete the erosion control reports on a weekly basis or within 24 hours of a rain event and will provide a copy upon completion of the report to the Contractor’s Erosion Control Individual. The Contractor shall take the required action outlined in the report within the timeframes required by state regulations. The Contractor’s Erosion Control Individual shall report directly to the MDOT erosion control inspector.

4.2.4 Water Quality

Water quality shall be maintained as described in Book 2, Section 12, the standards in Book 3 and per local and state regulations.

4.2.5 Waters and Wetlands

The Contractor shall be responsible for avoiding and/or minimizing all impacts, including those due to staging of equipment or materials, to floodplains, lakes, streams, and drains.

The Contractor shall comply with applicable State and local permitting and regulatory requirements for any dewatering activities associated with Project construction.

The Contractor shall maintain all permanent and temporary soil erosion and sedimentation controls as indicated in the Notice of Coverage (NOC). When the maintenance of these facilities does not satisfy the regulatory agencies, the Contractor shall implement a corrective or restorative action within 24 hours or prior to the next significant storm event, whichever occurs first.

The Contractor shall incorporate the MDOT *Phase II Storm Water Management Plan Permit No. MI0057364* into the Project design to ensure that the Project remains in compliance with the MDEQ Statewide General Permit MI0057364 for MDOT (MDOT-Statewide MS4).

4.2.6 Contaminated Properties

All Work in this Section 4.2.6, unless noted otherwise, shall be included in the Contractor's lump-sum Contract Price for the Project.

Environmental testing was completed at 15 boring locations. The environmental testing results are provided in Exhibit 2-4-C. The boring locations are defined in Book 2, Section 8.

4.2.6.1 Soil and Groundwater - General

The Contractor is responsible for all contamination determination, handling and disposal. MDEQ has documentation regarding existing underground storage tanks. No contaminated properties have been specifically identified on the Project within anticipated areas of construction site earth disturbances.

Treatment and/or disposal of Contaminated Materials resulting from permanent and temporary Work shall be the Contractor's responsibility.

4.2.6.2 Contaminated Soil Contingency Plan

In the event on-site observations indicate previously unidentified/non-permitted Contaminated Materials (such as solid waste, including demolition debris, containers or free product) or contaminated soil (based on organic vapor detector readings above background, visual staining or olfactory evidence) have been encountered in the Project area, the Contractor shall IMMEDIATELY NOTIFY MDOT. MDOT will be responsible for notifying the necessary regulatory agencies and other necessary parties. The Contractor shall be prepared to stop work at the contaminated area after discovering the Contaminated Materials. The Contractor is responsible for screening excavated soil for contamination and collecting and analyzing the soil or waste samples for contaminant levels, if necessary.

No excavation of Contaminated Materials or soil shall take place without the Approval of MDOT, nor shall any Contaminated Materials or soil be excavated unless MDOT is present. MDOT will determine which materials or soils are to be considered contaminated. The Contractor shall minimize the excavation of Contaminated Materials to the greatest extent possible and shall take measures to ensure Contaminated Materials are not mixed with non-contaminated materials. Costs related to the hauling, stockpiling, treatment, and/or disposal of Contaminated Materials for any excavation shall be per Section 4.2.6.5.

The Contractor shall stockpile all Contaminated Materials or soil encountered within excavation limits as described in Section 4.2.6.3 (Temporary Stockpile of Contaminated Material).

All contaminated media, including soil and groundwater, must be handled and disposed of appropriately in accordance with State and Federal regulations.

All non-contaminated materials are the property and responsibility of the Contractor.

MDOT may determine that some or all of the contaminated soil and Contaminated Materials must be disposed at a Michigan-permitted municipal solid waste (MSW) landfill facility or industrial landfill facility. The Contractor shall select the Michigan-permitted MSW landfill facility or industrial landfill facility for disposal of the contaminated soils.

If the Contaminated Materials or soil cannot be disposed of at a Michigan-permitted landfill facility because of excess contaminant level, or because it is classified as a hazardous waste, the Contractor shall be prepared to dispose of the material using a licensed Hazardous Waste Hauler.

The Contractor shall provide all required information to the landfill (typically waste profile information and soil analytical data) to obtain landfill acceptance of the contaminated soil for disposal or for use as daily cover as dictated by landfill acceptance criteria. The Contractor shall determine if MDOT's existing soil analytical data is sufficient for the landfill to accept the contaminated soil. The Contractor shall immediately inform MDOT if additional soil analytical data is required by the landfill. The Contractor is responsible for collecting and analyzing all additional samples required by the landfill.

The Contractor shall provide the landfill-required waste profile form(s) to MDOT for review and signature.

Contaminated material shall not be hauled to the landfill facility until MDOT has written approval from the landfill accepting the Contaminated Materials for disposal at the landfill facility.

The Contractor shall provide copies of shipping papers/manifests and landfill scale tickets to MDOT daily while material is being hauled to the landfill.

4.2.6.3 Temporary Stockpile of Contaminated Soil

All temporary stockpiling of contaminated soils shall be done according to MDOT Frequently Used Special Provision – Non -Hazardous Contaminated Material Handling And Disposal, 03SP205 (A).

4.2.6.4 Dewatering Contaminated Groundwater

Although MDOT does not anticipate contaminated dewatering, if this activity occurs the following procedure applies:

MDOT will obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Water Quality Permit for the discharge of contaminated groundwater. The Contractor shall be responsible for obtaining all other necessary permits and approvals for dewatering.

All contaminated dewatering activities shall be done according to the MDOT Special Provision for Dewatering System for Petroleum Contaminated Groundwater.

4.2.6.5 Remediation Work

Contaminated Materials have not been found on the Site. If encountered, the Contractor shall perform the Remediation Work in accordance with the MDOT Frequently Used Special Provision – Non -Hazardous Contaminated Material Handling And Disposal, 03SP205 (A). The Contractor shall notify MDOT a minimum of one Working Day prior to commencing backfill operations. A quantity of 500 cubic yards of non-hazardous contaminated material handling and disposal shall be included in the lump-sum Contract Price. Costs associated with this Remediation Work beyond 500 cubic yards shall be paid in accordance with Book 1, Section 11. Hazardous waste removal and disposal shall be compensated as Remediation Work per Book 1, Section 13.

4.2.7 Noise

The Contractor shall comply with all local noise ordinances, unless a variance is obtained from the local agency by the Contractor.

4.2.8 Air Quality

4.2.8.1 Construction

The Contractor shall mitigate construction/grading activities that disrupt ground cover by controlling fugitive dust emissions and other airborne particulates in accordance with Standard Specifications 107.15A and 107.19 and other applicable MDOT standards, including measures such as applying water to exposed soils, limiting emissions due to concrete sawing, and limiting the extent and duration of exposed soil conditions. EPA recommends the best available diesel retrofit control technology to mitigate particulate matter such as diesel oxidation catalysis or diesel particulate filters. The use of ultra-low sulfur diesel should be considered to reduce the effect of diesel emissions. The Contractor shall minimize duration of idling trucks within the Project.

4.2.8.2 Traffic

The Contractor shall, at all times, be responsible for responding to the concerns and policies of MDOT (in accordance with the Highway Project Development Process, Part II, Air Quality section), MDEQ, EPA, FHWA, local governments, and roadside neighbors as they relate to air quality impacts.

In the event that the scope or design of the Project is altered during the course of the Project, the Contractor shall evaluate the necessity for further air quality analysis and perform all necessary analyses.

4.2.9 Recreational Properties

Not applicable.

4.2.10 Endangered Specics

Not applicable.

4.2.11 Migratory Birds

If swallows or other migratory birds are present, the provisions of the Migratory Bird Treaty Act regarding nest removal shall be followed and the MDOT Frequently Used Special Provisions - Migratory Bird Protection shall be included in the Released for Construction Documents and complied with by the Contractor.

4.2.12 Detours

Not Applicable.

4.2.13 Erosion and Sedimentation Control

The Contractor shall use both temporary and permanent erosion and sedimentation control measures. Temporary measures shall be used during construction and permanent measures shall be used for the long-term stabilization of disturbed areas. The Contractor is responsible for the design, installation, and maintenance of all soil erosion and sedimentation control measures. Erosion and sedimentation control measures not properly installed or maintained by the Contractor shall be subject to negative monetary adjustments per MDOT Frequently Used Special Provisions – Non-Compliance With Soil Erosion And Sedimentation Control Requirements, 03SP208(A).

4.2.13.1 Temporary Erosion and Sedimentation Control During Construction

The Contractor shall develop an Erosion and Sedimentation Control Plan with design details for each stage of construction. The Contactor shall control erosion and prevent sediment related to the Project from entering

waters of the State of Michigan as well as prevent sediment from leaving MDOT ROW and contaminating wetlands, regulated stream and/or county drain crossings, and ponds. The Contractor shall use best management practices as described in the MDOT *Soil Erosion and Sedimentation Control Manual* for temporary erosion and sedimentation control. Other devices shall include silt fence, stone check dams, sediment traps, sediment basins, sandbag barriers, temporary drains for fill slopes, or temporary flumes to safely carry water down a slope and other items, such as ditch checks, earth diversions, and other diversions.

The Contractor shall install silt fence along the perimeter of the Project between the construction site earth disturbances and the existing MDOT and City of Detroit ROW within the Project limits, including areas requiring temporary widening and construction related to maintaining traffic during construction.

The Contractor shall install inlet protection fabric drops at all existing and proposed catch basins adjacent to construction site earth disturbances.

The Contractor shall use filter bags and gravel filter berms to keep sediment from entering adjacent county drains, regulated streams, or other watercourses in construction areas requiring dewatering. Sediment traps with stone check dams shall be installed in all ditches at their confluence with the upstream regulated stream and/or county drain.

The Contractor shall install gravel access approaches onto all public roadways the Contractor and its Subcontractor(s) plan to access from areas under construction. The Contractor shall remove material tracked onto the roadways and sweep the roadways free of sediment daily.

Maintenance of all temporary erosion and sedimentation control measures shall be the responsibility of the Contractor. Maintenance shall include removal, repair, cleaning, and replacement of all erosion control measures and all other work necessary to keep the erosion control devices function properly. Removal of silt fence and maintenance of sediment removal at all temporary erosion and sedimentation control measures shall be the responsibility of the Contractor.

4.2.13.2 Permanent Erosion and Sedimentation Control

Permanent erosion control measures are primarily designed to function with established vegetation after projects are complete. The Contractor shall use best management practices for permanent erosion control.

4.2.13.3 Public Act 451, Parts 91 and 31 and Notice of Coverage

The Michigan Department of Environmental Quality has designated the Michigan Department of Transportation as an Authorized Public Agency (APA) under Part 91, Soil Erosion and Sedimentation Control, of Public Act 451 of 1994, Natural Resources and Environmental Protection Act. The Contractor shall have a documented program and adequate procedures to comply with applicable soil erosion and sedimentation control regulations. To ensure continued APA status, earth change activities on MDOT ROW and DIBC property, regardless of size or location, shall be conducted in accordance with Part 91, the rules promulgated thereunder, the MDOT *Soil Erosion and Sedimentation Control Manual*, and all related MDOT manuals and guides.

This Project involves earth disturbance of greater than 5 acres, so a Notice of Coverage form has been submitted by MDOT to the Michigan Department of Environmental Quality and a permit issued as indicated in Exhibit 2-4-B. The Contractor is responsible for providing an Erosion Control Individual as defined in Section 4.2.3.

Unless otherwise directed by MDOT, the Contractor shall provide MDOT with a set of erosion control plans showing all soil erosion and sedimentation control measures with each RFC submittal.

A pre-construction meeting must be held prior to construction. The following individuals shall be included: MDOT Project Manager, MDOT Metro Region Soils Engineer, MDOT Representative from C&T (Tom

Killingsworth), Contractor’s Project Manager, Contractor’s Project Superintendent, and Contractor’s staff responsible for erosion control inspection.

4.3 MDOT Environmental Notification and Contact List

The Contractor shall use the Environmental Notification Contact List below that includes MDOT contact persons and reporting and notification requirements for unforeseen potential environmental impacts, encountered during the course of the Project.

In addition to the MDOT Project Manager and TSC Delivery Engineer, the list below specifies, at a minimum, the appropriate MDOT contact person(s) the Contractor must notify for reporting and notification of the following events:

- Contractor-caused hazardous material spill: Mike Anglebrandt, Jim Woodruff
- Discharge to groundwater: Tom Killingsworth
- Discovery of:
 - Prehistoric or historic artifacts: Lori Noblet, Jim Robertson
 - Human bones or remains: Lori Noblet, Jim Robertson
 - Hazardous materials such as petroleum-contaminated soils, asbestos-containing materials, solid wastes, and other regulated materials: Mike Anglebrandt, Jim Woodruff
 - NPDES inspections by MDEQ: Tom Killingsworth
 - Illicit discharges of water and/or sediment leaving site: Sharon Ferman
- Proposed or the Occurrence of Project activities:
 - In streams or wetlands not covered under an issued permit: Lori Noblet
 - Outside existing ROW: Lori Noblet
- Violation of permits and regulations such as:
 - Clean Water Act Section 401—Water Quality Certification
 - Clean Water Act Section 402—National Pollutant Discharge Elimination System
 - Clean Water Act Section 404—Permits for Dredged or Fill Material
 - Rivers and Harbors Act of 1899—Section 9 and Section 10
 - State of Michigan Public Act 451, Parts 31,91, 111, 301, 303, 315, 323, 325, 353, 365
 - Michigan Rules and Statutes
 - Contact David Dortman, Lori Noblet for all
- Detour upgrades proposed: Lori Noblet
- Violation of Migratory bird special provision: Lori Noblet

Both the MDOT Project Manager (Tia Klein) and environmental coordinator (Lori Noblet) are the appropriate first point of contact for other environmental issues.

4.4 Deliverables

The Contractor must have issued permits or regulatory agency approval prior to construction involving any regulated activity. MDOT will submit permit applications to the regulatory agencies.

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Permit application revision supporting data as required by permitting agencies or to represent the final proposed construction (if required)	Approval	1	1	Earliest possible date to ensure permit in place prior to construction	4.2.3, 4.2.5
Erosion and Sedimentation Control Plan	Approval	1	1	To be submitted with all RFC Documents	4.2.13
Temporary Erosion and Sediment Control Plan	Acceptance	0	1	Per Section 2.4	4.2.13.1
Permanent Erosion and Sedimentation Control Inspection Logs	Approval	1	1	Weekly or within 14 hours of storm event	4.2.13.2

EXHIBIT 2-4-A

FHWA Environmental Document (FONSI)

AMBASSADOR BRIDGE/GATEWAY PROJECT

FONSI

OCTOBER 1997

**PROPERTY OF
MDOT-METRO REGION
PLANNING DEPARTMENT**



U.S. Department
of Transportation

Federal Highway
Administration

Region 5
Michigan Division

315 West Allegan Street, Room 207
Lansing, Michigan 48933

October 23, 1997

Mr. Louis H. Lambert
Deputy Director
Bureau of Transportation Planning
Michigan Department of Transportation
Lansing, Michigan

Dear Mr. Lambert:

Ambassador Bridge/Gateway Project, Detroit: 822194-37795

We have reviewed the information submitted with your October 9, 1997 letter requesting a Finding Of No Significant Impact (FONSI) on the above project. We concur that the environmental and public involvement process has been properly done and has resulted in the proposed conceptual geometric design for this project. Our FONSI is attached approving the conceptual design of the project. Also, MDOT's previously requested (June 6, 1997) Interchange Modification request is also approved. MDOT may proceed with further project development.

Federal participation, at this time, is only available for portions of the design up to the points on the ramps where traffic can still depart without going onto the bridge. Further effort is needed to allow additional funding in accordance with 23 U.S.C. 129a. FHWA has been working with your staff to resolve this issue.

We wish to commend MDOT staff (particularly Project Manager Andy Zeigler) and the consultant, Corradino Group, for a job well done to advance this difficult project to this point.

Sincerely yours,

James A. Kirschensteiner
Environmental & Field Operations Engineer

For: James J. Steele
Division Administrator

Attachment

**Federal Highway Administration
Finding of No Significant Impact
for
The Ambassador Bridge / Gateway Project
Wayne County, Michigan**

The FHWA has determined that this project will not have any significant impacts on the human or natural environment. This finding of no significant impact is based on the attached Environmental Assessment (EA) / Programmatic Section 4(f) Evaluation which has been independently evaluated by the FHWA and determined to be adequate. It accurately discusses the environmental issues and impacts of the proposed project. It provides sufficient evidence and analysis for determining that an Environmental Impact Statement is not required. The FHWA takes full responsibility for the accuracy, scope, and content of the attached EA.

The proposed project will require the purchase of additional rights-of-way which will be acquired in compliance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

The proposed project is adjacent to properties eligible for the *National Register of Historic Places*. The preferred alternative avoids any adverse impacts to these properties. The State Historic Preservation Officer and the Advisory Council on Historic Preservation have concurred that there will be "no adverse effect" on these properties.

This proposed project does not adversely impact minority or low-income populations and is consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

A public hearing was conducted on February 6, 1997. During public review of the Environmental Assessment for the Ambassador Bridge / Gateway Project, local merchants on the west side of I-75 indicated concern with the proposed access from I-96 eastbound into West Mexicantown. The specific concern was that Porter Street at the service drive would be closed. This would require additional travel by motorists having the restaurant district on the west side of Mexicantown as a destination. This additional travel distance is approximately 250 meters (800 feet) to reach the same destinations.

A subsequent review was undertaken as a result of this public concern to determine whether Porter Street could remain open at the service drive on the west side of the freeways. Review of the issue indicated clearly that safety considerations would preclude allowing Porter Street to remain open. In light of this condition, and the relatively short distance added to the restaurant district trip, it was determined that Porter Street would be closed at the service drive as indicated in the preferred alternative presented in the EA.

Merchants and residents on the east side of I-75 also expressed concerns about local access. Specifically, the concerns involved the proposed closing of Bagley Avenue at the service drive, the indirect access from I-75 northbound to East Mexicantown, and the operation of 21st Street serving the proposed Travel Information Center / Retail Complex.

A review of these concerns resulted in the relocation of Bagley Avenue further north than its current intersection with the I-75 service drive. This will require the purchase of an additional parcel of land on the east side of I-75. However, this additional acquisition provides the opportunity to finalize the touch-down point of the proposed pedestrian crossing over I-75/I-96.

To address the I-75/East Mexicantown access issue, two items have been added to the preferred alternative. First, additional signing will be provided, including the use of "trailblazers," so that traffic will be directed from the Clark Street interchange and from Lafayette Street at the I-75 service drive, to Fort Street, then to Ste. Anne Street and 18th Street, and then into the east side of Mexicantown. "Gateway" entrances will be provided on the north side of Fort Street to "announce" the east side of Mexicantown at Ste. Anne Street and 18th Street. Likewise, streetscape improvements through ISTEA/NEXTEA "enhancement" project funding will be pursued for enhancement of the Ste. Anne Street and 18th Street "gateway" entrances north of Fort Street.

As the project progresses into the design phase, it is anticipated that refinements of the proposed project will occur. It is anticipated that these refinements in design will not constitute significant impacts to the environment.

10-23-97

Date


For FHWA

EXHIBIT 2-4-B

(MDEQ Parts 31, 91) MDEQ National Pollutant
Discharge Elimination System (NPDES) Notice of Coverage Permit



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



DAN WYANT
DIRECTOR

March 27, 2012

Mr. Tom Killingsworth
Michigan Department of Transportation
(sent electronically)

82194-116071

SUBJECT: MIR112026 MDOT-Gateway
Authorization to discharge Storm Water from Construction Activities under the National Pollutant Discharge Elimination System (NPDES).

This is to acknowledge that the Department of Environmental Quality (Department) received your complete Notice of Coverage form and \$400 fee. On **March 27, 2012**, you became authorized, under NPDES, to discharge storm water from your construction activities at **Gateway**. The NPDES number for this site is **MIR112026**. Please refer to this number in all future correspondence with the Department concerning this permit.

The authorization to discharge storm water pursuant to the provisions of Michigan's Permit-by-Rule expires on **March 27, 2017** or when the project has been completed by the stabilization of earth change activities. A Notice of Termination (NOT) must be submitted to the Department once the construction site is completely stabilized. If the NOT is submitted prior to the complete stabilization of the site, a new administratively complete NOC, including the fee must be submitted to obtain storm water authorization. A copy of the NOT form can also be accessed at the website indicated below.

Please be advised that the authorization to discharge requires that the soil erosion and sedimentation controls be under the supervision of a state certified storm water operator. A copy of Michigan's Permit-by-Rule can be found on the Department Web site at www.michigan.gov/deq, click on **Water** (left hand side), then click on **Surface Water**, and then click on **Storm Water**. These requirements must be followed during the entire period of your storm water discharge authorization.

The issuance of this permit does not authorize the violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department permits, or approvals from other units of government as may be required by law.

If you have any questions about your authorization to discharge storm water, please contact Mark Fife at 517-241-8993.

Sincerely,

Christine Alexander, Chief
Lakes Erie & Huron Permits Unit
Permits Section
Water Resources Division



NOTICE OF COVERAGE

FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITY

By Authority of R 323.2190 promulgated under Part 31 of Act 451, Public Acts of 1994, as amended
Failure to comply with the terms and provisions of R 323.2190 may result in fines up to \$25,000
per day and the possibility of imprisonment.

FOR DEQ USE ONLY	
NPDES Number	
Receipt No.:	
Permit Id:	

Filing of this Notice of Coverage (NOC) with the Michigan Department of Environmental Quality (MDEQ) is required before initiation of construction activities **that disturb 5 acres or more of land or is part of a larger common plan of development or sale** that requires a national permit pursuant to the provisions of 40 CFR Section 122.26(a). This constitutes notice that the construction permittee is authorized under R 323.2190 to discharge storm water associated with the construction activities. The construction permittee must be the land owner or the recorded easement holder of the property where the construction activity is located.

INSTRUCTIONS AND FEE INFORMATION: Soil Erosion and Sedimentation Control (SESC) coverage is required under Part 91, SESC, of Act 451 before submitting this NOC. The construction permittee will be deemed to have an NPDES permit for storm water discharges from a construction site when the MDEQ receives the completed NOC, **a copy of the appropriate SESC permit, a copy of the approved SESC Plan, a site map and the \$400 fee.** These must be received before construction begins. **This authorization to discharge construction storm water will expire** on the same day as the SESC permit originally submitted to the MDEQ with this package. The expiration date will be specified in the NOC acknowledgement letter provided by the MDEQ (please make sure you receive the NOC acknowledgement letter). NOC Authorization to discharge storm water may be extended (up to five years after original issuance date) by submitting a NOC Renewal form and a copy of the revised or extended SESC permit to the MDEQ **prior** to the NOC expiration. If the SESC permit number changes, expires, is revoked or terminated, prior to the complete stabilization of the site, a **new** administratively complete NOC and all the requirements, including the fee must be submitted to obtain storm water authorization.

PERMIT BY RULE REQUIREMENTS: The permittee must abide by the requirements of R 323.2190 which states in part: (a) Not directly or indirectly discharge waste materials into the waters of the state in violation of Part 31, Water Resources Protection, of the Act or rules promulgated there under; (b) Be in compliance with a soil erosion and sedimentation control permit for the site; (c) Properly maintain and operate the soil erosion control measures; (d) Have the soil erosion control measures under the specific supervision and control of a storm water operator who has been certified by the Department; (e) Cause the construction activity to be inspected by a certified storm water operator once per week, and within 24 hours after every precipitation event that results in a discharge from the site. Refer to R 323.2190 for the complete listing of requirements at: http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-23997--,00.html.

CONSTRUCTION PERMITTEE INFORMATION (Landowner, Easement Holder, or Authorized Public Agency)					
LANDOWNER/PERMITTEE Michigan Department of Transportation			AGENT FOR LANDOWNER (OPTIONAL) MDOT - Construction Field Services Division		
CONTACT PERSON (FIRST AND LAST NAME) Tom Killingsworth			CONTACT PERSON (FIRST AND LAST NAME) Tom Killingsworth		
E-MAIL ADDRESS (OPTIONAL FOR FASTER SERVICE) killingswortht@michigan.gov			E-MAIL ADDRESS killingswortht@michigan.gov		
MAILING ADDRESS PO Box 30049			MAILING ADDRESS PO Box 30049		
STREET 8885 Ricks Road			STREET 8885 Ricks Road		
CITY Lansing	STATE MI	ZIP 48909	CITY Lansing	STATE MI	ZIP 48909
STORM WATER CERTIFIED OPERATOR (CONSTRUCTION ONLY)			For Cashier's Office Only: 37000-40512-9091-481001-01		
CERTIFIED OPERATOR Tom Killingsworth					
CERTIFICATION NUMBER C-10-0086					

Control Section: 82194 Job Number: 116071
Project Manager: Tina Klein

SITE DESCRIPTION				
TOTAL ACRES OF SITE 10.9	ACRES OF DISTURBANCE 5.4	RECEIVING WATERS Detroit River		
PROJECT INFORMATION				
PROJECT NAME Gateway (For Project Information See Attachment A)		COUNTY Wayne	TOWNSHIP City of Detroit	
STREET Fort Street/West Grand/I-75/Ambassador Bridge		¼	¼	SECTION
CITY Detroit	STATE MI	ZIP	TOWN (T)	RANGE (R)
PART 91 SESC PERMITTING ENTITY INFORMATION				
NAME OF PART 91 SESC PERMITTING ENTITY OR APA AGENCY Michigan Department of Transportation				
E-MAIL ADDRESS (OPTIONAL FOR FASTER SERVICE) killingswortht@michigan.gov			PHONE NUMBER 517-322-6450	
ADDRESS P.O. Box 30049, 8885 Ricks Road			SESC PERMIT NUMBER OR APA STATUS Approved Public Agency	
CITY Lansing	STATE MI	ZIP 48909	ISSUE DATE January 1, 1975	

CERTIFICATION - Michigan regulations require this form be signed as follows:

Corporation: a principal executive officer of at least the level of vice president, or his designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in this form originates.

Partnership: a general partner.

Sole Proprietorship: the proprietor.

Municipal, State, or other public facility: either a principal executive officer, the mayor, village president, city or village manager, or other duly authorized employee.

I certify that I have read R 323.2190 and that all provisions of R 323.2190 will be complied with and that all information contained in this NOC is, to the best of my knowledge and belief, true, accurate and complete. I acknowledge that any discharge that is authorized by this NOC shall be in compliance with Act 451, Part 31, and the rules promulgated thereunder. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment. I certify under penalty of law that I possess full authority on behalf of the legal landowner/permittee to sign and submit this NOC.

SIGNATURE (ORIGINAL SIGNATURE REQUIRED) X <i>Tom Killingsworth</i>	DATE 3-23-12	TELEPHONE 517-322-6450
PRINTED NAME Tom Killingsworth	TITLE NPDES Coordinator	

MAKE CHECK OR MONEY ORDER IN THE AMOUNT OF \$400 PAYABLE TO: STATE OF MICHIGAN

MAIL COMPLETED APPLICATION, LOCATION MAP, SESC PERMIT AND PLAN, ALONG WITH THE \$400 FEE TO:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
CASHIERS OFFICE - WB-SW1
P O BOX 30657
LANSING, MI 48909-8157

ADDRESS FOR OVERNIGHT MAILING:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
CASHIERS OFFICE - WB-SW1
525 WEST ALLEGAN 5TH FLOOR SOUTH TOWER
LANSING, MI 48913

IF YOU HAVE ANY QUESTIONS ABOUT THE PREPARATION OF THIS FORM OR DON'T RECEIVE ACKNOWLEDGEMENT WITHIN 30 DAYS OF SUBMITTAL, CALL 517-335-4137 OR E-MAIL: PLOEHNK@MICHIGAN.GOV.

Notice of Coverage
Gateway Bridge Construction
City of Detroit, Wayne County

Attachment A

- Construct 2-lane “Truck Road” from inbound truck inspection plaza to S32 bridge.S01 Pier remediation
- Construct “4/3 Roadway” from MDOT ROW line to Ambassador Bridge
- Demolish DIBC Structure S01 span 19/pier 19
- Construct 2-lane Access Drive for emergency access
- Construct primary emergency egress from DIBC plaza utilizing “old” Howard.
- Toll booth relocation within DIBC plaza.
- Construct 1-lane special southern emergency egress route.

Notice of Coverage
Gateway Bridge Construction
City of Detroit, Wayne County

Attachment B

R 323.1703

Location: City of Detroit

Soils: Clay

Earth Change Limits: See Attachment A

Dewatering: Filter bags or inlet protection/fabric drop or inlet
protection sediment trap

Timing/Sequence: Start work on April 13, 2012, and finish
September 30, 2012.

All disturbed areas to be stabilized according to MDOT 2012
Standard Specifications for Construction.

Temporary Erosion Controls: Inlet protections/fabric drop
Inlet protection/sediment trap
Silt fence
Gravel access approaches

Permanent Erosion Control: Mulch blanket, topsoil, seed, and as
specified according to MDOT 2012 Standard Specifications
for Construction.

Maintenance of Permanent Erosion Control: Site will be
monitored until stabilized, corrective actions will be done as
necessary.

EXHIBIT 2-4-C

Environmental Testing of Roadway Borings

This file will be provided in an addendum.

5 THIRD-PARTY AGREEMENTS

5.1 General

The Contractor shall conduct all Work necessary to meet the requirements associated with agreements necessary to complete the Project.

5.2 Administrative Requirements

The Contractor shall meet all commitments contained in the agreements obtained by MDOT. In the event that the Contractor's Work necessitates a change to an agreement or a new agreement, the Contractor shall be responsible for all Work necessary to obtain the new permit or agreement. The Contractor shall note that additional permits and agreements exist in other sections of this RFP.

As of the date of the RFP, not all permits and agreements have been signed. Signed permits and agreements will be issued in future addendums as applicable.

6 UTILITIES

6.1 General

This section applies to all existing and proposed municipal and Private Utilities. Throughout this section, municipal and Private Utilities may be referred to as Utilities. This section excludes stormwater facilities, traffic signals, and intelligent transportation systems (ITS). The Contractor is responsible for Utility coordination for the Project.

6.1.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to Utilities, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT *Road Design Manual*
- AASHTO *Right of Way and Utilities Guidelines and Best Practices*
- AASHTO *A Policy on the Accommodation of Utilities Within Freeway Right-of-Way*
- AASHTO *A Guide for Accommodating Utilities Within Highway Right-of-Way*
- FHWA *Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects*
- AWWA Standards
- GLUMRB *Recommended Standards for Water Works*
- GLUMRB *Recommended Standards for Wastewater Facilities*
- Remaining standards set forth in Book 3

6.2 MDOT Responsibilities

6.2.1 Initial Allocation of Responsibility

MDOT has the legal authority to require the relocation of Utilities in conflict with the proposed Project. In no way shall the Contractor assume the legal authority is transferred to the Contractor. Therefore, certain Utility coordination documents may need to be prepared by the Contractor for MDOT's review and signature.

6.2.2 MDOT-Supplied Information

MDOT has completed a Request for Utility Information for the Project. All Utility responses will be made available to the Contractor electronically within three Working Days of receipt by MDOT. MDOT has performed a Subsurface Utility Engineering (SUE) investigation, as shown in Exhibit 2-6-C. Notwithstanding the inclusion of Exhibit 2-6-C, such information shall be considered Contract Documents only to the extent that they are used to determine whether an existing underground Utility is indicated at all or with "reasonable accuracy". All Utility lines in this file are depicted at quality level B. Quality level B is defined as information obtained through the application of appropriate geophysical methods to determine the existence and approximate horizontal position of subsurface utilities (CI/ASCE 38-02). Utility records were not available during the time of this investigation. Therefore, while lines that are depicted are accurate to the quality level B standard, other separate facilities, or extensions of facilities depicted, may be present in addition to those that are depicted in this file. The Contractor has no right to rely on these documents for any other purpose.

If, after the Contractor has taken all reasonable steps to avoid relocation of such Utilities, the Utilities must be relocated, costs and delays associated with relocating these Utilities will be compensated in accordance with Book 1, Section 13.3.

6.3 Contractor Responsibilities

The Contractor shall attend a mandatory Utility Verification Meeting with the Utilities and MDOT on April 16, 2012. This meeting will confirm Utility locations, potential conflicts, and coordination requirements. The Contractor shall also confirm or begin scheduling Utility relocation plans. All Utility relocations must be reviewed and Approved by both MDOT and the Contractor.

The Contractor shall take all reasonable steps to minimize Utility relocations to the extent feasible and otherwise consistent with other requirements of the Contract Documents.

The Contractor's obligations with respect to each Utility include the following:

- Identification, location, and verification of all Utilities located within the ROW and/or otherwise impacted by the Project.
- Guidance to each Utility regarding the location, type, and breadth of proposed Work and coordination regarding acceptable and advantageous locations for each Utility if relocation is necessary.
- Review and acceptance (including signature) of permits, including MDOT Form 2205, submitted to MDOT by the individual Utilities for Utility facility removal and relocation. This review and acceptance must include confirmation that the proposed solution is compatible with the Contractor's proposed Work. The Contractor shall track and confirm that all necessary Utility relocation permits have been submitted to the MDOT Detroit TSC Utilities and Drainage Engineer for issuance. The Contractor shall follow up with Utilities to ensure that all permit applications are submitted in a timely manner. MDOT will coordinate permit reviews that have bypassed the Contractor's review and approval.
- Coordination of the Utility Work to avoid relocating a Utility more than once.
- Verification that the design and construction of all affected and existing Utilities are compatible with the remainder of the Project.
- Coordination of Work with Utilities so that Utility Work may progress in a reasonable manner, minimizing duplication of work and unnecessary interruption of services.
- Coordination with each Utility regarding removal of facilities conflicting with proposed Work and/or out-of-service portions located within the ROW.
- Temporary or permanent protection of existing Utilities impacted by the Project, as necessary to ensure continued safe operation and structural integrity. The Contractor shall be responsible for treating Utilities taken out of service and left in place in accordance with a method Approved by MDOT.

6.3.1 Utility Tracking Report

The Contractor shall maintain a Utility Tracking Report, as shown in Exhibit 2-6-A that lists all Utilities within the Project limits. The Utility Tracking Report shall contain a minimum of the following information:

- Utility name and contact information
- Utility facility size and type
- Utility location(s)
- The nature of the Utility existing right of occupancy (permit, easement, etc.) of the ROW
- The proposed MDOT permit submittal date or approval date for each Utility
- The proposed start and completion dates of any Utility relocation work

-
- Plan and correspondence distribution dates
 - Indication of whether the Utility is in conflict with the proposed Work, and, if the Utility is in conflict, the proposed resolution
 - Updated weekly, or as often as required by the Engineer

6.3.2 Utility Coordination/Relocation

The Contractor shall make diligent efforts to obtain the cooperation of each Utility and shall notify MDOT immediately if a Utility is not cooperating. MDOT will be available, as necessary, to assist in resolving Utility coordination conflicts. This may result in MDOT's sending the Utility a Notice to Relocate letter or other appropriate correspondence as needed. Any assistance provided by MDOT, including legal action, will not relieve the Contractor of its responsibility for meeting the requirements of this section.

The Contractor shall provide necessary field services to assist in Utility relocation placement. This may include miscellaneous alignment staking (e.g., staking centerlines, edges of pavement, curbs, and ROW lines). The Contractor shall ensure existing and proposed Utility facility information is incorporated into Project plans.

6.3.3 Utility Coordination Plan

All Utility relocations/accommodations require cooperation between the construction activities and the Utilities. The Contractor shall be responsible for coordination with the affected Utilities, including the following:

- Provide the Utilities with a Project schedule and notify the Utilities of any significant changes to the schedule as soon as possible and coordinate the Utility work with the Project schedule.
- Include Utilities in decisions affecting their facilities to minimize service interruption.

The Contractor shall conduct Utility coordination meetings with the Utilities and MDOT as necessary and shall distribute meeting minutes to all attendees. The meetings, at a minimum, shall identify conflicts, develop Utility relocation schemes, discuss possible design modifications, review the Project schedule, and develop a coordinated Utility activity schedule.

The Contractor shall provide MDOT copies of all correspondence between the Contractor and Utilities, concurrent with issuance.

6.3.4 Coordination and Cooperation

The Contractor shall discuss and ensure that eligible reimbursable Private Utility relocations are identified. Confirm that the Utilities submit the necessary information as outlined in MDOT Form 2488. The Contractor shall review and verify that the appropriate items are included in each Utility's request for relocation reimbursement prior to submitting to the MDOT Detroit TSC Utilities and Drainage Engineer for processing and Authorization.

The Contractor shall be responsible for verifying the progress of Utility relocation Work. If it is believed that the Utility will not meet the specified time frame(s), the Contractor shall notify the Utility and MDOT and coordinate an appropriate plan of action.

The Contractor shall distribute plans to all Utilities in accordance with the MDOT *Road Design Manual Section 9.02.03*. Plans shall have Utility locations plotted and provide sufficient detail for Utilities and designers to determine potential conflicts. The Contractor shall use MDOT Form 2481 for Private Utilities and MDOT Form 2482 for Municipal Utilities to distribute these plans.

Copies of correspondence sent to any Utility shall be sent to the MDOT Detroit TSC Utilities and Drainage Engineer, MDOT Project Manager, and any other appropriate parties.

The Contractor shall prepare a final Utilities Status Report (MDOT Form 2286) and, if necessary, a final Utility Coordination Clause. The Contractor shall certify that these documents represent the Utilities’ Project involvement by signing Form 2286.

The Contractor will not be entitled to an increase in the Contract Price for any costs of coordinating with Utilities or for assisting MDOT in coordinating with Utilities.

6.3.5 Municipal Utilities

The Contractor is responsible for designing and constructing municipal Utility relocations, including water and sanitary sewer. The cost of this Work, except for Betterments, shall be included in the Contract Price. The cost share of Betterments, if applicable, shall be in accordance with the MDOT *Road Design Manual*. This Work shall be done in accordance with all applicable federal, State, and local laws, ordinances, and requirements. The Contractor shall coordinate design, permits, and construction per Exhibit 2-6-B (Municipal Design Requirements).

6.3.6 Betterments

A proposed Betterment will be added to the scope of the Work if Approved by MDOT. MDOT agrees to issue a Change Order increasing the Contract Price on account of any Betterment added to the Utility Work in this section. The amount of any Change Order related to Utilities shall be a direct pass-through of the negotiated amount by the Contractor, MDOT, and the Utility Owner (with no additional mark-ups) or, if no such price has been negotiated, an amount determined in accordance with the agreement entered into with the Utility. The Contractor shall not request or accept any payment directly from the Utility for any Betterment added to the Work.

MDOT may Approve the addition of a Betterment to the scope of the Work in this section only if: (a) the Utility has agreed to the addition of such Betterment to the Work, (b) such Betterment is compatible with the Project, (c) the Utility has agreed to reimburse MDOT for all the costs thereof, (d) the Utility has agreed as to the method (e.g., negotiated amount, unit prices or time and materials cost basis) of pricing such Work, and (e) it is feasible to separate the cost/pricing of the Betterment work from that for any related Utility Work being furnished or performed by the Contractor. The Contractor shall provide MDOT with such information, analyses and certificates as may be requested by MDOT in connection with its Approval.

If a proposed Betterment changes the scope of the Work, it shall not be considered an MDOT-Directed Change.

6.4 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Utility Tracking Report	Approval	0	1	Weekly, or as often as required by the Engineer	6.3.1

Deliverable	For Acceptance	Number of Copies		Submittal Schedule	Reference Section
MDOT Form 2205	Approval	0	1	No later than 3 weeks prior to Utility relocation to commence	6.3
Utility Coordination Clause	Approval	0	1	No later than 3 weeks prior to start of construction	6.3.4
MDOT Form 2286	Approval	0	1	No later than 3 weeks prior to start of construction	6.3.4
MDOT Form 2481 for Private Utilities	Acceptance	0	1	In accordance with the MDOT <i>Road Design Manual 9.02.03</i>	6.3.4
MDOT Form 2482 for Municipal Utilities	Acceptance	0	1	In accordance with the MDOT <i>Road Design Manual 9.02.03</i>	6.3.4

EXHIBIT 2-6-A

Ambassador Bridge Plaza Utility Tracking Report Template

EXHIBIT 2-6-B

Municipal Design Requirements

EXHIBIT 2-6-B

Municipal Design

(Applicable only when Municipal Utilities are encountered within the Project limits)

The Contractor shall design and construct Municipal Utility relocations. This Work shall be done in accordance with all applicable federal, State, and local laws, ordinances, and requirements. Municipal Utility Design shall be coordinated with the MDOT Design Engineer – Municipal Utility Unit.

The Contractor shall design and construct street lighting relocations. This Work shall be done in accordance with all applicable federal, State, and local laws, ordinances, and requirements. Electrical Utility Design shall be coordinated with the MDOT Design Engineer – Electrical Utility Unit.

Municipal Utility Design includes, but is not limited to, the following:

- Coordinate applications for all necessary permits.
- Incorporate all Municipal Utility comments and develop the final Municipal Utility plans, profiles, special provisions and estimates. Resolve any outstanding issues and/or conflicting comments.
- Submit the final Municipal utility plans, profiles, special provisions and estimates for review and acceptance to the Municipality and the Design Engineer – Municipal Utilities. Request that the Municipality obtain the appropriate Michigan Department of Environmental Quality (MDEQ) Approvals and/or permit(s). The prints must be signed and sealed by a Professional Engineer licensed in the State of Michigan.
- Determine financial responsibility for Municipal Utility relocation costs. Conduct or participate in meetings convened for the purpose of Municipal Utility Betterments. The cost share of this work, including Betterments if applicable, shall be in accordance with the MDOT *Road Design Manual*.
- Receive Municipality Approval and applicable permits and distribute to the MDOT Design Engineer - Municipal Utility Unit or the MDOT Design Engineer – Electrical Utility Unit. For more details regarding the preparation final Municipal Utility plans, special provisions and estimates, refer to the following:
 - AWWA Standards
 - MDOT *Road Design Manual*
 - *Ten States Standards for Water Works*
 - *Ten States for Wastewater Facilities*
 - MDOT *Standard Specifications for Construction*

EXHIBIT 2-6-C

Ambassador Bridge Plaza Subsurface Utility Engineering (SUE)

File Name: Gateway SUE 4-2-12.dgn

This exhibit includes a file named Gateway SUE 4-2-12.dgn that depicts non-gravity subsurface utilities in specific locations within the Project limits. This file is the result of a field investigation completed by a Subsurface Utility Engineering (SUE) consultant.

This file will be provided in an addendum.

7 RIGHT-OF-WAY

7.1 General

All proposed Work for this Project will be contained entirely within Right-of-Way (ROW) owned by the Detroit International Bridge Company (DIBC), except for portions of the Truck Road east of the existing Bridge to Canada, for which MDOT has allocated a portion of the Fort Street ROW. The Contractor shall not encroach onto MDOT ROW, City of Detroit ROW, or other non-DIBC ROW, except as previously permitted. The Contractor shall not encroach onto property east of the fence along the Cargo Inspection Facility. No additional ROW will be granted for the Project.

7.1.1 Establishing ROW Limits

The Contractor shall be responsible for establishing the ROW limits of the Project. This includes MDOT ROW limits along Fort Street to the south and I-75 to the northwest, the Access Drive permanent easement, City of Detroit ROW limits along the east side of West Grand Boulevard and along both sides of 22nd Street and 23rd Street north of Fort Street. The Contractor shall prepare a Project ROW Limits Drawings showing the ROW limits. The Contractor will be responsible for repairing any damage caused by the Contractor outside of the ROW limits.

7.1.2 Truck Road

A portion of the Truck Road will be located within the Fort Street ROW between the exit from the Truck Inspection Area and 22nd Street. The Truck Road must be entirely on DIBC property west of the easterly property line at 22nd Street.

7.1.3 25-Foot Permanent Easement For Access Drive

DIBC has granted MDOT a 25-foot permanent easement as shown in Exhibit 2-7-A (Easement for Access Drive).

7.1.4 Right of Entry to DIBC Property

The Contractor is granted legal Right of Entry to the Plaza as described in Exhibit 2-7-B (Right of Entry to Plaza).

7.1.5 Equipment and Material Staging on MDOT Property

MDOT will allow the Contractor to store materials and equipment within the Fort Street ROW currently in use by the Truck Road after the Truck Road has been constructed within DIBC ROW and opened to traffic. No other staging areas will be made available to the Contractor on MDOT property at any time or for any reason.

7.2 Administrative Requirements

7.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to ROW activities, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT *Standards of Practice- Design Surveys*
- MDOT *Road Design Manual*
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT *Design Survey Manual*
- MDOT CAD Standards

- MDOT Guidelines for Plan Preparation, Road Sample Plans
- Remaining standards set forth in Book 3

7.3 Resources Provided by MDOT

Not used.

7.4 Pre-Acquisition Activities

Not used.

7.5 Acquisition Activities

Not used.

7.6 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Project ROW Limits Drawing	Approval	0	1 (DGN)	Within 15 Days of NTP.	7.1.1

EXHIBIT 2-7-A

Easement for Access Drive

Bernard J. Youngblood
Wayne County Register of Deeds
October 18, 2007 01:07 PM
Liber 46737 Page 1279-1292A
#207399224 EAS FEE: \$54.00



EASEMENT FOR INGRESS AND EGRESS

THIS EASEMENT FOR INGRESS AND EGRESS is made this 16th day of October, 2007, by MEXICAN TOWN REAL ESTATE a/k/a MEXICAN TOWN REAL ESTATE COMPANY a/k/a MEXICAN TOWN REAL ESTATE COMPANY, INC. a/k/a MEXICAN TOWN REAL ESTATE CO., a Michigan corporation, DETROIT INTERNATIONAL BRIDGE COMPANY a/k/a THE DETROIT INTERNATIONAL BRIDGE COMPANY, a Michigan corporation, and AMMEX, INC., a Michigan corporation, whose addresses are 12225 Stephens Road, Warren, Michigan 48089 (collectively "Grantor").

RECITALS:

WHEREAS, collectively Grantor owns all of the real estate located in the City of Detroit, Wayne County, Michigan identified as the Access Drive Easement in and legally described on the Sketch of Easement dated July 14, 2006 prepared by Hubbell, Roth & Clark, Inc. (Job No. 20060142) attached hereto as Exhibit "A" and incorporated herein by reference (the "Access Drive Easement"); and

WHEREAS, that certain parcel of real estate located in the City of Detroit, Wayne County, Michigan legally described on Exhibit "B" attached hereto and incorporated herein by reference (the "Parcel B") is located adjacent to a portion of the Access Drive Easement; and

WHEREAS, that certain parcel of real estate located in the City of Detroit, Wayne County, Michigan legally described on Exhibit "C" attached hereto and incorporated herein by reference (the "Parcel C") is also located adjacent to a portion of the Access Drive Easement; and

WHEREAS, the Michigan Department of Transportation ("MDOT") is acquiring a portion of the property and/or property rights in Parcel B and Parcel C under eminent domain for the design, construction, maintenance and operation of certain improvements to access between Highways I-75/I-96 and the Ambassador Bridge connecting Detroit, Michigan, to Windsor, Ontario, across the Detroit River, all as set forth in Agreement No. 2004-2013, dated April 23, 2004, as amended by Amending Agreement dated February 17, 2006 (the "Gateway Project Agreement"), leaving a remainder in each of Parcel B and Parcel C to the current owners of Parcel B and Parcel C.

WHEREAS, Grantor desires to grant to the owner(s) of Parcel B and Parcel C once the construction of the improvements under the Gateway Project Agreement is completed a non-exclusive easement for ingress and egress over the Access Drive Easement for ingress and egress to and from West Fort Street for the benefit of the remaining portions of both Parcel B and Parcel C not acquired in fee simple by MDOT subject to the terms and conditions contained herein.

AGREEMENT:

NOW, THEREFORE, for and in consideration of the covenants contained herein, Grantor hereby agrees as follows:

1. **Grant of Easement.** Grantor does hereby grant to the owner(s) of that portion of both Parcel B and Parcel C not acquired in fee simple by MDOT, their successors and assigns, and their agents, guests, invitees, employees, customers and visitors a non-exclusive easement for ingress and egress over the Access Drive Easement.

2. **Restrictions.** The Access Drive Easement shall be used solely for ingress and egress of pedestrians and vehicles from and to that portion of both Parcel B and Parcel C not acquired in fee simple by MDOT to and from West Fort Street. The Access Drive Easement shall not be used for stopping, waiting, parking or servicing of any vehicles. The Access Drive Easement shall be used in a reasonable manner.

3. **Utilities.** The Access Drive Easement is expressly subject to all currently existing and in-place utilities crossing over or under the Access Drive Easement.

4. **Binding Nature.** The Access Drive Easement is intended to and shall run with the land, and shall be binding upon and inure to the benefit of all of the present and future owners of the real estate comprising the Access Drive Easement, and that portion of both Parcel B and Parcel C not acquired in fee simple by MDOT and their respective successors and assigns.

5. **Termination of Easement.** In the event that any one of the entities comprising Grantor becomes the fee simple owner of those portions of both Parcel B and Parcel C not acquired in fee simple by MDOT, the Access Drive Easement shall automatically terminate and be of no further force or effect.

6. **Integration.** This grant of easement constitutes the entire conveyance with respect to the subject matter hereof. All prior understandings and discussions with respect to the subject matter hereof, whether written or oral, are merged herein so that this grant of easement is fully integrated.

7. **Eminent Domain.** No taking under the power of eminent domain and no deed or grant in connection with or contemplation of the widening of any public roadway or right-of-way shall be deemed or construed to be a violation of any of the provisions of this grant of easement or of any of the rights herein granted or conferred; provided, however, that this provision shall not limit any party's rights as provided under the Constitution of the State of Michigan.

8. **Severability.** The provisions of this grant of easement are severable. If any section, paragraph, sentence or provision hereof shall be determined to be invalid or unenforceable, it shall not effect the validity of any remaining provisions herein and all remaining provisions shall be given full force and effect separately from the invalid or unenforceable section, paragraph, sentence or provision, as the case may be.

9. **Effective Date.** This Easement for Ingress and Egress shall become effective on the latter of (i) May 1, 2010, or (ii) on the day that the construction of the improvements under the Gateway Project is completed and MDOT has turned over physical possession of the remaining portions of both Parcel B and Parcel C to which MDOT has not acquired fee simple title to the current owner of each of Parcel B and Parcel C.

IN WITNESS WHEREOF, the parties hereto have caused this Easement for Ingress and Egress to be executed by their duly authorized representatives as of the date first stated above.

(signatures contained on following page)

GRANTOR:

MEXICAN TOWN REAL ESTATE a/k/a
MEXICAN TOWN REAL ESTATE COMPANY
a/k/a MEXICAN TOWN REAL ESTATE
COMPANY, INC. a/k/a MEXICAN TOWN
REAL ESTATE CO., a Michigan corporation

By: 

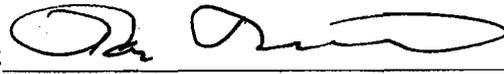
Its: President

DETROIT INTERNATIONAL BRIDGE
COMPANY a/k/a THE DETROIT
INTERNATIONAL BRIDGE COMPANY, a
Michigan corporation

By: 

Its: President

AMMEX, INC., a Michigan corporation

By: 

Its: AGENT

STATE OF MICHIGAN)
COUNTY OF Macomb)ss.

The foregoing instrument was acknowledged before me on the 16th day of October, 2007, by Dan Stamper, the President of Mexican Town Real Estate a/k/a Mexican Town Real Estate Company a/k/a Mexican Town Real Estate Company, Inc. a/k/a Mexican Town Real Estate Co., a Michigan corporation, on behalf of said corporation.



Notary Public
Pamela Evans County, Michigan
My Commission Expires:
Acting in Macomb County

PAMELA EVANS
NOTARY PUBLIC, STATE OF MI
COUNTY OF OAKLAND
MY COMMISSION EXPIRES Mar 25, 2014
ACTING IN COUNTY OF Macomb

STATE OF MICHIGAN)
)ss.
COUNTY OF Macomb)

The foregoing instrument was acknowledged before me on the 16th day of October, 2007, by Dan Stamper, the PRESIDENT of Detroit International Bridge Company a/k/a The Detroit International Bridge Company, a Michigan corporation, on behalf of said corporation.

Pamela Evans

Notary Public
Oakland County, Michigan
My Commission Expires:
Acting in Macomb County

PAMELA EVANS
NOTARY PUBLIC, STATE OF MI
COUNTY OF OAKLAND
MY COMMISSION EXPIRES Mar 25, 2014
ACTING IN COUNTY OF Macomb

STATE OF MICHIGAN)
)ss.
COUNTY OF Macomb)

The foregoing instrument was acknowledged before me on the 16th day of October, 2007, by Dan Stamper, the Agent of Ammex, Inc., a Michigan corporation, on behalf of said corporation.

Pamela Evans

Notary Public
Oakland County, Michigan
My Commission Expires:
Acting in Macomb County

PAMELA EVANS
NOTARY PUBLIC, STATE OF MI
COUNTY OF OAKLAND
MY COMMISSION EXPIRES Mar 25, 2014
ACTING IN COUNTY OF Macomb

Drafted by and when recorded return to:
David D. Marsh, Esq.
Kemp Klein Law Firm
201 W. Big Beaver Road, Suite 600
Troy, MI 48084
248-528-1111

EXHIBIT "A"

SKETCH OF EASEMENT

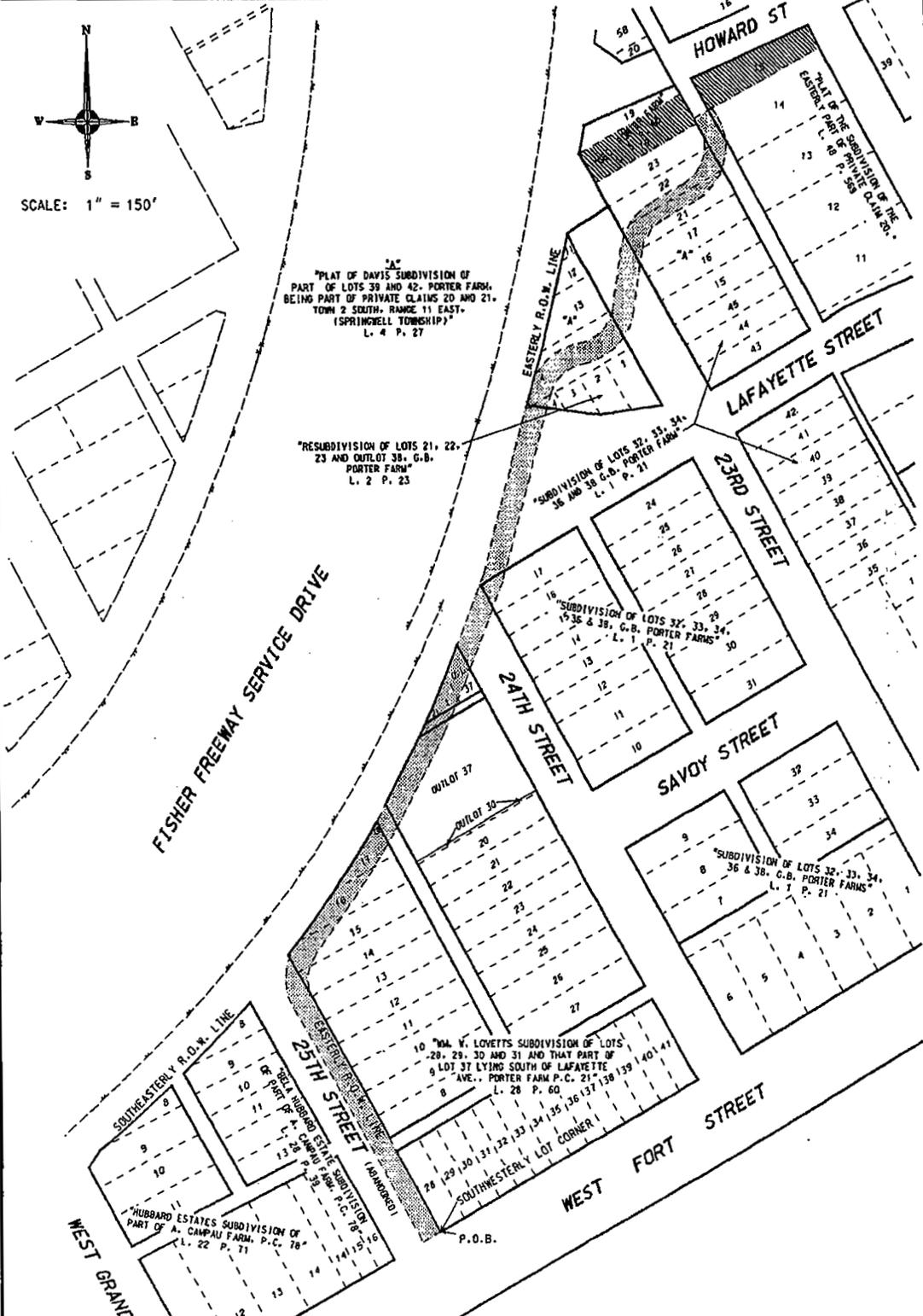
PRIVILEGED AND CONFIDENTIAL

PARCELS OWNED BY OTHERS



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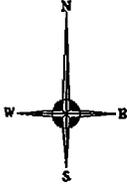
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ACCESS DRIVE EASEMENT	JOB NO. 20060142	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. 1
	DATE 07-14-06		P.O. BOX 824 48303-0824 OF 8

SKETCH OF EASEMENT

PRIVILEGED AND CONFIDENTIAL



SCALE: 1" = 50'

MATCH LINE SEE SHEET 5 OF 8

MATCH LINE SEE SHEET 3 OF 8

"PLAT OF DAVIS SUBDIVISION OF PART OF LOTS 39 AND 42, PORTER FARM, BEING PART OF PRIVATE CLAIMS 20 AND 21, TOWN 2 SOUTH, RANGE 11 EAST, (SPRINGWELL TOWNSHIP)" L. 4 P. 27

"RESUBDIVISION OF LOTS 21, 22, 23 AND OUTLOT 38, G.B. PORTER FARM" L. 2 P. 23

"SUBDIVISION OF LOTS 32, 33, 34, 35 & 38, G.B. PORTER FARMS" L. 1 P. 21

FISHER FREEWAY SERVICE DRIVE

LAFAYETTE STREET

23RD STREET

24TH STREET

DESIGN FILE - V:\20060142\20060142\From Review\Revised Easement Location\06142.dwg (JMS) 03/29/06 11:45
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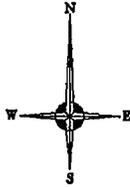
ACCESS DRIVE EASEMENT

JOB NO. 20060142	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO. 4
DATE 07-14-06		OF 8

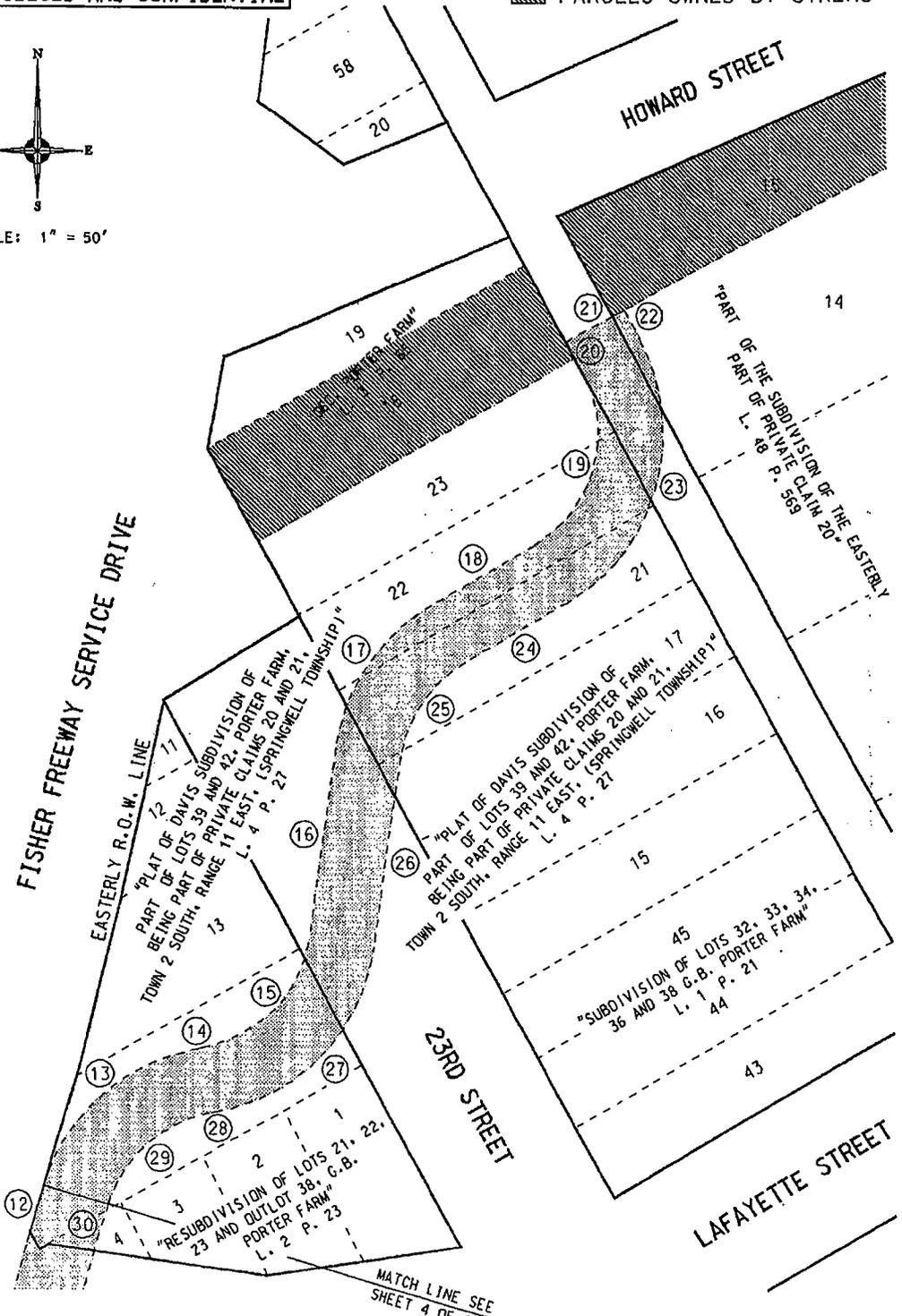
SKETCH OF EASEMENT

PRIVILEGED AND CONFIDENTIAL

PARCELS OWNED BY OTHERS



SCALE: 1" = 50'



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ACCESS DRIVE EASEMENT	JOB NO. 20060142	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	JOB NO. 20060142
	DATE 07-14-06		SHEET NO. 5 OF 8
		P.O. BOX 824 48303-0824	

SKETCH OF EASEMENT

PRIVILEGED AND CONFIDENTIAL

ACCESS DRIVE EASEMENT

BEGINNING at the Southwesterly Corner of Lot 28 of "Mrs. W. Lovett's Subdivision of Lots 28, 29, 30 and 31 and that part of Lot 37 lying South of Lafayette Ave., Porter Farm P.C. 21" as recorded in Liber 28 of Plats, Page 60, Wayne County Records:

thence South 59 degrees 46 minutes 57 seconds West 25.01 feet;

thence North 28 degrees 14 minutes 23 seconds West 317.48 feet;

thence 84.13 feet along the arc of a 75.00 foot radius curve to the right, said curve having a central angle of 64 degrees 15 minutes 05 seconds and a chord bearing North 03 degrees 53 minutes 39 seconds East 79.79 feet to a point on the Southeastly right of way line of Fisher Freeway Service Drive;

thence along the Southeastly and Easterly right of way lines of said Fisher Freeway Service Drive the following ten (10) courses:

(1) 172.08 feet along the arc of a 1916.61 foot radius curve to the left, said curve having a central angle of 05 degrees 08 minutes 39 seconds and a chord bearing North 33 degrees 27 minutes 22 seconds East 172.02 feet.

(2) North 30 degrees 22 minutes 57 seconds East 12.23 feet.

(3) North 27 degrees 29 minutes 41 seconds East 100.82 feet.

(4) North 25 degrees 15 minutes 58 seconds East 17.61 feet.

(5) North 24 degrees 23 minutes 55 seconds East 26.88 feet.

(6) North 23 degrees 08 minutes 02 seconds East 38.38 feet.

(7) North 21 degrees 35 minutes 37 seconds East 128.24 feet.

(8) North 15 degrees 02 minutes 49 seconds East 214.26 feet.

(9) North 16 degrees 35 minutes 53 seconds East 18.16 feet.

and (10) 81.85 feet along the arc of a 75.00 foot radius curve to the right, said curve having a central angle of 62 degrees 31 minutes 57 seconds and a chord bearing North 47 degrees 51 minutes 52 seconds East 77.85 feet;

thence North 79 degrees 07 minutes 51 seconds East 1.64 feet;

thence 61.76 feet along the arc of a 50.00 foot radius curve to the left, said curve having a central angle of 70 degrees 46 minutes 38 seconds and a chord bearing North 43 degrees 44 minutes 32 seconds East 57.91 feet;

thence North 08 degrees 21 minutes 13 seconds East 73.11 feet;

thence 67.37 feet along the arc of a 75.00 foot radius curve to the right, said curve having a central angle of 51 degrees 28 minutes 02 seconds and a chord bearing North 34 degrees 05 minutes 14 seconds East 65.13 feet;

thence North 59 degrees 49 minutes 15 seconds East 44.89 feet;

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USER NAME - bwinocent

ACCESS DRIVE EASEMENT	JOB NO. 20060142	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO.
	DATE 07-14-06		7 OF 8

SKETCH OF EASEMENT

PRIVILEGED AND CONFIDENTIAL

ACCESS DRIVE EASEMENT (CONTINUED)

thence 44.91 feet along the arc of a 50.00 foot radius curve to the left, said curve having a central angle of 51 degrees 28 minutes 02 seconds and a chord bearing South 34 degrees 05 minutes 14 seconds West 43.42 feet;

thence South 08 degrees 21 minutes 13 seconds West 73.11 feet;

thence 92.65 feet along the arc of a 75.00 foot radius curve to the right, said curve having a central angle of 70 degrees 46 minutes 38 seconds and a chord bearing South 43 degrees 44 minutes 32 seconds West 86.87 feet;

thence South 79 degrees 07 minutes 51 seconds West 1.64 feet;

thence 54.57 feet along the arc of a 50.00 foot radius curve to the left, said curve having a central angle of 62 degrees 31 minutes 57 seconds and a chord bearing South 47 degrees 51 minutes 52 seconds West 51.90 feet;

thence South 16 degrees 35 minutes 53 seconds West 17.82 feet;

thence South 15 degrees 02 minutes 49 seconds West 215.35 feet;

thence South 21 degrees 35 minutes 37 seconds West 130.01 feet;

thence South 23 degrees 08 minutes 02 seconds West 38.99 feet;

thence South 24 degrees 23 minutes 55 seconds West 27.35 feet;

thence South 25 degrees 15 minutes 58 seconds West 18.28 feet;

thence South 27 degrees 29 minutes 41 seconds West 101.93 feet;

thence South 30 degrees 22 minutes 57 seconds West 13.08 feet;

thence 174.32 feet along the arc of a 1941.61 foot radius curve to the right, said curve having a central angle of 05 degrees 08 minutes 39 seconds and a chord bearing South 33 degrees 27 minutes 22 seconds West 174.27 feet;

thence 56.08 feet along the arc of a 50.00 foot radius curve to the left, said curve having a central angle of 64 degrees 16 minutes 05 seconds and a chord bearing South 03 degrees 53 minutes 39 seconds West 53.19 feet to the Easterly right of way line of 25th Street;

thence South 28 degrees 14 minutes 23 seconds East 316.61 feet along said Easterly right of way line to the POINT OF BEGINNING.

Said property contains 38,750 square feet or 0.8896 acres, more or less.

TIME - 14-JUL-2006 12:02

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USER NAME - bvwbaart

ACCESS DRIVE EASEMENT

JOB NO. 20060142	HUBBELL, ROTH & CLARK, INC. CONSULTING ENGINEERS 555 HULET DRIVE BLOOMFIELD HILLS, MICH.	SHEET NO.
DATE 07-14-06		8 OF 8
P.O. BOX 824 48303-0824		

EXHIBIT "B"
LEGAL DESCRIPTION

Land situated in the City of Detroit, Wayne County, Michigan, legally described as:

Lot 15, lying south of Howard Street of the subdivision of the eastern part of Private Claim 20, according to the plat thereof as recorded in liber 48, page(s) 569 of Deeds, Wayne County Records.

Commonly known as: 3307 Howard
Ward 12, Tax Item No. 7932-5

EXHIBIT "C"
LEGAL DESCRIPTION

Land situated in the City of Detroit, Wayne County, Michigan, legally described as:

Lot 18, except the north 2.00 feet of the west 114.00 feet and except the north 12.50 feet of the east 25.52 feet, Subdivision of the South Part of Outlot No. 39, Porter Farm, City of Detroit, Wayne County, Michigan, as recorded in liber 3, page 65 of Plats, Wayne County Records.

Commonly known as: 1060 23rd Street
Ward 12, Tax Item No. 7959

547126v2

EXHIBIT 2-7-B

Right of Entry to Plaza

RIGHT OF ENTRY

To comply with Court Orders issued in *MDOT v DIBC*, et al., Wayne County Circuit Court Case No 09-015581-CK, which are not yet addressed or resolved on appeal, under the threat of contempt and to avoid further contempt sanctions, and with full reservation of its appellate rights:

The **Detroit International Bridge Company (DIBC)**, a Michigan corporation, grants to the **Michigan Department of Transportation (MDOT)**, the right to enter upon the lands described as "Part A" in the April 23, 2004 Gateway Implementation Agreement (§ 1) and depicted on the attached Exhibit I to the February 17, 2006 Gateway Amendatory Agreement, in order to complete construction of the DIBC's portion of the Gateway Project in compliance with Exhibit E to the Performance Bond issued by Safeco Insurance Company of America dated March 12, 2007, and the Court's February 1, 2010 Opinion and Order.

It is understood by the parties that MDOT will take every reasonable effort to cause the completion of the project without unnecessary interference with the operations of Ammex, Inc., the United States of America and its agencies, and the right and duty of DIBC to facilitate traffic across the Ambassador Bridge.

MDOT's authorized employees, agents, contractors, and any public utility are also authorized to enter in furtherance of the purpose of completing construction of the Gateway Project as ordered by the Court, which may include reasonable relocation or construction of utility facilities. The right to enter is subject to any restrictions imposed by an agency of the United States of America.

This Right of Entry is not assignable or otherwise alienable and shall remain in full force and effect until the Court in the above case certifies that the construction of DIBC's portion of the Gateway Project is completed in compliance with the February 1, 2010 Opinion and Order or reversal of the underlying order of the court by an appellate court of competent jurisdiction.

This instrument is effective upon execution.

Witness: Grantor:

Detroit International Bridge Company

By 

Its: President, Under Authority of Its
Gateway Expansion Project Committee

Subscribed and sworn to before
me this 22nd day of March, 2012.


Notary Public

Wayne County

CYNTHIA J. VILLENEUVE
Notary Public, Wayne County, MI
My Commission Expires: 09/28/17

8 GEOTECHNICAL

8.1 General

The Contractor shall conduct all Work necessary to meet the requirements of geotechnical investigations, analysis, design, and construction.

8.2 Administrative Requirements

8.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to geotechnical, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Special Provision – High Performance Portland Cement Concrete Grade P1 (Modified)
- MDOT Special Provision – Lime Stabilized Subgrade
- MDOT Special Provision – Structural Steel Foundation Piling Material
- MDOT Special Provision – Steel Sheet Piling, Temporary, Special
- MDOT Special Provision – Concrete Base Course, Reinforced, 4 inch
- MDOT Special Provision – High Performance Biaxial Geogrid
- MDOT Special Provision – Geotextile Separator
- MDOT Special Provision – Managing Diamond Grinding Slurry From Ride Quality HMA
- MDOT Special Provision – Managing Diamond Grinding Slurry From Ride Quality Concrete
- MDOT Frequently Used Special Provisions
- MDOT *Uniform Field Soil Classification System (Modified Unified Description)*
- MDOT *Geotechnical Investigation and Analysis Requirements for Structures*
- MDOT *Manual for the Michigan Test Methods (MTM'S)*
- MDEQ *Stratigraphic Lexicon for Michigan 2001*
- ASCE *Recommended Practice for Plugging Soil Borings, 1969*
- MDOT *Bridge Boring Sample Plan*
- MDOT *Road Boring Sample Plan*
- MDOT *Bridge Design Manual*
- MDOT *Road Design Manual*
- MDOT *Density Control Handbook*
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT *HMA Production Manual*
- MDOT *Materials Source Guide*
- MDOT *Materials Quality Assurance Procedures Manual*
- MDOT *Pavement Design and Selection Manual*
- MDOT Special Details
- MDOT Standard Plans
- AASHTO *Manual on Subsurface Investigation*
- AASHTO *Standard Specifications for Materials and Methods of Sampling and Testing*
- AASHTO *Provisional Standards*

- AASHTO *Standard Specifications for Highway Bridges*
- FHWA Publications
 - *Subsurface Investigations – Geotechnical Site Characterization*
 - *Geotechnical Engineering Circular Number 4, Ground Anchors and Anchored Systems*
 - *Manual for Design & Construction Monitoring of Soil Nail Wall*
 - *Micropile Design and Construction Reference Manual*
 - *Handbook on Design and Construction of Drilled Shafts Under Lateral Load*
 - *Design and Construction of Driven Pile Foundations, Volumes I and II*
 - *The Cone Penetration Test*
 - *The Pressuremeter Test for Highway Applications*
- ASTM Standards
- Other standards set forth in Book 3

8.2.2 Software Requirements

The Contractor shall provide boring log information in Microstation V8 (DGN) format in accordance with current MDOT format, as shown in MDOT *Bridge Boring Sample Plan* and MDOT *Road Boring Sample Plan*.

8.2.3 Equipment Requirements

The Contractor shall use a global positioning system (GPS) unit to collect boring survey information, including Northing and Easting information. Coordinates must be in the following Horizontal Datum: Michigan State Plane Coordinates (NAD 1983 South Zone 2113).

8.2.4 Personnel Requirements

The Contractor shall provide a geotechnical team prequalified by MDOT to perform geotechnical services. The geotechnical team should be experienced in matters relating to geotechnical exploration, geotechnical analysis and design, engineering geology, settlement and settlement rates of embankments or temporary pavements, short- and long-term groundwater effects, and the use of Load Factor Design (LFD), specifically as it relates to Substructure units and foundations.

8.2.5 Certification Requirements

The Contractor shall perform all laboratory testing at an AMRL-accredited facility for the geotechnical tests described herein and in the standards.

8.3 Design Requirements

Pavement and Foundation boring logs for the Project are provided in Exhibits 2-8-A and 2-8-B. Pavement and Foundation boring logs shall be considered Contract Documents only to the extent that they are used to determine the location of each soil boring and the point information of actual soil conditions at the time of drilling at each boring. Presentation of this information in no way implies that subsurface conditions are the same at locations other than the exact location of the boring.

8.3.1 Supplemental Subsurface Investigations

The Contractor shall conduct supplemental subsurface investigations and subsequent geotechnical analyses and designs as necessary to meet minimum boring requirements based on the Contractor's design and to supplement information provided by MDOT in this Section 8 to substantiate the Contractor's design of the Project.

The Contractor shall submit a Subsurface Investigation Report containing subsurface investigation(s) the Contractor plans to perform. This report shall evaluate the need and locations of additional subsurface

investigation(s) and discuss the requirements in Sections 8.3.1.1 and 8.3.1.2, as they apply to the specific situation.

8.3.1.1 Supplemental Foundation Subsurface Investigations

Foundation subsurface investigations refer to geotechnical soil borings, field tests, standard penetration tests (SPTs), other in-situ testing methods, and laboratory tests conducted to support the analysis and design of structures, such as bridges, walls, and signs. If the Contractor chooses to supplement the subsurface information provided by MDOT or needs to supplement the subsurface information to meet the minimum boring requirements based on the Contractor's design, the Contractor shall selectively locate foundation subsurface investigations on the basis of field observations, design considerations, and the criteria specified in Table 1. Location of investigations shall be as topography, Site conditions, soil conditions, and design factors dictate.

All supplemental subsurface investigations shall include the following items:

- A study of existing and preliminary plans and temporary staging plans
- A review of all subsurface investigation information applicable to the Project
- An on-Site inspection
- Planning the investigation program
- Obtaining soil samples when appropriate
- Obtaining rock cores when appropriate
- Measuring groundwater levels
- Preparing a field boring log
- Performing laboratory tests on soil samples
- Producing a final boring log summarizing all investigation and testing information

The Contractor shall review, at a minimum, the above information to ascertain alignment, Site topography, location of bridge piers, profiles of proposed bridge footings, locations of Utilities in the vicinity of the proposed investigations, and general locations of structures with regard to existing roads and waterways.

The on-Site inspection shall include an engineering reconnaissance of soil and geologic conditions existing at the Site. The Contractor shall review the contemplated effect of the proposed construction. The Contractor shall record notes on performance of existing embankments in the immediate vicinity, differential settlement, foundation failures, active landslides, bedrock exposure, limits of questionable foundation areas, stability of adjacent earth or manmade masses, and possible damage to existing structures and facilities. The Contractor shall establish the possible locations of supplemental investigations during the field reconnaissance study.

8.3.1.1.1 Project-Specific Requirements

The Contractor shall review the subsurface information provided by MDOT for the Project and determine if the appropriate information is provided to support the Contractor's design. The subsurface investigation shall follow and meet, at a minimum, the requirements listed in Table 1. The MDOT information provided in the Section 8 exhibits can be used to help meet the Table 1 requirements. These minimum requirements do not preclude the Contractor from performing additional investigative procedures to obtain sufficient subsurface information for the design of foundation elements.

The Contractor may also use boring information previously gathered that meets the requirements listed in Table 1. If the Contractor chooses to do so, it shall be understood by all parties that the Contractor takes full responsibility for the information contained in the boring information and MDOT is not liable in any way for issues that arise out of the use of the information.

Table 1: Required Foundation Borings for Foundation Support Type

Structure and Foundation Support Type	Minimum Number of Foundation Borings per Substructure	Boring Locations	Minimum Boring Depth	Required Investigation Method
Bridge spread footings	One	As required per standards, subject to MDOT Approval.	As required per standards	Rotary or hollow stem auger borings in soil and rock
Bridge pile foundation	One	As required per standards, subject to MDOT Approval.	As required per standards	Rotary or hollow stem auger borings in soil and rock
Bridge drilled shaft foundation	One	As required per standards, subject to MDOT Approval.	As required per standards	Rotary or hollow stem auger borings in soil and rock

For structures not listed in Table 1, the Contractor shall comply with requirements listed in the standards.

8.3.1.1.2 Soil and Rock Classification

Soil Classification

The Contractor shall visually inspect, hand-manipulate, and give a description of every sample taken during the supplemental boring program. The Contractor’s description shall give consideration to the driller’s description of the material and particularly to soil layer changes. The Contractor shall classify all mineral soils according to the MDOT *Uniform Field Soil Classification System (Modified Unified Description)*. Each layer and/or sample shall have a description pertaining to texture, color, moisture content, organic content, relative density, and relative consistency. Laboratory testing shall be completed according to MDOT *Geotechnical Investigation and Analysis Requirements for Structures*. Method of description shall be at the discretion of the Contractor, except that the Contractor shall define all symbols and all descriptions on the finished boring log.

Rock Classification

The Contractor shall examine all rock samples and describe the appropriate engineering and geological characteristics. Details, definitions, and accepted abbreviations of materials characterization terminology shall comply with MDEQ Geological Survey Division *Stratigraphic Lexicon for Michigan 2001*.

The following is a list of the required characteristics depending on the type of rock sample collected.

- Augered washed samples: lithology and/or rock type (with modifying mineral descriptions when possible), grain size and/or texture, color, name of formation, and member
- Split-tube samples: lithology and/or rock type (with modifying mineral descriptions when possible), weathering, grain size and/or texture, relative hardness, color, name of formation, and member (when possible)
- Core: lithology and/or rock type (with modifying mineral descriptions when possible), weathering, grain size and/or texture, minor constituents, relative hardness, geological discontinuities (including voids and joint or bedding spacing and angle), color, name of formation, and member (when possible)

In addition, the Contractor shall measure and determine the following properties for each rock core interval:

- Percent recovery (% REC)
- Rock quality designation (RQD) determined and reported as a percentage (% RQD)

- Average core length (ACL)
- Rock Mass Rating (RMR)

The Contractor shall also identify and record discontinuities in the form of core breaks as the number of fractures per 2-foot interval (or other specified interval).

8.3.1.1.3 Subsurface Investigation

For purposes of this Section 8, “borings” or “foundation borings” shall be defined as standard rotary drilled or hollow stem auger boreholes that incorporate split-spoon samples and SPTs and as described in this Section 8.3.1.1.3. The boring program may be adjusted to include other techniques in lieu of or in addition to soil borings, such as cone penetrometer test (CPT), dilatometer (DMT), pressuremeter, or similar, with the prior Approval of MDOT. CPT soundings may also be taken at designated locations to supplement the conventional foundation boring program.

Rotary Drill Method

The Contractor shall perform the Rotary Drill Method in accordance with Section 7.5.1.4 of the AASHTO *Manual on Subsurface Investigations*. The use of casing shall be at the discretion of the Contractor, except that the casing shoe or bit shall never extend below the top of any interval to be sampled. The Contractor shall remove all casing upon completion of the boring.

Hollow Stem Auger Method

The Contractor shall perform the Hollow Stem Auger Method in accordance with Section 7.5.1.5 of the AASHTO *Manual on Subsurface Investigations*.

Diamond Core Drilling

The Contractor shall perform diamond core drilling in accordance with ASTM Designation D 2113, with the following exceptions:

- The Contractor shall use only NQ or NMX barrel sizes.
- The method of plug-drilling shall be at the discretion of the Contractor.
- The Contractor shall take wash samples during the period of plug-drilling.

If soft or friable rock deposits are encountered, where core drilling results in low recovery, the Contractor may propose alternative drilling and sampling techniques and methodologies to characterize the material for use in engineering design and analysis.

Cone Penetration Test

CPT soundings may be taken to supplement the conventional foundation boring program (see Table 1 for required spacing and depth). CPT soundings shall be performed in accordance with ASTM D5778. Data to be collected includes corrected tip resistance, side friction, and pore water pressure. The data shall be presented in graphical format and include an interpretation of the soil behavior type. An electronic copy of the final CPT logs shall be submitted to the State's Geotechnical Services Section (Construction and Technology). This electronic file shall be in Microstation V8 (DGN) format.

Other Investigation Techniques

The Contractor may employ other in-situ investigation methods or techniques to be applied within a borehole or as a separate and distinct exploration method with the prior Approval of MDOT. Examples include:

- Marchetti flat plate DMT
- Pressuremeter

-
- Flat plate load tests
 - Test pits
 - Flow tests/packer tests
 - Exploration geophysical techniques (electrical resistivity, seismic, ground penetrating radar, magnetics, gravity)
 - Vane shear test

These methods shall be conducted in accordance with applicable ASTM, MIOSHA, or AASHTO standards. Field data acquisition, reporting, and analysis shall be consistent with the test method, or the state-of-practice. Information similar to borehole information shall be recorded and reported (e.g., date, location, depth, sampling, and crew)

Borehole Site Cleanup

The Contractor shall seal all test holes and borings in accordance with the *ASCE Recommended Practice for Plugging Soil Borings, 1969*, and in a manner that prevents subsequent settlement of the backfill and holes hazardous to persons, animals, or equipment. Upon completion of the field investigation, the Contractor shall remove all surplus material, temporary structures, and debris on land and water resulting from the Work. The Contractor shall leave the premises in a neat, orderly condition. The Contractor shall restore any areas disturbed during boring operations in the kind and character existing before the Work was started.

If flowing artesian conditions are encountered in a borehole, the Contractor shall ensure the flow is stopped, that the source is properly sealed against future leakage, and that the water is prevented from infiltrating other strata.

8.3.1.1.4 Field Testing and Sampling

Modified Standard Penetration Test

The Contractor shall perform SPTs and split-barrel sampling of soils in accordance with ASTM D 1586, with the following exceptions:

The Contractor shall calibrate the hammers used for SPTs. The Contractor shall note the calibrated hammer blow counts as N_{60} on the final boring logs after the conversion has been completed. In addition, the Contractor shall note on the first page of each boring log (in the Remarks column) the calibrated hammer efficiency and last calibration date. As an example, the text shall read “SPT hammer calibrated to 65 percent efficiency on 3/11/2000.”

Pressuremeter Test

The Contractor shall perform pressuremeter testing (PMT) in accordance with ASTM D 4719. Corrected pressure-volume data shall be presented in graphical format with supporting field data provided in tabular format. FHWA-IP-89-008 manual entitled “The Pressuremeter Test for Highway Applications” should also be reviewed before field PMT is attempted. The final foundation boring log shall indicate the depth(s) of the PMT information in a format agreed to by MDOT.

Soil Sampling

The Contractor shall perform Thin-Walled Tube Sampling of Soils in accordance with ASTM D 1587, with the following exceptions:

- Thin-wall samplers shall be 3 inches in outside diameter.
- The length of push shall not exceed 24 inches.

The Contractor shall perform the sampling of the type and frequency as indicated in the MDOT *Geotechnical Investigation and Analysis Requirements for Structures*.

Foundation Boring Field Logs

The Contractor shall prepare the foundation boring field logs in ink. The foundation boring field logs shall include the following information:

- Project identification number and bridge or structure number
- Location of boring referenced to preliminary centerline survey stationing measured to the nearest foot
- Boring log number
- Method of drilling and sampling
- Diameter of bore hole
- Date of start and completion of boring
- Name of driller and crew members
- Ground surface elevation measured to the nearest 0.5 foot
- Sheet number and total number of log sheets for each boring
- Definition of all symbols not otherwise self-explanatory
- Description of each layer encountered and sample obtained, including information pertaining to classification, thickness, color, strength, moisture condition (dry, moist, wet, saturated), composition, and degree of compactness
- Depth at which obstacles were encountered in advancing the boring
- Reason for abandoning boring in the event specified depth was not reached
- Water measurement data
- Description of drill rig
- Type of SPT hammer used
- Any other unusual conditions encountered during drilling and sampling

For rotary drill and hollow stem auger borings, field boring logs shall include the following additional information:

- Field number of each sample taken, type of sample, and depth taken
- Depth to which casing was driven
- Number of blows in 6-inch increments required to drive sampler during SPT

For borings in rock, the field boring logs shall include the following additional information:

- Length of each run for rock core and footage of core recovered
- Record of type of cuttings flushed to surface while plug-drilling
- Depth where drilling mud return circulation was lost
- Changes occurring in rate of advance of bit

8.3.1.1.5 Laboratory Soil/Rock Testing

General Requirements

Table 2 shows the minimum number of lab tests to be performed for each sample type. Additional lab tests may be required to determine additional soil properties such as strength, compressibility, and permeability.

Table 2: Required Lab Tests

Sample Type	Minimum Required Lab Tests
Thin-wall	One unconfined compression test One moisture test One unit weight determination
Split-tube	One moisture test

Moisture Content Tests

The Contractor shall determine moisture content of soil in accordance with AASHTO T265. The Contractor shall determine the moisture content for every sample procured by the supplemental boring program, except wash samples and tailings.

Unconfined Compression Tests

The Contractor shall determine unconfined compressive strength of cohesive soil in accordance with AASHTO T208, with the following exceptions:

- The Contractor shall collect specimens with a minimum diameter of 2.8 inches.
- Humidity room and vertical lathe are not required.
- Specimens shall be free of tailings, seams, cracks, and other characteristics that may affect the strength value obtained. The Contractor shall not obtain specimens from the upper 6 inches of thin-walled samples or from areas of noticeable disturbance caused by the sampling operation.
- Testing remolded specimens is not required.
- Testing by the Controlled Stress Method is not required.
- Preparing a load-strain graph is not required.
- The Contractor shall determine unconfined compressive strength from the maximum load value obtained or the load at 15 percent strain, whichever occurs first.

The Contractor shall conduct at least one unconfined compression test on each thin-walled sample of cohesive soil that is undisturbed.

Triaxial Compression Tests

If the Contractor chooses to determine strength parameters of soils by triaxial compression, tests shall be completed in accordance with AASHTO T297, Consolidated-Undrained Triaxial Compression Test on Cohesive Soils. Selection of samples for triaxial testing is at the discretion of the Contractor. The Contractor shall use three different consolidation pressures to define a failure envelope. When Mohr's circles have been plotted and a line cannot be constructed tangent to three circles, the Contractor shall perform an additional test at increased consolidation pressure.

Unit Weight Tests

The Contractor shall determine the moist unit weight in conjunction with unconfined compression tests. The same shall apply if triaxial compression tests are completed.

One-Dimensional Consolidation Tests

The Contractor shall determine one-dimensional consolidation properties of soils in accordance with AASHTO T216-94. Selection of samples for consolidation testing is at the discretion of the Contractor,

except that the Contractor shall selectively choose samples to represent major compressible soil strata on the overall Project. The Contractor shall not perform consolidation testing under any of the following conditions:

1. When the natural moisture content of the soils are near the plastic limit,
2. On soft soils near the ground surface (depths less than 10 feet) that will be excavated, or
3. When the proposed additional loading is 0.25 tons or less.

Specific Gravity

The Contractor shall determine specific gravity of soils in accordance with AASHTO T100. The Contractor shall determine the specific gravity of soils in conjunction with consolidation tests.

Atterberg Limit Tests

The Contractor shall determine liquid limit of soils in accordance with AASHTO T89. Selection of samples for liquid limit tests is at the discretion of the Contractor, except that the samples shall represent major soil strata on the overall Project. The Contractor shall determine the plastic limit (PL) and plasticity index (PI) of soils in accordance with AASHTO T90. The Contractor shall determine the plastic limit and plastic index for all samples tested for liquid limit.

Particle-Size Analysis

The Contractor shall determine particle-size analysis of soils in accordance with AASHTO T88. The Contractor shall determine the particle-size analysis for all samples tested for liquid limit.

Organic Content Tests

The Contractor shall determine organic matter content of soils in accordance with AASHTO T267. Selection of samples for organic matter content is at the discretion of the Contractor. The Contractor shall selectively choose samples for organic matter testing to represent major soil strata on the overall Project that are black in color or described as organic.

8.3.1.1.6 Foundation Boring Final Logs

The Contractor shall prepare foundation boring final logs based on the driller's field boring logs and containing all laboratory test results for each test boring. The boring log format shall match that used by MDOT. The final boring log title page shall contain:

- Boring number
- Unique boring number that begins where the previous borings on the site leave off so that boring numbers for the site are sequential
- Project number
- Bridge number, if applicable
- Preliminary centerline station and offset distance
- Surface elevation (NAVD 88 datum)
- NAD83 county coordinates
- Latitude and longitude
- Type of drilling equipment
- Definition of all symbols and terms that is otherwise not self-explanatory
- Sheet number and total number of log sheets for each boring
- Date of drilling

For rotary drill and hollow stem auger borings, the final boring log title page shall include the following additional information:

- SPT hammer type (auto or manual)
- SPT hammer calibration information (in notes column)
- Drillers' notes describing whether drilling mud was used

The final boring log body shall include:

- Depth scale
- Horizontal line at stratum change
- Elevation of bottom of boring
- All drillers' notes tabulated in relation to the zone where the conditions were encountered
- A description of material of each stratum
- Water level observation and a description of how water level was determined

For rotary drill and hollow stem auger borings, the finished boring log body shall include the following additional information:

- All laboratory test results tabulated in relation to the exact depth from which the sample was retrieved
- All corrected SPT values (N_{60}) tabulated in relation to the exact depth that the test was conducted

The Contractor shall prepare final borings log sheets from the field boring log information that meet the requirements of Section 8.2.2 and the MDOT *Bridge Boring Sample Plan*.

8.3.1.1.7 Sample Retention and Transfer

After samples are obtained, classified, tested, and logged, they shall be properly labeled with the Project, borehole, sample number, specimen depth, and date. Specimens shall be stored in a manner that preserves the moisture content, overall integrity of the sample and meets the requirements of ASTM D-4220 and D-5079. Undisturbed samples shall be kept from freezing. The Contractor shall retain all samples and/or specimens until completion of the Project. The Contractor shall deliver samples and/or specimens to the MDOT Construction and Technology building upon request.

Rock cores of soft/weak rock shall be wrapped in plastic to preserve the in-situ moisture conditions. Cores shall be placed in the box as shown in Figure 1. Typically, cores are sampled in 5-foot intervals. The starting and ending depth is written on wooden blocks located at the start and end of the core run. If, however, the length of the core run is less than 5 feet, more than one core can fit into the box. A block shall be placed between the two cores showing the ending depth of the first core and the starting depth of the second core. Information regarding the name of the Project, structure number, location, and depth information is written on the side of the box.

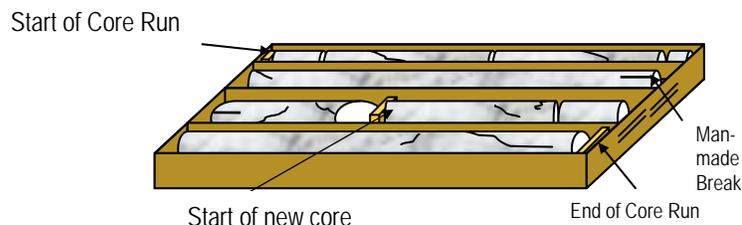


Figure 1: Rock Core Placement in Core Box

8.3.1.2 Supplemental Roadway Subsurface Investigations

Roadway subsurface investigation refers to soil borings, existing pavement cores, field tests, soil boring logs, and laboratory tests conducted to support the analysis and design of roadways, small culverts, pond areas, and infiltration zones.

The Contractor shall perform a supplemental roadway investigation to define the in-situ soil, rock, groundwater, and existing pavement/subgrade conditions, and to identify the material types and their engineering characteristics to the extent necessary for the design of the most economical, uniform, and stable temporary and permanent Roadways, as well as for the design of detention pond features and infiltration zones.

8.3.1.2.1 Roadway Boring Requirements

If the provided boring information does not encompass the Project, the Contractor shall obtain a sufficient number of tests and borings with sufficient depths to enable the preparation of the Materials Design Recommendation as described in Section 8.3.8.

When the Contractor proposes changes to the existing alignment that result in deviations of more than 50 feet horizontally, or where borings are less than 5 feet below the proposed new profile grade line in cut sections or less than 5 feet below existing ground in fill sections, the Contractor shall take borings approximately every 500 feet along the proposed changed alignment. On divided highways, the borings on the two roadways can be staggered, resulting in a 1,000-foot spacing along each alignment or bound (in the case where the divided roadway has one alignment and the median does not vary).

The Contractor shall perform sufficient land surveying work on the centerline to identify the location of Roadway borings to within 5 feet horizontally and within 0.5 feet vertically.

Borings shall provide a continuous profile of the subsurface soil conditions. If supplemental borings are required due to horizontal or vertical changes in alignment, the Contractor shall take borings to a depth of at least 10 feet below the proposed profile grade line in cut areas and at least 5 feet below natural ground in fill sections. At least one boring in each fill section shall extend to a depth equal to the height of the proposed fill. Where soils are encountered that are considered unsuitable for roadway embankment construction, frost heave textured material or contain peat, muck, marl or underlying very soft clay, the Contractor shall follow the requirements of Section 8.3.1.2.4 (Peat).

For embankments with fill heights greater than or equal to 10 feet, the Contractor shall perform a global stability analysis.

8.3.1.2.2 Solid Stem Auger

The Contractor shall obtain shallow soil borings through a pavement core hole to a depth of 5 feet below the top of pavement. If, based on previous projects and/or other available information, there is reason to believe the soil is questionable related to peat or muck, groundwater treatments, culverts in close proximity, existing settlement or any other evidence of soil instability, the Contractor shall propose boring depths and sampling procedures to MDOT for Approval.

The Contractor shall hydraulically pull soil borings taken in saturated, organic, or thin layered soils instead of being augered to the surface. However, the Contractor shall bring no more than 2.5 feet of material to the surface at one time.

For roadway borings deeper than 10 feet, Contractor shall conduct hollow stem auger borings in accordance with ASTM requirements.

8.3.1.2.3 Rock

If evidence of bedrock or auger refusal is found in any roadway boring, the Contractor shall take additional borings or soundings in the immediate area to determine the cause of refusal.

Where evidence suggests that buried bedrock lies above the proposed grade line, the Contractor shall take additional foundation borings. Roadway borings in rock shall extend to a depth of 5 feet below the top of the proposed pavement. The number of borings shall depend on anticipated rock variability and length of cut. On side-hill cuts, the Contractor shall take additional borings on the uphill side to reflect maximum rock cut and possible groundwater problems. Rock outcrops shall also be shown on the profile and cross-section sheets.

8.3.1.2.4 Peat

The roadway borings are to determine the character and depth of frost heave textured material, peat, muck, marl, or very soft clay material. The Contractor shall perform enough borings to identify the area, extent, and bottom profile of these materials. Standard penetration test (SPT) foundation borings or cone penetration test (CPT) soundings may be used to supplement information obtained from borings. Where deep deposits of compressible soils are encountered that will not likely be excavated, the Contractor shall perform laboratory testing for consolidation and slope stability.

The Contractor shall plot all unstable materials (such as, frost heave textured material, peat, muck, marl, or very soft clay material) soundings, borings, and water elevations on a layout and properly identify on the soils profile and cross-sections. At a minimum, the Contractor shall take borings at 50-foot intervals along centerline, and at 25-foot intervals each direction perpendicular to centerline, to the edge of unstable material or the right of way. All borings shall extend through unstable material to a point 5 feet into firm mineral soil. Where the unstable material section has a sloping bottom or the location alignment encounters the unstable material area at a point where the roadbed would be partially on unstable foundation materials and partially on higher, more stable ground, additional soil borings are necessary.

8.3.1.2.5 Existing Pavements

If not provided by MDOT, the Contractor shall take core borings of existing pavements to verify the thicknesses of existing areas of paved surfaces are adequate (i.e., roadway shoulders) to be used to carry traffic during construction. The Contractor shall record thicknesses of bound surfacing and aggregate base. The Contractor shall take cores in all pavement areas where it can be reasonably ascertained that a change in material type or thickness exists.

8.3.1.2.6 Field Testing and Sampling

The Contractor shall take at least two representative samples of each major soil type (textural class) for laboratory testing and identification.

The Contractor shall retain and make available to MDOT additional representative samples of each major soil type through the life of the Project.

Minimum sample quantities required for disturbed roadway boring tests shall be per the applicable Michigan Test Method.

Sampling for hollow stem auger roadway borings shall be in accordance with the requirements of Section 8.3.1.1.3 (Subsurface Investigation/Hollow Stem Auger Method).

No composite sampling of subbases is allowed.

8.3.1.2.7 Laboratory Testing

The Contractor shall perform laboratory soils tests of sufficient number and type to ascertain the nature, strength, conditions, stability, and consolidation characteristics of soil conditions existing at the Site that influence the proposed design and construction activities. Laboratory tests required are Atterberg limits,

particle size (percent sand, silt, and clay), organic content, and Proctor density. The Contractor shall perform laboratory testing in accordance with the procedures set forth in the *MDOT Geotechnical Investigation and Analysis Requirements for Structures*.

Gradation testing shall be in accordance with MTM 109-97 and MTM 108-97, Minimum sieves to be included for MTM 109-97 are the 25.4 mm, #4, #8, #16, #30, #40, #50, #60, #80, and #100. Materials larger than 25.4 mm shall not be included in the MTM 108-97 analysis.

Permeability testing, if needed, shall be in accordance with MTM 122-97.

8.3.1.2.8 Roadway Boring Field Logs

The Contractor shall prepare a field boring log in ink for each roadway boring in the supplemental subsurface investigation and shall include a copy in the Materials Design Recommendation. The field boring logs shall include the following information:

- Date and site of core/boring
- MDOT job number (JN)
- Core/boring longitudinal location by station or distance offset from a physical item.
- Core/boring lateral offset in feet from physical item (curb, edge of metal etc.)
- Survey location of boring in Horizontal Datum
- Core/boring reference to lane in which it was obtained
- Core/boring identification number
- Graphic profile of the core describing conditions and depth in inches or feet, with pavement layers, deterioration (type), reinforcing steel, and coarse aggregate all noted
- Graphic profile of soil conditions and depth of layers in inches or feet
- Aggregate base depth, aggregate base material type, subbase depth, soil classification, consistency, compactness, collection of soil sample, and moisture conditions
- The exact depth of each layer shown on the graphic profile
- Names of the investigation crew members

8.3.1.2.9 Roadway Boring Final Logs

The Contractor shall prepare final boring log sheets from the field boring log information that meet the requirements of Section 8.2.2 and the *MDOT Road Boring Sample Plan*.

8.3.2 Foundation Analysis and Design

The Contractor shall perform analyses of foundation borings and prepare foundation analyses and recommendation reports for all proposed structures using the borings provided by MDOT, if applicable, and borings from the Contractor's supplemental investigation, if completed. The Contractor shall perform all foundation analyses and designs using the LFD method. The Allowable Stress Design (ASD) Method shall only be used where LFD design methods do not exist in the provided standards.

8.3.2.1 Project Specific Requirements

8.3.2.1.1 Re-use of Existing Foundations

The Contractor may reuse in-place substructures.

8.3.2.2 Foundation Design Criteria

The Contractor shall meet the requirements of the *MDOT Bridge Design Manual - Chapter 7: LFD*.

8.3.2.3 Foundation Analysis

Methods and procedures for analyzing stability, settlement, bearing capacity, and pile requirements are at the discretion of the Contractor, except that the Contractor shall indicate all assumptions, soil parameters, water levels, and design criteria in the report.

The Contractor shall analyze the following:

- For structures, suitable foundation types.
- For spread footing foundations, a bearing capacity and settlement analysis. The analysis shall also include an estimate of the total and differential settlements anticipated for each structure analyzed. In addition, the Contractor shall include an estimate of the time rate of settlement to account for the primary and secondary settlement that may be expected over the life of the Project. The Contractor shall design all spread footings for a minimum embedment depth of 4 feet to protect against frost heave effects.
- For piles, nominal resistance graphs that show the capacity in relation to tip elevation for both compression and tension. In addition, the Contractor shall calculate and consider down drag and lateral squeeze. The Contractor shall develop lateral earth pressure calculations including parameters for P - y curve development for structures subject to horizontal loads. The Contractor shall provide minimum tip elevations, casing requirements, and estimates of overdrive. Static analysis shall not be used to determine the resistance of piles. The maximum nominal pile resistance for the proposed pile sections shall not exceed values given in the MDOT *Bridge Design Manual* - Chapter 7: LFD.
- For drilled shafts, nominal resistance graphs that show the capacity in relation to tip elevation for both compression and tension. In addition, the Contractor shall calculate and consider downdrag and lateral squeeze. The Contractor shall develop lateral earth pressure calculations including parameters for P - y curve development for structures subject to horizontal loads. The Contractor shall provide minimum tip elevations and casing requirements.
- The Contractor shall analyze structures supported on rock or tied to rock formations. This includes analyses for areas such as rock bolts and rock cuts.
- Continuous flight auger piles may not be used for foundation support.
- Soil nail walls will not be allowed as part of permanent work.

8.3.3 Roadway Analysis and Design

8.3.3.1 Roadway Design Criteria

At a minimum, the Contractor shall provide the pavement sections specified in Section 8.3.5.

Compaction shall follow the compaction requirements in the Standard Specifications.

If local streets or roads are impacted by the Project and a pavement section is not provided by MDOT in the Contract Documents, the Contractor shall design local streets and roads to carry projected ESALs (Equivalent 18-kip Single Axle Loads) for 20 years minimum and also comply with local municipality/road authority requirements. Subsurface drainage outlets shall not cross roadways. Left and right side subsurface drainage systems shall not use a common outlet pipe.

Differential settlement across approach slabs shall not exceed 0.50 inches in 25 feet. The Contractor shall implement ground improvement techniques to the approach embankment subgrade, if necessary, to meet this requirement.

8.3.3.2 Detention Ponds and Infiltration Zones

Not Used.

8.3.3.3 Alternative Designs

The following are unacceptable alternatives for pavement design:

-
- Change in surface type (bituminous or concrete) for any pavements covered in the pavement selection in Section 8.3.5.
 - Fly ash, or other chemical stabilization of subgrade soils or aggregate subbase and base in the upper 3 feet of the grading subgrade.
 - Alternatives that result in a decrease in the depth of non-frost susceptible material.
 - Decreases in thickness relative to minimum structural requirements. This applies to individual layer thicknesses, as well as the total minimum structural requirements.
 - Decreases in granular equivalent (GE) relative to minimum structural requirements. This applies to individual layer GE, as well as the total minimum GE structural requirement.
 - High strength concrete.

8.3.4 Geotechnical Instrumentation Plan

If temporary pavement, temporary pavement slopes, bridge elements, slopes or embankments adjacent to a bridge are supported by temporary means, the Contractor shall determine what geotechnical instrumentation is required to monitor settlement and vibrations to protect the project area and develop, implement, and maintain a documented Geotechnical Instrumentation Plan. All geotechnical instruments shall be installed and monitored by the Contractor. Any instruments damaged during construction and requiring removal and/or recalibration shall be replaced and/or recalibrated by the Contractor. If temporary pavement is supported longitudinally, monitoring shall be completed at a maximum spacing of 100 feet but the Contractor shall evaluate the specific situation and provide additional monitoring at critical areas.

Prior to beginning geotechnical instrumentation, the Contractor shall identify and submit in writing to MDOT the recommended instrument types, locations, installation requirements, zones of influence, critical readings, and frequency of readings. This plan shall also include the content to be shown in the Geotechnical Instrumentation Report submitted during construction as well as the action plan that will be implemented if any measurements are above critical readings.

Depending on the Contractor's approach to the Work, the plan shall include instrumentation to protect temporary pavement, adjacent structures or slopes. The Geotechnical Instrumentation Plan may include such parameters as:

- Settlement and settlement rates of embankments or temporary pavements
- Pore water pressures
- Groundwater levels
- Stability of bridges, walls, slopes, and temporary or permanent pavement

The Contractor should pay particular attention to construction methods that may induce settlement or vibrations (pile driving, steel sheet installation, etc.) and deploy monitoring instrumentation accordingly. A baseline of existing vibration information shall be gathered to compare construction vibrations prior to construction activities that will induce vibrations. Refer to Section 13 (Structures) for additional information on monitoring vibrations.

8.3.5 Paving Design Requirements

8.3.5.1 Subgrade Undercutting

Subgrade undercutting is required where soil of poor quality is uncovered that does not meet the requirements of the Standards or will not support the loading applied to it. The Contractor is responsible for addressing areas regarding subgrade undercutting in accordance with the Standards.

8.3.5.2 Full-Depth Concrete Pavement Section

Pavement sections shall be concrete and, at a minimum, meet the requirements shown in the following table:

Table 3: Minimum Concrete Full-Depth Pavement Section

Location	Layer Description	Minimum Thickness (in)	Transverse Joint Spacing (ft)
Truck Road 4/3 Roadway	Conc Pavt, Misc, Nonreinf, High Performance	12	14
Southern Special Return Route All ingress and egress points adjacent to the 4/3 Roadway	Aggregate Base, (21AA)	16	-
DIBC Plaza Fort Street	Subbase, CIP (Class II)	12	-

8.3.5.2.1 Pavement Section Requirements

Concrete pavement shall comply with the MDOT Special Provision – High Performance Portland Cement Concrete Grade P1 (Modified). A uniform thickness is required for all pavements.

Underdrains shall be a minimum of 6 inches in diameter and be wrapped per MDOT Special Detail R-80-Series. Underdrain inverts shall be placed with the top of pipe at a minimum of 2 inches below the bottom of subbase and the trench shall be backfilled with granular material Class IIA in accordance with the Standards.

No intermixing of pavement types will be allowed.

Lanes greater than 12 feet wide shall have a longitudinal joint placed at the center of the lane.

Place tie bars at 6” depth.

8.3.5.3 Access Drive

The pavement design for the Access Drive shall be according to the following table:

Table 4: Minimum HMA Full-Depth Pavement Section – Access Drive

Location	Layer	Layer Description	Minimum Thickness (in)	Application Rate (lb/SY)	Performance Grade
Access Drive	Top	LVSP/E03 (AWI = N/A)	2	220	64-22
	Leveling/ Base	LVSP/E03	2	220	64-22
	Aggregate Base	21AA	6	-	-

The Contractor shall design and construct all tie-in work to avoid differential problems, accounting for factors such as total surfacing thickness, minimum structural requirements, unbound base/subbase thickness, and frost-free characteristics.

8.3.5.4 Subsurface Underdrains

The Contractor shall provide underdrains as specified in Section 8.3.5.2. The Contractor shall meet the requirements of MDOT Special Detail R-80-Series and the remaining Standards, as applicable. Underdrains shall outlet into the nearest storm sewer system at least 4 inches above the storm sewer structure invert. Underdrains shall drain no more than 30 feet of pavement width. When additional underdrains are required, they shall be placed in the center of a lane. Maximum spacing between underdrain outlets shall be 300 feet. Underdrain outlets shall have a desirable slope of 4 percent, with a minimum slope of 1 percent. Where Site conditions are restrictive, slopes flatter than 1 percent to provide positive drainage may be allowed, with Approval by MDOT.

8.3.5.5 Sidewalks

Sidewalk shall be 4-inch concrete over a minimum of 4 inches of granular material. Sidewalk within 6 feet of roadway intersection corners shall be constructed of 8-inch-thick concrete where large loads, such as semi-trailers, can access the walk. Sidewalk disturbed due to performing the Work shall be replaced in kind.

8.3.6 Excavations and Embankments

Not used.

8.3.7 Foundation Analysis and Design Report

The Contractor shall use the subsurface investigation information provided, along with any supplemental information necessary, to produce a Foundation Analysis and Design Report for each structure on the Project, including engineering analyses and design recommendations. Each report shall include a letter that contains a Project reference, a brief description of the proposed design, the number of borings taken by the Contractor, which borings were used for design that were provided by MDOT, a brief description of the soils and groundwater conditions encountered, and if required, conclusions of an engineering analysis and design recommendations.

8.3.7.1 Presentation of Foundations Investigation

The plotted borings may be abbreviated, but shall include soil and rock classifications, Standard Penetration Test values, unconfined compression test results, and where soils become saturated or where groundwater conditions are encountered, all plotted with depth. The Contractor shall make all plots on tabloid-size (11-inch by 17-inch) paper and plotted to an engineering scale.

8.3.7.2 Project Information

The Foundation Analysis and Design Report shall contain a separate section labeled “Project Information.” This section shall include information about the types of structures analyzed, the locations of the structures, and any other pertinent information that aids in the general description of the design.

8.3.7.3 Subsurface Investigation Summary

The Foundation Analysis and Design Report shall contain a separate section labeled “Subsurface Investigation Summary.” This section shall include information about the borings taken by the Contractor for the Project, a brief description of the foundation soil and rock conditions, a summary of the water level measurements taken, and an interpretation of the static water level. Information shall be submitted in the form of plotted borings on proposed plans, profiles, and cross-sections. Also included in this section shall be a list of borings provided by MDOT that were used by the Contractor.

8.3.7.4 Foundation Analysis

The Foundation Analysis and Design Report shall contain a separate section labeled “Foundation Analysis.” In this section, the Contractor shall summarize the results of a detailed foundation analysis to identify critical design elements and provide a basis for foundation recommendations. At a minimum, the Contractor shall address the following:

1. The foundation analyses listed in Section 8.3.2.3
2. A summary of the design assumptions, including information about embankment fill heights, unit weights of fill, side slope and end slope angles, bridge loading information (both axial and horizontal), retaining wall loading information, design methodologies, and other pertinent information
3. An evaluation of MDOT borings used by the Contractor and the assumptions and design completed from these borings
4. Construction considerations such as design of temporary slopes and shoring limits
5. Subcut recommendations and backfill requirements (including details prepared by the Contractor for the Project)
6. Construction staging requirements, where applicable

8.3.7.5 Foundation Recommendations

The Foundation Analysis and Design Report shall include a section labeled “Foundation Recommendations.” This section shall include definitive recommendations listed as follows:

1. Nominal bearing capacities and associated performance factors for the recommended foundation type.
2. Recommended design soil parameters (e.g., coefficient of friction, lateral earth pressure coefficients, etc.)
3. Recommended footing sizes and embedment depths
4. Recommended pile section, minimum pile tip elevation, and estimated pile tip elevation
5. Recommended drilled shaft dimensions and construction methods
6. Recommended slope angles
7. Waiting periods for embankments
8. Surcharge systems recommendations
9. Recommended foundation types, sizes, and embedment depths
10. Recommended rock cut slopes, including slope and subsurface drainage recommendations
11. Topsoil excavations and unstable materials (such as, frost heave textured material, peat, muck, marl or very soft clay material) and poor soil excavations
12. Trench excavation slopes
13. Temporary slopes and shoring limits
14. Rock excavation and any other recommendations as they apply to the design
15. Temporary earth retention system layout(s)
16. Temporary cofferdam layout(s)

8.3.8 Materials Design Recommendation

The pavement section material thicknesses and types provided to the Contractor are minimums, and it is possible not all roadway materials or sections are provided in the Contract Documents. As such, the Contractor shall prepare recommendations for Project features not provided that could include unstable material (such as, frost heave textured material, peat, muck, marl or very soft clay material), peat excavations, subgrade excavations, embankment construction (including the need for special materials, controlled rate of fill, etc.), need for perforated pipe or dewatering, frost treatments, shrinkage factors, turf establishment, detention ponds, infiltration zones, and base and surfacing design. This information shall be provided regardless of whether the minimums of the Contract Documents will be met.

The Contractor shall prepare the Materials Design Recommendation in accordance with MDOT 2003 *Standard Specifications for Construction*, MDOT *Materials Quality Assurance Procedures Manual* and MDOT *Material Source Guide*. In addition, the Contractor shall address temporary and permanent dewatering and the potential impacts of dewatering on nearby structures, wells, springs, etc. The Contractor

shall not address foundation design recommendations in the Materials Design Recommendation, as those are addressed in the Foundation Reports.

8.4 Construction Requirements

8.4.1 Protection of the Grade

The Contractor shall protect the existing and proposed subgrade and subbase layers of the Project and plan means and methods accordingly so the earth grade is not damaged. Costs associated with repairing or replacing earth grade damaged by the Contractor shall be borne by the Contractor.

Items to consider regarding protecting the grade include, at a minimum: haul route location and temporary drainage so water is not trapped in or against the grade, the size or type of equipment used to perform the Work, the frequency of construction traffic, and location and the method of material placement.

8.4.2 Geotechnical Instrumentation Report

If a Geotechnical Instrumentation Plan is required as part of the Work, the Contractor shall submit a Geotechnical Instrumentation Report weekly, at a minimum, or within 24 hours after an event in which the Project was impacted or action was taken by the Contractor or MDOT due to instrumentation readings recorded or settlement of retained pavement is observed or reported. The format and content for this report shall be as agreed to in the Approved Geotechnical Instrumentation Plan.

8.4.3 Density Requirements

At a minimum, the Contractor shall provide density control that meets the requirements set forth in the following:

- MDOT *Density Control Handbook*
- MDOT 2003 *Standard Specifications for Construction*

8.4.4 HMA Pavement Requirements

The following MDOT Frequently Used Special Provisions shall be followed for completion of this Project: 03SP501(B), 03SP501(C), 03SP501(F), 03SP502(F) and 03SP504(C). 8.4.5 ***Concrete Pavement Requirements***

The following MDOT Frequently Used Special Provisions shall be followed for completion of this Project: 03SP602(B), 03SP602(L) and 03SP605(B). 8.4.6 ***Reusing Existing Materials***

If materials that currently exist on the Project will be disturbed and reused on the Project, these materials shall be stockpiled for MDOT to sample, test, and Accept. Other means besides stockpiling may be acceptable and can be proposed by the Contractor for MDOT Approval.

8.4.7 Open-Graded Underdrain Video Inspection

All underdrains and underdrain outlets installed on this Project will be subject to video inspection. The Contractor shall complete video inspections of open-graded underdrains and underdrain outlets as directed by MDOT on 10 percent of the underdrains and underdrain outlets installed on this Project after Roadway pavement placement, but before shoulder paving is performed. Should deficiencies be found, a more extensive video inspection with expanded video coverage will be conducted, as directed by MDOT. The Contractor shall submit to MDOT a Log of Installed Underdrain Outlets detailing the locations of all drain outlets that are installed on this Project. These drain outlets include, but are not limited to, bank drain outlets, subgrade and subbase underdrain outlets, and open-graded underdrain outlets. Underdrain outlets, including outlet endings, must be completely installed prior to conducting the video inspection. Corrective action, including excavation and repair or removal and replacement of the underdrain or underdrain outlets, will be required if any of the following defects are found:

1. Crushed pipe
2. Separated joints
3. Plugged underdrain or underdrain outlet pipe
4. Standing water exceeding one-half the pipe diameter for a distance of more than 25 feet.
5. Other non-specification installation deficiencies

The Contractor's repair method and/or removal and replacement method must be Accepted by MDOT prior to conducting this work. All corrective action must be completed within 10 Days of completion of video inspection or by a date agreed upon with MDOT.

All excavation, repair, removal and replacement, and backfill of the deficient underdrain or underdrain outlet and replacement and compaction of the overlying fill, geotextile separator, aggregate base separator course, and open-graded drainage course materials will be the responsibility of the Contractor. In the event that the finished shoulder material is in place at the time the deficiency is discovered, this material will also be removed and replaced at the Contractor's expense and by an Acceptable method.

The Contractor shall submit to MDOT an Underdrain Inspection Report that contains a copy of the video inspection, a summary of findings with location, date video inspection completed, who completed the inspection, location(s) of underdrain and/or underdrain outlets video inspected and the proposed method of repair, removal or replacement.

8.4.8 Material Transfer Device

Not Used.

8.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Subsurface Investigation Report	Approval	0	1	Approval required before the start of field operations	8.3.1
Foundation Boring Field Logs	Acceptance	0	1	Within 15 Days of completing field work	8.3.1.1.4
Roadway Boring Field Logs	Acceptance	0	1	Within 15 Days of completing field work	8.3.1.2.8
Foundation Boring Final Logs	Acceptance	0	1-PDF, 1-Microstation	Within 30 Days of completing field work	8.3.1.1.6
Roadway Boring Final Logs	Acceptance	0	1-PDF, 1-Microstation	Within 30 Days of completing field work	8.3.1.2.9
Foundation Lab Testing Data	Acceptance	0	1	With Foundation Boring Final Logs	8.3.1.1.5

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Roadway Lab Testing Data	Acceptance	0	1	With Roadway Boring Final Logs	8.3.1.2.7
Subgrade Undercutting Plan of Action	Acceptance	0	1	Within 5 Days of the inspection but before Work begins	8.3.5.1
Foundation Analysis and Design Report	Acceptance	0	1	Within 15 Days of Foundation or Roadway Boring Final Logs	8.3.7
Subsurface Investigation Summary	Acceptance	0	1	With Foundation Analysis and Design Report	8.3.7
Materials Design Recommendation	Acceptance	0	1	With or before Release for Construction Documents	8.3.8
Geotechnical Instrumentation Plan	Acceptance	1	1	With or before Release for Construction Documents	8.3.4
Geotechnical Instrumentation Report	Acceptance	1	1	Weekly or as required by Materials Design Recommendation	8.4.3
Log of Installed Underdrain	Acceptance	0	1	Within 5 days of completing installation	8.4.7
Underdrain Inspection Report	Acceptance	0	1 – PDF of report 1- DVD of video	Within 5 Days of the inspection	8.4.7

EXHIBIT 2-8-A

Pavement Boring Data

This file will be provided in an addendum.

EXHIBIT 2-8-B

Foundation Boring Data

This file will be provided in an addendum.

9 LAND SURVEYING

9.1 General

The Contractor shall conduct all Work necessary to meet the requirements associated with land surveying, including secondary horizontal and vertical control surveys, mapping and subsequent topographic surveys, bridge surveys, utility surveys, soils surveys, construction surveys, as-built surveys, hydraulics surveys, and all other land surveying services necessary to complete the Project in an accurate, neat, and timely fashion. All survey work shall be conducted under the direct supervision of a Professional Surveyor licensed to practice in the State of Michigan.

9.2 Administrative Requirements

9.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to land surveying, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Special Provision – The Preservation and Perpetuation of Public Land Survey Corners, Property Controlling Corners, Alignment Control Points and Horizontal Control Points
- MDOT *Standards of Practice- Design Surveys*
- MDOT *Design Survey Manual*
- MDOT Frequently Used Special Provisions
- MDOT *Road Design Manual*
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT CAD Standards
- National Spatial Data Infrastructure *Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy, FGDC-STD-007.3-1998*
- American Congress on Surveying and Mapping and the American Society of Civil Engineers *Definitions of Surveying and Associated Terms*
- Remaining standards set forth in Book 3

9.2.2 Survey Data Provided to the Contractor

The Contractor shall verify and confirm the location, accuracy, and datum of all information provided to the Contractor, regardless of the source of the information. The Contractor shall document all forms of data verification. If the Contractor identifies any discrepancy, the discrepancy shall be reported in writing to MDOT for review. MDOT will respond to the discrepancy within five Working Days.

MDOT will perform and/or provide the following items:

- The locations and coordinate values of the available horizontal control and vertical control benchmarks (Exhibit 2-9-A) within the Project
- The locations of buildings, structural survey, and existing drainage structures within the Project area, and topographic survey within the Ambassador Bridge Plaza, including survey data (Exhibit 2-9-B)

9.2.3 Survey Coordination and Qualifications

The Contractor shall designate a Survey Manager for the Project. The Survey Manager must be currently licensed as a Professional Surveyor in Michigan. The Survey Manager shall manage all Contractor survey

activities associated with the Project, be responsible for directing and reviewing all Contractor and Subcontractor survey work, and be the point of contact for all survey activities.

The Survey Manager shall be available to be on Site during design and construction activities. The firm completing surveying tasks shall be prequalified by MDOT to perform Right-of-Way Surveys, Road Design Surveys, Structures Surveys, and Hydraulics Surveys.

9.3 Design Requirements

9.3.1 Survey Control Requirements

9.3.1.1 Survey Control Adjustments and Accuracy

The Contractor shall document the use of present survey control networks and the establishment of any subsequent survey control networks that will be used in conjunction with the Project. These records shall include survey control monument coordinates, descriptions, adjustment reports and establishment methods.

9.3.1.2 Survey Control Datum

The horizontal survey datum used for the Project is the North American Datum of 1983 (NAD 83), CORS (2011). The vertical survey datum is on a local Project Datum derived from a previous design project (JN 110565, CS 82194; Sheet 13). Any additional design survey work completed shall be completed on these datums.

9.3.2 Preservation of Survey Monuments

9.3.2.1 Existing Survey Control Monuments

The Contractor shall locate and preserve all previously established survey monuments located within the Project. The Contractor shall be responsible for notifying MDOT in writing of all such survey monuments that will be disturbed as a result of the Project at least five Calendar Days prior to their disturbance. The Contractor shall follow the MDOT Special Provision - The Preservation and Perpetuation of Public Land Survey Corners, Property Controlling Corners, Alignment Control Points and Horizontal Control Points.

9.3.2.2 Public and Private Land Survey Monuments

The Contractor shall locate and preserve the location of all previously established public land survey system (PLSS) monuments and monuments marking property corners located within the Project. The Contractor shall be responsible for perpetuating the location and replacing the monuments of all such PLSS survey corners that are disturbed as a result of the Project. The Contractor shall be responsible for perpetuating the coordinate location of all monuments marking property corners that are located within the Right-of-Way of the Project. The Contractor shall replace all monuments disturbed as a result of the Project, including those located outside the Right-of-Way.

9.3.3 Design and Right-of-Way Surveys

9.3.3.1 Mapping

The Contractor shall conduct all tasks necessary to complete all mapping for the Project. This shall include all planimetric, topographic, design, utility, alignment, hydraulics, and base maps necessary to complete the Project. The Contractor shall submit to MDOT for review and Approval a detailed Survey Work Plan which defines the proposed additional survey to support the Project design within 15 Days of NTP.

9.3.3.2 Location Surveys

This shall include location surveys as described below. This list is not intended to be all-inclusive, but rather to cover location surveys commonly encountered.

- Road design survey

-
- Bridge survey
 - Hydraulic/hydrology survey

9.3.3.3 Right-of-Way Surveys

If the Contractor's design requires additional ROW, the Contractor shall perform the ROW survey, as needed.

9.3.4 Survey Records and Reports

The Contractor shall maintain neat and accurate documents for all survey operations conducted throughout the Project. These records shall include all calculations, staking notes, and field crew daily diaries. The Contractor shall write a formal survey report for all survey calculations related to survey control networks, road alignments, property boundaries, public land survey system surveys, and ROW surveys. The intent of each report is to document and perpetuate the information and rationale used to determine the survey data that is part of the Project. The Contractor shall provide full documentation of the surveying work performed by the Contractor as outlined in Exhibit 2-9-C (Checklist for Survey File Documentation Requirements). The survey records and reports shall be signed by a Professional Land Surveyor licensed in the State of Michigan.

9.4 Construction Requirements

9.4.1 Construction Surveys

The Contractor shall perform all construction staking necessary to facilitate all construction operations for the duration of the Project. As with the design survey, this work must be conducted under the direct supervision of the Survey Manager.

The firm completing construction staking shall be prequalified by MDOT to perform Construction Staking.

9.4.2 As-Builts

The Contractor shall produce reports documenting the location of the as-built alignments, profiles, structure locations, Utilities, and survey control monument placement. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. The Contractor's as-built data shall include the coordinate types (x , y , and/or z) and feature codes in the same format that the preliminary construction data was generated in. Where data has been provided to the Contractor from MDOT in an x , y , z coordinate format, the Contractor shall provide MDOT with data in an x , y , z coordinate format. Where data has been provided to the Contractor from MDOT in an x , y only coordinate format, or z only coordinate format, the Contractor shall provide MDOT with data in an x , y only coordinate format, or z only coordinate format.

9.4.2.1 Survey Base Map

The Contractor shall provide to MDOT a coordinate correct as-built survey base map file in MicroStation Version 8 format (.DGN). This file will include:

- Utilities – Structures and related items above and below the ground that are part of the power, water, sewer (storm and sanitary), natural gas, telephone, communications, and pipeline systems within the Project. The Contractor shall collect and record x , y , z coordinate information for all underground facilities associated with ITS, culverts, storm sewer, and all Utilities that are installed as part of the Project when the installation is complete, whether the installation is performed by the Contractor or a Utility Owner. The Contractor shall provide MDOT and the Utility Owner with a copy of the coordinate information, which shall, at a minimum, meet the following requirements:
 - The underground facilities shall be located and measured to an accuracy range of plus or minus 6 inches following *Geospatial Positioning Accuracy Standards, Part 3: National Standards for Spatial*

Data Accuracy. Storm sewer, culverts, and sanitary sewer elevations shall be located and measured to an accuracy range of plus or minus 0.1 foot.

- The measurement shall be reported in *x, y, z* coordinates referenced to the Project horizontal and vertical datum.
- The horizontal and vertical alignment and elevation position shall be reported at minimum intervals of 100 feet and at each point where the direction of the facility is intentionally changed. The *x, y, z* coordinates shall define the top center of the facility, except for gravity lines, where the coordinates shall define the invert of the facility.
- For facilities installed by jacking, boring, plowing, or other means that do not involve an open trench, the *x, y, z* coordinate information shall be provided at the endpoints of the casing, pipe, or other such underground facility being installed, and at each point where the direction of the facility is intentionally changed.
- Alignment – The location of the “as-constructed” roadway alignment within the Project.
- Survey Control – The location and coordinate values of the available horizontal and vertical control stations within the Project.
- As-Built topography that includes, at a minimum, proposed edges of pavement, edges of shoulder, ditch lines, guard rail, bridge deck outlines, barriers, curb and gutter and retaining walls in addition to the existing topography provided in the Contract Documents that remains after Work is complete.

The Contractor shall provide a GEOPAK database file (.GPK) containing coordinate geometry and feature code information for the above mentioned Utilities, property information, alignment, and survey control items.

The Contractor shall provide a GEOPAK as-built drainage database file (.GDF) consisting of the as-built storm sewer system.

All as-built survey files shall be delivered within 15 Calendar Days of Substantial Completion of the Project or with the As-Built Documents if delivered prior.

9.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Survey Work Plan	Approval	1	1	Within 15 Days of NTP.	9.3.3.1
Survey Records & Reports (including Portfolio)	Approval	1	1	At Substantial Completion unless requested earlier by MDOT	9.3.4 and Exhibit 2-9-D

Deliverable	For Acceptance	Number of Copies		Submittal Schedule	Reference Section
As-built survey map	Approval	0	1	Within 15 Days of Substantial Completion or with As-Built Documents, if delivered prior	9.4.2.1

EXHIBIT 2-9-A

Horizontal and Vertical Control Data

This file will be provided in an addendum.

EXHIBIT 2-9-B

Topographic Field Survey Data

This exhibit is provided as a series of electronic files.

Exhibit 2-9-B1 – File name: 116071_PL.DGN

File description: 2d MicroStation file of the complete final Survey Map to include but not limited to the following features: location of all buildings, drainage structures (storm and sanitary) with connectivity, utility features, boring locations, bridge substructure units, fences, barriers, slabs and surface materials; reference line layout for piers 11-13

Exhibit 2-9-B2 – File name: 116071_TRIANGLE.DGN

File description: 3d MicroStation file of the edited triangles that represent the DTM surface
TIN

Exhibit 2-9-B3 – File name: 116071_DTM.DAT

File description: A DTM file that can be read directly into GEOPAK to create the TIN.

Exhibit 2-9-B4 – File name: 116071_S01_BOTTOM OF BEAMS.PDF

File description: A PDF file containing a sketch illustrating the bottom of beam and pier cap elevations of structure S01.

Exhibit 2-9-B5 – File name: 116071_STRUCTURE_INVENTORY.XLS

File description: An Excel spreadsheet containing the drainage structure inventory that is correlated to the connectivity map with rim and invert elevations, pipes size and directions.

These files will be provided in an addendum.

EXHIBIT 2-9-C

Checklist for Survey File Documentation Requirements

PORTFOLIO & CD CONTENTS

NOTE: This document outlines the *minimum* required deliverables for Design-Build projects only. It supersedes the Portfolio and CD Contents requirements for these types of projects only. Additional survey documentation may be required as defined in Book 2 of the contract documents. Any deviation from these requirements must be approved by the MDOT Project Manager.

In order to reduce paper and speed the retrieval of information, the MDOT Design Survey Unit is making a conscious effort to move to a “paperless portfolio” as much as possible. Given the nature of the industry, some paper will still need to be provided for legal reasons. During this time of transition, a paper portfolio is required with the contents as stated in the table below. **Everything listed below shall be in the Adobe Acrobat Master file.** One portfolio and two sets of CDs are required to be sent to the Design Project Manager for distribution to the MDOT Supervising Surveyor of the Lansing MDOT Design Survey Services Unit for archival purposes.

The survey submittal shall be contained in 10" by 12" divided portfolios with flap covers. The number of portfolios needed should be used to contain all the required papers and CDs. Each portfolio shall be labeled on the outside as per the following example:

SURVEY NOTES FOR:

Structure number B01 Survey Order 9092

CONTROL SECTION 99999 JOB NUMBER 99999 ROUTE M-99

LOCATION AND PROJECT LIMITS DATE

BY Organization SURVEYOR John J. Doe LICENSE # 12345

Portfolio _____ of _____ Copy _____ of _____

Sections in the portfolios shall be labeled as to the type of data contained in that section. A portfolio may contain several types of data but no section of the portfolio should contain more than a single type. Every sheet in each portfolio shall be marked with Control Section, Job Number, Section and Page Number. Compact Disks (CD’s) or DVD’s shall be labeled with the same information as the portfolio and clearly show the Date of the latest revision and placed in the Administration Folder.

There are six general types or sections of information obtained in each of the five survey categories or a deliverable MDOT Design survey. When the survey is completed, the notes are assembled in a portfolio for hard copy record and on a CD or DVD to submit to the MDOT Project Manager arranged in "sections" or folders. Presentation must be made in the following format:

Hard-Copy Portfolio	Include on CD	Include in PDF	Administration Folder
X		Include as bookmarked on left side of screen	Table of Contents matching portfolio contents
X		X	MDOT Form 222 (5/01) Survey Notes Receipt and Transmittal filled out with the appropriate data in each block and signed
X		X	QA/QC Certification, signed and sealed by the Project Survey Manager
X		X	<p>Complete synopsis in a Surveyors Project Report of the survey containing:</p> <ul style="list-style-type: none"> • Explanation of any deviation from the Scope and/or the Standards • Basis of horizontal and vertical control, with specific emphasis on datum sources used (CORS and NAVD benchmarks tied), equipment, software, methods used to establish the components, errors detected and methods used to eliminate them • Legal, Survey, or As-constructed alignment, information and method used to compute its location • Property issues addressed, with specific information that may be useful for a surveyor to retrace or an engineer during design. If necessary, refer to specific conversations with property owners and their concerns • Any mapping issues encountered, with specific information that may be useful for an engineer during design • Any information obtained regarding drainage issues reported by local authorities or residents should be discussed • If RTK is used, explain the methodology, equipment and procedure used. Include any station names of any NGS control monuments used, or other points with geodetic and State Plane coordinates • Discuss the contents of anything that appears in the Miscellaneous section. Also address any concerns, concepts or ideas for MDOT improvement of survey services
	X		The Adobe [Master]PDF named JNxxxxxTaskxxxx.pdf (all items typically provided in hardcopy (documents, drawings, field notes, etc. must be scanned or converted to PDF format and combined into a master PDF with appropriate bookmarking organized in the same manner as the survey

			portfolio.)
X			The CD or DVD – 2 per project in the Administration Folder
Hard-copy Portfolio	Include on CD	Include in PDF	Control Folder
		X	Sketch or plot of network or traverse from processing software.
	X		Electronic raw field data files in ASCII or RINEX format for all horizontal and vertical control established. Note requirements in QA/QC checklist in the current MDOT Design Survey Standards of Practice.
		X	Calculations for horizontal and vertical adjustments including input parameters and data, raw unadjusted closures, initial and final constrained adjustments, final coordinates with standard deviations, chi-square (f), alpha (w) and beta (t) test results. Include the name of the adjustment program used, and supply all written calculations to support the final results.
		X	Horizontal and vertical datums, ellipsoid, Geoid model, and State Plane Coordinate (SPC) zone used in adjustment and units (international feet).
		X	Minimal-constrained adjustments – includes all possible report options such as histograms, error ellipses, loop closures, adjusted coordinates, residuals, and statistical tests.
		X	Fully-constrained adjustments - includes all possible report options such as histograms, error ellipses, loop closures, adjusted coordinates, residuals, and statistical tests.
		X	A Microsoft Word document named JNxxxxxHC.doc of all NEWLY ESTABLISHED horizontal control points with the Northing, Easting, Elevation, combined scale factor, standard deviation in each coordinate, material of the monument, station and offset and witnesses. The header should outline the company name, month and year of point establishment and the SPC zone. Also an Ascii file named JNxxxxxHC.txt from the Microsoft Word document.
		X	A Microsoft Word document named JNxxxxxVC.doc of all NEWLY ESTABLISHED vertical control points with the elevation, description, station and offset and witnesses. The header should outline the company name, month and year of benchmark establishment and specify the NAVD88 datum. Include all observed benchmarks noting which points were fixed. Also an Ascii file named JNxxxxxVC.txt from the Microsoft Word document.
Hard-	Include	Include	Alignment Folder

Copy Portfolio	on CD	in PDF	
		X	Link to the portion of the Surveyor’s Report regarding Alignment.
		X	Research of all references used to establish alignment, including all records, measurement data, field notes and calculations used to determine the alignment.
		X	Alignment MicroStation drawing with point numbers and coordinates of the point of beginning, points of intersect, points of curvature and tangency, point of ending, complete curve data (deflection angle (RT or LT), radius, external, tangent length, PC station, PI station and PT station) with coordinates and stationing of all points of intersect and station equations. Also show Section Corner ties along the section line to the intersection with the alignment. Indicate the type of alignment used. Each sheet of the alignment sketches must be certified, signed and sealed by the Professional Surveyor as described in the Alignment section of the current MDOT Standards of Practice.
	X		A Microsoft Word document named by Route Name / Alignment Type / Year Retraced.doc with the datum used, all Northing and Easting coordinates, description, station, witnesses and curve data for all alignment points. Multiple alignments can be in the same file with the name of the alignment preceding the information. Indicate the type of alignment used. e.g.: I-94 WB Legal 1963.doc
	X		An XML format file for all alignments created or used shall be included as part of the survey deliverables.
Hard-copy Portfolio	Include on CD	Include in PDF	Property Folder <u>(If ROW determination is required)</u>
		X	Copies of any descriptions used for Right of Way determination
		X	Government corner LCRC information and submittals to Remonumentation Committees, if required
		X	Copies of recorded plats adjacent to the project
		X	Copies of any certified surveys in the project area
		X	Copies of unrecorded surveys obtained from local surveyors along the project
		X	Tax maps marked with the point numbers of the property corners located in the field and tied in to the project coordinate system
		X	Tax descriptions of adjacent properties

		X	Evidence of other surveys found in the field
		X	Calculations for alignment and how it fits within a section
		X	MicroStation drawing showing the bearing and distance between adjacent PLSS corners, the distance from the corners to the Legal alignment, the station of the section line intersection with the alignment and the rough location and point designation for any found irons (specify the alignment type on the drawing or sketch).
	X	X	A Microsoft Word document named JNxxxxxPROP.doc of all property corners found / located in the field with the Northing, Easting, description of the corner, and station and offset. The header should outline the company name, month and year of property corner location.
	X	X	A Microsoft Word document named JNxxxxxPLSS.doc of all PLSS corners located in the field with the Northing, Easting, Elevation, description of the monument recovered, station and offset, and witnesses. The header should outline the company name, month and year of the recovery.
Hard-copy Portfolio	Include on CD	Include in PDF	Mapping Folder
	X	X	MicroStation Control drawing containing the Control Point, Bench Mark, Alignment Point, and PLSS Corner lists.
	X		2d MicroStation file of planimetric survey map as defined in Book 9 of the contract documents. 3d MicroStation file created from the edited TIN (Triangulation Irregular Network) that accurately represents the vertical terrain surface features of the project.
Hard-copy Portfolio	Include on CD	Include in PDF	Structure Survey Specific Information
	X	X	Underclearance, plan and elevation views of any structures requiring survey.
Hard-copy Portfolio	Include on CD	Include in PDF	Miscellaneous
X		X	Data not assignable to one of the other five sections may be placed here. Newspaper articles, photographs, etc. would be examples of appropriate information. The surveyor's project report should specify any items included here

10 GRADING AND SITE WORK

10.1 General

The Contractor shall conduct all Work necessary to meet the requirements of grading, including clearing and grubbing; excavation and embankment; removal of existing buildings, pavement, curb and gutter, sidewalk, pavement markings, and miscellaneous structures and objects; subgrade preparation and stabilization; dust control; sand subbase, aggregate base, open graded drainage course; earth shouldering; and disposal of surplus or unsuitable material in accordance with the requirements of this Section 10 and the listed standards.

10.2 Administrative Requirements

10.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to grading, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT Special Details
- MDOT Standard Plans
- MDOT *Standard Specifications for Construction*
- MDOT *Road Design Manual*
- Remaining standards set forth in Book 3

10.2.2 Definitions

Within this Section 10, the plaza pavement area (driving surface/pavement only) shall be defined as the area bounded by the outline of existing S01 of DIBC to the north; the existing pavement marking delineating the 4/3 Roadway inner lane edge along the east; the existing barrier wall along the west; and the existing inner through lane edge of the 4/3 Roadway along the south.

10.3 Design Requirements

See Standards.

10.4 Construction Requirements

The Contractor shall not remove material from one location on the Project and place at another location without prior Approval by MDOT. All excavated material to be salvaged shall be stockpiled at locations Approved by MDOT. Stockpiled material may be reused as Approved by MDOT provided there is no contamination of one material within the other.

10.4.1 Clearing and Grubbing

See Standards.

10.4.2 Earthwork

See Standards.

10.4.3 Removals

10.4.3.1 Removal of Buildings

See Standards.

10.4.3.2 Removal of Pavement, Curb and Gutter, and Sidewalks

The Contractor shall remove the existing pavement related to the construction of the following roadways: the 4/3 Roadway, the Truck Road, the Access Drive, and the Southern Special Return Route. The Contractor shall not remove any other existing pavement within the plaza without prior Approval from MDOT.

When removing pavement, curb and gutter, or sidewalk, the Contractor shall saw cut the pavement, curb and gutter, or sidewalk with neat lines at the removal terminations. The Contractor shall conduct all pavement removal operations by saw cutting the pavement full depth and removing the existing pavement in such a manner as to not disrupt or damage the existing struts or slabs or footings. Use of impact type equipment such as a crane and ball or air hammers is not allowed.

Other methods of pavement removal require MDOT approval prior to performing the Work.

10.4.3.3 Removal of Pavement Markings

See Standards.

10.4.3.4 Removal of Miscellaneous Objects

The Contractor shall remove and properly dispose of all objects in conflict with proposed Work that are not otherwise designated for removal, salvage, relocation, or reuse.

The Contractor shall remove and dispose of all existing underdrains, underdrain outlets, and end sections encountered during pavement removal for the construction of the 4/3 Roadway, the Truck Road, the Access Drive, and the Southern Special Return Route. Existing subgrade drainage patterns shall be maintained at all times.

10.4.4 Subgrade

See Standards.

10.4.5 Dust Control

See Standards and Book 2, Section 4.

10.4.6 Pavement Structure

Not Used.

10.4.7 Disposal of Materials

The Contractor shall dispose of surplus excavated material in accordance with subsection 205.03.P of the Standard Specifications.

10.4.8 Project Cleanup

See Standards.

10.4.9 Plaza Items

No work shall be done to the diesel or auto fueling stations, including the pumps, the canopy, the structural columns for the canopy, and the concrete pavement slab (auto fueling station only). Any damage to the fueling stations caused by the Contractor shall be repaired at the Contractor's expense.

The existing curbed island/sidewalk adjacent to the diesel fueling stations shall remain.

Items on the existing curbed island/sidewalk adjacent to the auto fueling stations shall remain. Remove portions of the existing curbed/island sidewalk in conflict with the proposed Work.

The duty free store and warehouse building shall remain. Except where in conflict with the proposed Work, items associated with the building that shall also remain include the curbed islands and sidewalks adjacent to the building, parking located to the west of the building, and the loading dock with electrical items located to the east of the building. Existing features located within the islands shall also remain. Any damage to the building and the associated building items caused by the Contractor’s construction operations shall be repaired at the Contractor’s expense.

The Contractor shall not decrease the amount of available auto parking spaces for the duty free store and warehouse building. Any auto parking in conflict with the proposed Work shall be relocated elsewhere within the plaza.

The Contractor shall not decrease the amount of available truck parking spaces located within the plaza. Any truck parking in conflict with the proposed Work shall be relocated elsewhere within the plaza.

10.5 Deliverables

Not used.

11 ROADWAYS

11.1 General

The Contractor shall conduct all Work necessary to meet the requirements of roadways. Roadway classifications include mainline, acceleration lanes, deceleration lanes, ramps, arterials, local roads and private entrances.

11.2 Administrative Requirements

11.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to roadways, the order of precedence shall be as set forth below, unless otherwise specified:

- AASHTO *A Policy on Geometric Design of Highways and Streets*
- AASHTO *A Policy on Design Standards Interstate System*
- AASHTO *Roadside Design Guide*
- MDOT *Geometric Design Guides*
- MDOT Special Details
- MDOT Standard Plans
- MDOT *Road Design Manual*
- MDOT Administrative Rules regulating Driveways, Banners and Parades
- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT *Drainage Manual*
- MDOT *Soil Erosion and Sedimentation Control Manual*
- MDOT CAD Standards
- MDOT Guidelines for Plan Preparation, Road Sample Plans
- Remaining standards set forth in Book 3

11.2.2 Software

The Contractor shall use Microstation V8 and Geopak Civil Engineering Package by Bentley Systems, Inc.

11.2.3 Meetings

Not Used.

11.2.4 Definitions

Not Used.

11.3 Design Requirements

11.3.1 Design Standards

The Contractor shall comply with the Project-specific design standards listed in this Section 11.

PROJECT-SPECIFIC DESIGN STANDARDS

Roadway: **Truck Road**

Location: South side of the Plaza, from the westerly curb line on St. Anne Street to S02 of DIBC

Design Standards		NATIONAL HIGHWAY SYSTEM
Jurisdictional System		DIBC
Functional Class		Urban
Access Control		Limited
Roadway Type		Arterial
Design Vehicle		WB-67
Terrain		Level/Rolling
Lane Width		Varies, 12 feet – 18 feet
Shoulder Width	Median	2-foot valley gutter
	Outside	2-foot valley gutter
Traffic Volumes	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Traffic Volumes (Projected)	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Posted Speed		Not posted
Proposed Design Speed		20 mph
Special Features:		

<p>1. Within this Section 11, the Truck Road shall be defined in segments, as follows:</p> <ul style="list-style-type: none"> a) Segment TR-A: Between existing Pier 5 of Bridge to Canada and the westerly curb line of St. Anne Street. b) Segment TR-B: Adjacent to existing Pier 5 of Bridge to Canada. c) Segment TR-C: Between intersection with Southern Special Return Route and existing Pier 5. d) Segment TR-D: Between curve required to access S02 of DIBC and intersection with Southern Special Return Route. e) Segment TR-E: Curve required to access S02 from the tangent section parallel with Fort Street.
<p>2. The vertical alignment east of existing Pier 5 shall be set by widening existing Fort Street. Saw cut existing parking lane edge and widen to outside using 2% cross slope away from existing Fort Street crown point. The vertical alignment west of existing Pier 5 shall be set by using a minimum longitudinal grade of 0.5% and a maximum longitudinal grade of 4%. Minimum vertical curves lengths shall be 150'. No more than 5 vertical curves shall be used west of existing Pier 5.</p>
<p>3. The plan grade and point of rotation shall be at the center of the Roadway.</p>
<p>4. Construct shoulders as follows:</p> <ul style="list-style-type: none"> a) TR-A outside – 2-foot valley gutter with double-face concrete barrier. TR-A inside – 2-foot valley gutter with single face concrete barrier. b) TR-B outside – 2-foot valley gutter with double face concrete barrier. TR-B inside – 2-foot valley gutter adjacent to Pier 5. c) TR-C outside- 2-foot valley gutter with double face concrete barrier. TR-C inside – MDOT Type F curb and gutter. d) TR-D outside – MDOT Type F curb. Tie the back of curb to existing grade at Fort Street ROW line using a minimum 4-inch concrete over Class II granular material. The sidewalk slope shall not be steeper than 1:4 (V:H). TR-D inside – 2-foot valley gutter with double face concrete barrier. e) TR-E outside – 4-foot valley gutter with single face concrete barrier. TR-E inside – MDOT Type F curb and gutter with a driveway to access the existing cell tower site. Construct 4-foot valley gutter with single face concrete barrier downstream of the driveway.
<p>5. Where existing fence is in conflict with the proposed Work, construct fence with visual screen on outside shoulder as follows:</p> <ul style="list-style-type: none"> a) 6-foot high black PVC coated fence with visual screen on top of concrete barrier in segments TR-A, TR-B, and TR-C. b) 10-foot high black PVC coated fence with visual screen in segment TR-D.
<p>6. All blunt ends of concrete barrier within the clear zone shall be protected by an impact attenuator.</p>
<p>7. Transition at east end to match existing pavement cross-section and geometry at west curb line of St. Anne Street. End construction at west end where cross-sections and horizontal/vertical alignments match existing approach section to S02.</p>

PROJECT-SPECIFIC DESIGN STANDARDS

Roadway: **4/3 Roadway**

Location: Contained within the Ambassador Bridge Plaza, connecting I-75 to the Bridge to Canada.

Design Standards		NATIONAL HIGHWAY SYSTEM
Jurisdictional System		DIBC
Functional Class		Urban
Access Control		Limited
Roadway Type		Arterial
Design Vehicle		WB-67
Terrain		Level/Rolling
Lane Width		Varies, 12 feet – 13 feet
Traffic Volumes	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Traffic Volumes (Projected)	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Posted Speed		Not posted
Proposed Design Speed		20 mph
Special Features:		
1. Transition to match existing pavement cross-section and geometry at north entrance and at approach to existing S01 of DIBC. Begin construction at MDOT ROW line crossing north entrance. End construction where cross-sections and horizontal/vertical alignments match existing approach section to S01.		
2. Except where lane reduction is required at the Auto Fueling facility, four inbound lanes from I-75 shall be continuous. Inner-most lane shall be an exit only lane to Auto Plaza west of the Duty Free Store and Warehouse. Four lanes are required between toll booth areas and S01 of DIBC.		
3. The outside lane of the 4/3 Roadway shall be defined in segments, as follows: <ul style="list-style-type: none"> a) Segment 4/3-A: Bounded on east by the existing Bridge to Canada b) Segment 4/3-B: Bounded on south by proposed Truck Road along Fort Street. c) Segment 4/3-C: Bounded on west by easterly limit of existing cell tower site. 		

<p>4. Locate roadway segments as follows:</p> <ul style="list-style-type: none"> a) 4/3-A: East of Pier 11, existing Diesel Fueling facilities, and existing Duty Free store. b) 4/3-B: South of existing Duty Free store and existing Auto Fueling station. c) 4/3-C: West of existing Auto Fueling facilities.
<p>5. Construct connection from Auto Return to Canada Lane at north entrance, north of the Northern Special Return Route.</p>
<p>6. Construct a connecting roadway with a minimum of one 12-foot lane, north of Pier 11 in Section 4/3-A, to provide access to the Auto Plaza area. Use MDOT Type F curb on inside of the roadway and single-face concrete barrier on outside of roadway.</p>
<p>7. Construct crossover in Segment 4/3-A to provide egress from loading dock to Special Southern Return Route.</p>
<p>8. Construct ingress driveway from Auto Plaza in Segment 4/3-C to provide at least three toll booths for Duty Free toll collection. Driveway shall accommodate toll booth placement per Exhibit 2-17-A.</p>
<p>9. Construct widened roadway section west of Auto Fueling facilities to provide at least five toll booths. Widening shall accommodate toll booth placement per Exhibit 2-17-A.</p>
<p>10. The plan grade and point of rotation shall be at the outside joint of the outermost through lane.</p>
<p>11. Cross slope of all lanes shall be 2.0%, sloped continuously in plane. Superelevation shall not exceed 4.0%.</p>
<p>12. The minimum longitudinal grade shall be 0.3%. Grade breaks at beginning and end of construction shall not exceed 0.25%.</p>
<p>13. Vertical clearance for S01 of DIBC over 4/3 Roadway shall be a minimum of 17.00 feet.</p>
<p>14. Existing pier columns and building walls within clear zone, as defined by Table 3.1 of the 2006 AASHTO Roadside Design Guide, shall be protected with single-face concrete barrier.</p>
<p>15. All blunt ends of concrete barrier within clear zone shall be protected by impact attenuator.</p>
<p>16. Provide valley gutter in concrete barrier sections. Construct variable-width valley gutter where required to maintain minimum lane widths and avoid impact to all existing columns supporting S01 of DIBC. The minimum valley gutter width shall be 2 feet.</p>
<p>17. Except where concrete barrier is required to protect roadside hazards or delineate separation from the Truck Road, construct MDOT Type F curb along both sides of roadway. Construct curb cuts to provide access to the following locations:</p> <ul style="list-style-type: none"> a) Outside: <ul style="list-style-type: none"> i. Auto Return to Canada Lane ii. Northern Special Return Route iii. Truck Return to Canada Lane iv. Employee Parking v. Southern Special Return Route b) Inside: <ul style="list-style-type: none"> i. Access Drive ii. Auto Plaza egress iii. Loading dock iv. Auto Fueling Facilities v. Toll Booth ingress

18. Where curb is required, construct raised island or back-to-back MDOT Type F curb that ties into existing pavement. In raised islands, fill gaps between back of curbs with a minimum of 4 inches of Class 23A aggregate over Class II granular material. The slope between backs of curb shall not be steeper than 1 V:4 H.
19. Parking spaces and/or parking lanes will not be permitted within or adjacent to any lane on 4/3 Roadway.
20. The minimum horizontal clearance between inside shoulder, including barrier wall, and existing Duty Free Store and Warehouse Building shall be 6 feet.

Roadway: **Special Southern Return Route**

Location: Connection between the 4/3 roadway and the Truck Road at the south end of the Plaza.

Design Standards		NATIONAL HIGHWAY SYSTEM
Jurisdictional System		DIBC
Functional Class		Urban
Access Control		Limited
Roadway Type		Local Road
Design Vehicle		SU
Terrain		Level/Rolling
Lane Width		16 feet
Traffic Volumes	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Traffic Volumes (Projected)	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not Provided
Posted Speed		Not posted
Proposed Design Speed		20 mph
Special Features:		
1. Construct one 16-foot lane.		
2. Cross slope shall not exceed 2.0%.		
3. Construct 2-foot valley gutter with single face barrier on both sides of lane.		

- | |
|--|
| 4. On outside of roadway, transition single-face barrier to MDOT Type F curb south of Pier 18 to provide sufficient intersection sight distance at Truck Road. |
| 5. All blunt ends of concrete barrier within clear zone shall be protected by an impact attenuator. |

Roadway: **Access Drive**

Location: Connection between the 4/3 Roadway and Fort Street, along the northerly edge of the DIBC Plaza.

Design Standards		NATIONAL HIGHWAY SYSTEM
Jurisdictional System		DIBC
Functional Class		Local Road
Access Control		Limited
Roadway Type		Access Road
Design Vehicle		SU
Terrain		Level/Rolling
Lane Width		10 feet
Traffic Volumes	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Traffic Volumes (Projected)	ADT	Not provided, assume maximum values for design applications
	% Commercial	Not provided
Posted Speed		None
Proposed Design Speed		20 mph
Special Features:		
1. Construct two 10-foot lanes.		
2. Cross slopes shall be 2.0%, crowned at the center of the Roadway.		
3. Construct MDOT Type F2 curbs along both sides of the Roadway.		

4. Construct the roadway within the easement shown in Exhibit 2-7-A (Easement for Access Drive), except for the portion northeast of the tangent section identified by items 18 and 24 in the Exhibit 2-7-A Sketch of Easement, where alignment deviations are required to connect to the 4/3 Roadway at the north entrance.

11.3.1.1 Slopes

Grading slopes shall be 1:6 (V:H) or flatter at tie-ins to adjacent properties. The Contractor shall avoid using non-recoverable slopes whenever possible. The use of slopes steeper than 1:3 (V:H) without barriers is prohibited. Where Site conditions do not permit a 1:6 (V:H) slope, the Contractor shall follow the foreslope criteria below.

1. Use 1:6 (V:H) slopes or flatter.
2. Use steeper slopes of 1:6 to 1:3 (V:H).
3. Use non-recoverable slopes shielded by traffic barrier.

The Contractor shall design the slopes in the order of precedence shown with criterion 1 being the requirement, followed by criterion 2 as the next desirable, and other criteria in decreasing levels of desirability.

11.3.1.2 Turf Establishment

The Contractor shall define areas for turf establishment on the RFC Documents. The Contractor shall establish turf in disturbed areas on the north side of the Truck Road east of the Bridge to Canada using turfgrass species that are compatible with the requirements of this section, stormwater management methods, and the MDOT Special Provision - Turf Establishment, Performance.

The Contractor must establish turf within the Project limits to meet the requirements of MDOT's National Pollutant Discharge Elimination System (NPDES) Phase II permit requirements.

11.3.2 Design Justification

Upon request by MDOT, the Contractor shall submit design justifications wherever the Contract Documents require that the "Contractor shall consider" various factors or alternatives. Documentation may be computer-generated or hand-written and shall clearly identify the following:

- Design issue
- Items requiring consideration
- Basis for evaluation
- Final decision and justification

11.3.3 Design Exceptions

Design Exceptions will not be allowed.

11.4 Construction Requirements

See Standards.

11.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Design Justifications	Acceptance	1	1	As required	11.3.2

12 DRAINAGE

12.1 General

The Contractor shall conduct all Work necessary to meet the requirements associated with drainage, including roadway ditches, culverts, and storm sewer systems.

12.2 Administrative Requirements

12.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to drainage, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- FHWA Hydraulic Engineering Circular Number 22 (HEC-22), *Urban Drainage Design Manual*, (FHWA-NHI-10-009)
- MDOT *Drainage Manual*
- MDOT *Bureau of Highways Instructional Memos*
- MDOT *Road Design Manual*
- MDOT Standard Plans
- MDOT *Soil Erosion and Sedimentation Control Manual*
- MDOT Special Details
- MDOT *Phase II Storm Water Management Plan Permit No. MI0057364*
- MDOT *Bridge Design Manual*
- MDOT *Design Survey Manual*
- Remaining standards set forth in Book 3

12.2.2 Software

Not Used.

12.2.3 Data Collection

In the event that the Contractor proposes any changes to the permitted drainage facilities in this Project, the Contractor shall identify all water resource issues, utilizing available data, concerning the Project.

The Contractor shall acquire existing plans and/or survey data, including all data on storm sewer systems within the Project area. The Contractor shall complete all field surveys needed to define the existing drainage system components, locations, and elevations. The Contractor shall confirm the design of the existing stormwater treatment devices for the storm sewer system to ensure it meets NPDES permit requirements. The Contractor shall also determine existing drainage areas that contribute to the Project drainage system.

12.2.4 Coordination with Other Agencies and Disciplines

Refer to Book 2, Section 4.2.3 for coordination, permit, and meeting requirements.

Stormwater discharge for the Project is permitted under MDOT's statewide NPDES permit (Permit No. MI0057364), administered by MDEQ-Water Bureau. Compliance with this permit requires following the provisions of MDOT's Phase II Storm Water Management Plan (SWMP) and the MDOT *Drainage Manual*.

During the Project design phase, particular interest should be given to provisions in Part I.B.4 of the Permit, Post Construction Stormwater Management Program for New Development and Redevelopment Projects.

12.3 Design Requirements

The Contractor shall provide calculations for proposed drainage facilities and for any changes to permitted drainage facilities proposed as part of this Project.

The Contractor shall develop a Drainage Design Report (Truck Road) and a Drainage Design Report (Complete), which shall be signed by a Michigan-licensed Professional Engineer and shall include all hydrologic and hydraulic drainage computations and all supporting data. The Drainage Design Report (Truck Road) shall be completed for the Truck Road Computations only. The Drainage Design Report (Complete) shall include the entire Project area including the Truck Road computations. The Drainage Design Report shall include the following sections:

- Basis of Design: List of standards followed
- Evaluation of Existing Drainage System: Calculation results and summary
- Evaluation of Improvement Alternatives: Calculation results and summary
- Appendices:
 - Drainage area maps for design
 - Hydrologic and hydraulic calculations
 - Document results on standard forms
 - Computer input and output on CD

12.3.1 Surface Hydrology

12.3.1.1 Design Frequencies

Inlet capacity and spread calculations:

- 10-year design frequency
- 50-year check frequency

Storm drains:

- 10-year (full flow) design frequency
- 10-year Hydraulic grade line (HGL) check. HGL shall be at or near the top of pipe.

12.3.1.2 Hydrologic Methods

See Standards. Use MDOT Rainfall Tables for Zone 10.

12.3.2 Pavement Drainage Systems

12.3.2.1 Bridge Deck Drainage

Not used.

12.3.2.2 Storm Drains

Prior to removal of any storm sewer, the Contractor is responsible for verifying that all stormwater currently draining into the existing storm system will be collected in the proposed storm system.

The Contractor may construct a storm drainage system that reuses or modifies the existing system or a new system.

The hydraulic analysis shall include each Project drainage system to its connection to the existing trunk line which passing under Fort Street.

Additional system requirements:

- Storm drainage systems shall maintain the existing flow rates to the existing trunk lines.
- The proposed flow rates must not exceed the allowable flow rates provided by the storm water treatment units. If the proposed storm drainage system exceeds the allowable flow rates, the Contractor shall provide an appropriately sized storm water treatment device meeting NPDES permit requirements.
- Minimum longitudinal grade for parking lot or non-Roadway areas is 0.5 percent. All Project stormwater shall be intercepted by the storm drainage system.
- Inlet capacity and spread shall be analyzed for all roadway travel lanes within impacted areas. Allowable spread shall be the shoulder plus 3 feet for the design year and the shoulder plus 1 travel lane for the check year.
- Sump calculations shall be provided for parking lots. Maximum depth of ponding in parking lots is 6 inches.
- Slotted drains are not permitted.

12.3.2.3 Roadside Ditches

Not used.

12.3.2.4 Culvert Design

Not used.

12.3.3 Clear Zone Requirements

Not Used.

12.4 Construction Requirements

Drainage facilities shall be provided during all stages of construction. The Contractor shall provide drainage design details for each stage of construction, including temporary erosion control and other best management practices needed to satisfy the NPDES and other regulatory requirements. The water resource notes in the Released for Construction Documents shall include a description of the drainage design for each stage of construction.

All Work shall comply with the requirements/restrictions in Book 2, Section 4.

The Contractor shall videotape the existing and proposed storm drains contained within the Project area to their respective outfalls per Standards. The Contractor shall protect new and existing sewers during all construction activities. All damage to new or existing sewers will require replacement at the Contractor's expense.

The Contractor may utilize the existing storm system in place of a proposed system within the Project area if the sewer and structures are in good condition and are adequately sized for the proposed flow per the design calculations. Existing storm sewers within the Project area that cannot be reused must be removed or abandoned. The Contractor shall bulkhead and fill with flowable fill any existing storm drains that will be abandoned and left in place.

12.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original CADD format and in Adobe Acrobat (PDF). Design software files used to perform calculations shall be submitted electronically in original format. At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Drainage Design Report (Truck Road)	Acceptance	4	1	Prior to construction.	12.3
Drainage Design Report (Complete)	Acceptance	4	1	Prior to construction.	12.3
Construction Video Inspection	Acceptance	1	1	After construction of drainage facilities.	12.4

13 STRUCTURES

13.1 General

The Contractor shall conduct all Work necessary to meet the requirements of permanent and temporary structures needed for the removal of Pier 19 and Span 19 and the reconstruction of Piers 12 and 13 of structure S01 of Detroit International Bridge Company (DIBC). The Work includes construction of permanent barrier along the west side of Bridge to Canada and the sidewalk adjacent to Span 19 of structure S01 of DIBC and on the top of deck along Pier 18. The Work also includes the removal of a portion of the Old Auto Fueling Canopy that is in conflict with the Access Drive.

13.2 Administrative Requirements

13.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to structures, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Special Provision for Expansive Waterstop
- MDOT Special Provision for Structural Steel Foundation Piling Material
- MDOT Special Provision for Post-Tensioning System
- MDOT Supplemental Specifications
- MDOT Frequently Used Special Provisions
- MDOT *Standard Specifications for Construction*
- MDOT Special Details
- MDOT Standard Plans
- MDOT *Bridge Design Guides*
- MDOT *Bridge Design Manual*
- MDOT *Materials Source Guide*
- *AASHTO Standard Specifications for Highway Bridges*
- *AASHTO Guide Design Specifications for Bridge Temporary Works*
- *AASHTO Construction Handbook for Bridge Temporary Works*
- *AASHTO/NSBA Steel Bridge Fabrication Guide Specification*
- *AASHTO/AWS D1.5M/D1.5:2008 Bridge Welding Code*
- *AASHTO/NSBA Steel Bridge Erection Guide Specification*
- *AASHTO/NSBA Guide Specification for Coating Systems with Inorganic Zinc-Rich Primer*
- *MDOT Bridge Analysis Guide*
- *AASHTO The Manual for Bridge Evaluation*
- *MDOT Michigan Structure Inventory and Appraisal Coding Guide*
- National Bridge Inspection Standards
- *AASHTO Roadside Design Guide*
- *ASCE/SEI Minimum Design Loads for Buildings and Other Structures (7-10)*
- *ICC 2012 International Building Code*
- Remaining standards set forth in Book 3

13.2.2 Personnel

The engineer(s) performing the design of structural systems must be a licensed Professional Engineer(s) registered in the State of Michigan and must be prequalified with MDOT in short, medium, and complex span bridges.

Bridge painting contractors must have current SSPC QP1 and QP2 certifications.

The design of non-typical structural systems, when proposed, shall be conducted by a design engineer who is a licensed Professional Engineer in the State of Michigan. The Contractor shall submit the design team's resumes for MDOT Approval. The design engineering firm performing the design of non-typical substructure systems must be prequalified with MDOT for the service classification of Complex Bridge Design. For the purpose of this Project, non-typical substructure systems include hammer head piers and non-redundant fracture critical piers.

13.3 Design Requirements

13.3.1 Design Method

All proposed superstructure and substructure elements of the bridge structures shall be designed by the Load Factor Design (LFD) method.

13.3.2 Design Parameters

13.3.2.1 Loads and Forces for Load Factor Design Method

The number of design lanes shall be the integer part of the ratio of $W/12$ where W is the clear roadway width in feet between curbs and/or barriers.

The design vehicles shall be a HS25 Truck and 11 Axle Two Unit Truck. The HS25 truck or lane loading is 125 percent of the corresponding HS20-44 loading as defined in AASHTO *Standard Specifications for Highway Bridges* Article 3.7.6. The 11 Axle Two Unit Truck is per Exhibit 2-13-A and shall occupy up to two adjoining lanes. Impact shall be applied to the live load according to AASHTO *Standard Specifications for Highway Bridges* Article 3.8.

The wind loads shall be determined according to Article 3.15 of AASHTO *Standard Specifications for Highway Bridges*.

The temperature range used to determine thermal forces and movements shall be in conformance with AASHTO *Standard Specifications for Highway Bridges* Article 3.16 for cold climate temperature range. The type of structure used in determining the temperature range shall be defined by the material of the main supporting members of the superstructure or substructure being considered.

The loads for the Old Auto Fueling Canopy shall be determined according to the ASCE/SEI *Minimum Design Loads for Buildings and Other Structures*.

13.3.2.2 Concrete Design

Concrete components shall be designed to satisfy the applied loading.

The compressive strength of cast-in-place concrete for use in design of the concrete structural members shall be the following:

- Substructure Concrete: 3,000 psi for Grade S2 concrete
- Superstructure Concrete: 4,000 psi for Grade D concrete

Minimum concrete clear cover for reinforcement, except for the concrete deck slab, shall comply with the following:

- Concrete cast against earth: 3 inches
- Prestressed Concrete Beam: 1 inch

- All other locations: 2 inches

13.3.2.3 Steel Design

For steel design, the maximum nominal flexural resistance is limited to F_y .

13.3.2.4 Slope Stability

The Contractor shall check the overall stability of earth slopes in the vicinity of all structures, including bridge piers. Overall stability includes internal, external, compound, and global stability. The factor of safety for slope stability shall be 1.5 or greater. The steepest permanent slope allowed shall be 1:2 (V:H).

13.3.2.5 Signs, Lighting, Signals, and Utilities

Conduits shall not be placed on the outboard side of fascia girders, deck fascia or outside the barrier wall.

Light poles and luminaires shall be salvaged for installation on the proposed barrier.

Bridge elements shall be designed by the Contractor to accommodate the forces and moments resulting from loads (e.g., dead, wind, and ice) applied to the signs, lighting, signals, and utilities.

13.3.3 Additional Design Requirements

13.3.3.1 Location Features

All permanent and temporary structures, including related excavation, slopes, and embankment, shall be within DIBC ROW unless otherwise specified in the Contract Documents.

13.3.3.2 Geometrics

Proposed piers shall be located outside of the roadway clear zone as defined by the current AASHTO *Roadside Design Guide*. Where this is not feasible, the pier(s) shall be shielded from impact by errant vehicles.

The vertical clearance shall be a minimum of 17.00 feet.

13.3.3.3 Proposed Substructure

Preferred substructure types are as follows:

- Straddle bents with concrete columns and a concrete post tensioned cap.
- Straddle bents with concrete columns and a steel cap

13.3.3.4 Components

13.3.3.4.1 Foundations and Foundation Piling

Bottoms of footings shall be set at least 4 feet below the proposed ground.

13.3.3.4.2 Piers and Pier Caps

Piers that are not system-redundant shall be made member-redundant. Steel pier caps can be made member redundant through fabrication procedures and by design (e.g., if a crack were to develop, the load would be carried by other members that make up the pier cap). Concrete pier caps can be made member redundant by adding additional post tensioning strands to carry the load if one were to fail.

Piers shall have base wall or filler wall in accordance with MDOT Standard Plan R-55-Series.

Hammer head piers shall be designed to prevent cracking. Post tensioning of the caps may be used.

Pier caps made of steel boxes shall have provisions for future inspection inside the box.

13.3.3.4.3 Bearings

The elastomeric bearings shall be laminated steel-reinforced elastomeric bearings. The elastomer shall have a specified shear modulus of 100 psi.

13.3.3.4.4 Bridge Barriers

The Contractor shall use barriers that have passed full scale impact (crash) tests. The type of barrier chosen will be according to the guidelines in the MDOT *Bridge Design Manual*.

The toe of the permanent barrier along the Bridge to Canada that is parallel to Span 19 of S01 of DIBC, shall line up with the face of the existing sidewalk. The north end of this barrier shall be protected to prevent a direct collision with the end of the barrier by a device that redirects or absorbs the energy of a vehicle collision.

The end of the slab along Reference Line 18 shall be protected by a permanent concrete barrier.

The north end of the sidewalk along the Bridge to Canada shall be closed off by a permanent barrier that meets pedestrian geometric requirements as defined by AASHTO *Standard Specifications for Highway Bridges*.

Waterstops shall be provided for all barriers. Expansive waterstops may be used at the Contractor's option. Slip-forming of barriers is not allowed.

13.3.3.4.5 Temporary Retaining Wall Structures

All temporary earth retention systems used on the Project shall be completely removed prior to completion of the Project. Structural components of earth retention systems may be reused as part of permanent retaining wall (two-phase walls) systems, provided all of the structural support elements and materials meet the requirements of permanent structure standards.

13.3.3.4.6 Diaphragms (Pier 18 of S01 of DIBC)

The Contractor shall salvage existing longitudinal reinforcement of Span 18 of S01 of DIBC. Damage to the epoxy coating shall be repaired according to Subsection 706.03 of the Standard Specifications.

The Contractor shall coat the sides of the existing beams with colored paraffin wax from the beam end to three inches past the edge of the pier diaphragm.

Openings for future conduits shall be provided in all bays. The opening size shall be 1'-10" wide by 8" tall.

13.3.3.4.7 Slabs and Sidewalks

The Contractor shall salvage existing reinforcement. Damage to the epoxy coating shall be repaired according to Subsection 706.03 of the Standard Specifications. The Contractor shall blast clean existing reinforcement that does not have epoxy coating.

The Contractor shall widen the existing slab as necessary to facilitate permanent barrier construction. See Subsection 13.3.3.4.4 for barrier alignment.

The Contractor shall reconstruct the existing sidewalk of S01 of DIBC as necessary to construct the proposed permanent barrier. The reconstructed portions of the sidewalk do not need to be ADA compliant.

13.3.3.4.8 Old Auto Fueling Canopy

The Contractor shall design the new portions of the Old Auto Fueling Canopy according to the ICC 2012 *Building Code*.

13.3.4 Materials

All bridge materials shall be in accordance with the Standard Specifications and on the MDOT Qualified Products List in the MDOT *Materials Source Guide*.

13.3.4.1 Concrete

The Contractor shall not use lightweight concrete for structural members.

Prestressed Concrete

The release and final strengths shall be determined by the Contractor. The minimum release and final compressive concrete strength shall be 4,000 psi and 5,000 psi, respectively. The maximum design compressive strength shall be limited to 7,000 psi.

Cast-in-place Substructure and Superstructure Concrete

The Contractor shall use substructure and superstructure concrete per the Standard Specifications.

Superstructure and Substructure Patching Mixture

The Contractor shall use Concrete Patching Mixture Type C-L per the Standard Specifications.

Concrete Mix Design Options

Proposed concrete mix design options shall comply with the Standard Specifications.

13.3.4.2 Prestressing Steel

Strands for prestressed concrete beams shall be 0.5-inch nominal diameter with a cross-sectional area of 0.153 square inches, or 0.6-inch nominal diameter with a cross-sectional area of 0.217 square inches meeting requirements of AASHTO M 203 (ASTM A 416), Grade 270, Low Relaxation Strand.

The minimum spacing for prestressing strands shall be 2 inches.

13.3.4.2 Post Tensioning

Grout post tensioning ducts with Type E-1 grout per the Standard Specifications. Stress pocket shall be filled with Type H-1 grout per the Standard Specifications.

13.3.4.3 Reinforcing Steel

All mild steel reinforcement for structures, including prestressed concrete beam steel reinforcement and stirrups, shall be deformed Grade 60 steel bars.

The Contractor shall use laps or mechanical splices as required to facilitate continuation of reinforcement capacity. Welded splices will not be allowed.

All substructure reinforcement above footings shall be epoxy coated. All superstructure reinforcement, except reinforcement entirely embedded in the prestressed concrete beams, shall be epoxy coated.

13.3.4.4 Structural Steel

All structural steel shall conform to AASHTO M 270, Grade 50, or AASHTO M 270 Grade 50W. AASHTO M 270, Grade 36 steel may be used in lieu of these steel types for bearings, diaphragms, and cross frames.

Contractor shall use bolts, nuts, and washers for structural joints per the Standard Specifications. Field connections shall be bolted with ¾-inch-diameter high strength bolts. All structural steel shall be coated per the Standard Specifications. The paint color shall match the structural steel on the Bridge to Canada.

Shear developers shall be ¾-inch-diameter studs.

13.3.4.5 Bearing

Position dowels for bearings shall be hot-dip galvanized according to AASHTO M 232.

13.3.4.6 Timber

See Standard Specifications. Permanent timber structures are not allowed.

13.3.4.7 Old Auto Fueling Canopy

The Contractor shall design and construct the new portions of the Old Auto Fueling Canopy to match those of the existing canopy aesthetically and of material composition. The new canopy shall cover a minimum of four inspection lanes from the east to the west. The canopy does not need to fully cover the far west inspection lane.

13.4 Construction Requirements

13.4.1 Removal of Existing Structure

The Contractor shall protect the portions of the existing S01 of DIBC and Bridge to Canada structures that will remain open to traffic during the Project. The Contractor is responsible for locating all active Utilities in the vicinity of the Project prior to construction and shall take care not to disturb any Utilities not requiring relocation. The Contractor is responsible for any damage to Utilities resulting from the Contractor's operations.

Before beginning any removal, repair, or construction activities, the Contractor shall construct false decking over traffic areas to prevent debris from falling from the structure onto vehicular and pedestrian traffic. No portion of the deck formwork or falsework installed over traffic shall encroach on the existing underclearance.

Sawcuts are required on all visible surfaces when new concrete is to be bonded to existing concrete.

The Contractor shall submit a detailed schedule showing components to be removed and the sequence of removal.

The Contractor shall submit details for the temporary supports and supporting design calculations.

The Contractor shall remove the portions of the Old Auto Fueling Canopy in conflict with the Access Drive.

13.4.1.1 Jacking Procedures

Jacks shall be used to lift superstructure or substructure components enough to transfer the load from the component being removed to the temporary support. Shims shall be placed and the jacks removed once the component has been raised. Jacks shall not remain loaded for more than 24 hours.

Jacks shall be raised and lowered simultaneously on each side of a pier.

The Contractor shall submit a detailed schedule for the sequence and rate at which the jacks will be raised and lowered. The Contractor shall also submit information from the jack manufacturer specifying each jack's capacity.

13.4.1.2 Span 19 Removal

Removal of Span 19 of S01 of DIBC shall not occur until a temporary or permanent barrier has been installed along the Bridge to Canada.

The existing light fixtures attached to the Span 19 barrier may be reused. See Section 17 (ITS/Toll/Electrical) for lighting requirements.

13.4.1.3 Pier 19 Removal

Removal of Pier 19 shall not occur until the superstructure above is removed or temporarily supported.

13.4.1.4 Pier 12 and 13 Pier Removal

Only one pier shall be temporarily supported at any time.

Removal of the beams and or deck of Spans 12, 13, or 14 is not allowed. Drilling into existing prestressed concrete beams is permitted in the beam webs only. Ferro scanning shall be required prior to drilling to avoid strands and reinforcement.

Relocate existing lights, wiring, and conduits per Section 17 (ITS/Toll/Electrical).

Temporarily relocate drain pipes during construction to maintain drainage. Drain pipes shall be permanently attached to the new piers.

13.4.1.5 Pier 12 and 13 Pier Constructon

The Contractor shall prepare concept drawings and a brief summary of the pier replacement concept that includes the following:

- Elevation view of the temporary support showing the beams, jack locations, and existing pier
- Elevation view of the proposed pier
- Plan view of the temporary support and proposed pier with the 4/3 Roadway shown

13.4.1.6 Vibration Monitoring

Prior to construction, the Contractor shall inspect and videotape the existing condition of all structures and property surrounding the structures. This includes videotaping both the inside and outside of the existing structures.

The video shall be in color on premium-quality DVD format, which allows both audio and video information to be recorded. The audiovisual record must be made during a time of good visibility. Recording should not be done during periods of time when low light, precipitation, snow, leaves, or other natural debris would prevent a clear viewing of the area to be recorded.

The recording must be made on a continuous recording media on which sound and video information can be recorded simultaneously.

To preclude the possibility of tampering or editing in any manner, all audiovisual recordings must be by electronic means and display continuously and simultaneously generated transparent digital information including the date and time of recording, as well as the corresponding station. The date information will contain the month, day and year (for example 10/5/2007), and be placed directly below the time information. The time information shall consist of hours, minutes and seconds, separated by colons (10:35:18). This transparent information will appear on the extreme upper left hand third of the screen.

Control pan and zoom rates to ensure playback clarity, and provide lighting for the camera if necessary. Also provide audio commentary as necessary during filming to enhance documentation of existing conditions. Special consideration shall be given to any existing structural defects, including, but not limited to, measurement of any crack lengths and widths.

After completion of the video inspection, the Contractor shall furnish three copies of the DVD's to MDOT with a written description of any existing damage. The submitted DVD's and written description must be Approved by MDOT prior to the start of construction.

The Contractor shall retain the services of a vibration consulting firm with personnel to conduct the following vibration monitoring requirements:

1. Submission of monitoring plans and daily reports and overseeing installation of the vibration monitoring equipment and interpretation of vibration monitoring data shall be performed by personnel with the following qualifications:
 - A. Must be a Professional Engineer registered in the State of Michigan.
 - B. Must have a minimum of five years' experience in the vibration consulting field.
 - C. Must have successfully completed at least five projects that involved monitoring vibrations and evaluating effects of vibrations on structures.
2. Installation and monitoring of the vibration monitoring equipment, and collection of the vibration monitoring data shall be performed by personnel with the following qualifications:
 - A. Must have at least two years of experience in the operation of the proposed monitoring equipment and interpretation of data produced by such equipment.

- B. Must have installed, operated, monitored and interpreted vibration monitoring equipment and data on at least three projects that involved monitoring vibrations and evaluating the effects on structures.

The qualifications shall be submitted to MDOT for review and approval two weeks prior to start of construction.

The Contractor's vibration consultant shall develop a detailed vibration monitoring program, install all the necessary vibration monitoring equipment, monitor vibrations, and interpret vibration monitoring data during all construction operations. The vibration consultant's monitoring program shall be submitted to MDOT for Approval prior to the start of construction. The following items must be met:

1. The consultant's monitoring plan shall be developed in accordance with AASHTO R8-96. The instrumentation locations, monitoring procedures, and a description of the monitoring devices and/or Manufacturers' brochures shall be included in the submitted plan.
2. The recorded peak ground particle velocities shall not exceed 0.20 in/sec at any structure including residential and commercial buildings.
 - A. Any recordings in excess of this particle velocity shall require the responsible construction activity to immediately cease.
 - B. MDOT shall be notified immediately.
 - C. The Contractor is responsible for using different methods and/or different equipment to stay within vibration tolerances while constructing the work to MDOT specification at no additional cost.
3. Provide recommendations for vibration-limiting methods to meet the specified peak particle velocity limitations.
4. Provide daily reports to MDOT when vibration-inducing operations are taking place. The following shall be included:
 - A. The source of the vibration readings.
 - B. A plot of the 10 highest readings (occurrences) on a graph of Particle Velocity (in/sec) vs. Frequency (Hz). Include the U.S. Bureau of Mines (USBM) RI 8507 curve on the same graph.

The Contractor shall have complete responsibility for monitoring and controlling vibrations, prevention of consequent settlement and/or damage to any existing structure, residences and property, and repair of any damage whatsoever resulting from operations.

13.4.2 Field and Shop Painting of Structural Steel

Slip critical connections and splices shall be coated according to Subsection 716.03.b.2.a of the Standard Specifications. Coated connections and faying surfaces shall meet the minimum cure times and mill thickness according to the product qualification test and Subsection 716.02 of the Standard Specifications before connection assembly.

13.4.3 Structural Metals

The Contractor shall comply with the Standard Specifications for fabrication of structural metals. The Contractor shall hold a pre-fabrication meeting at least two weeks prior to beginning shop and/or field fabrication. The Contractor's Quality Control staff, the fabricator's Quality Control staff, and MDOT's Quality Assurance staff shall attend the meeting to discuss fabrication method, materials, and documentation required under the Standard Specifications.

13.4.4 Bracing and Steel Sheet piling

The Contractor shall furnish and install all temporary and permanent bracing required per the Contractor's design.

The Contractor shall furnish and install temporary steel sheet piling to protect existing S01 structure and slope during excavation and construction of the proposed substructure units.

13.4.6 Substructure and Superstructure Concrete

All joints in concrete cast against earth shall be waterproofed per the Standard Specifications.

All deck pours shall be designated as night pours and subject to the restrictions of the Standard Specifications.

The Contractor shall provide 1-inch open joints in the bridge railing spaced at a maximum of 100 feet and over the pier. The perpendicular railing joints shall be filled with 1-inch joint filler to 1/2 inch from the bevels of railing. The remaining 1/2 inch shall be sealed with a silicone rubber sealant.

The Contractor shall install electrical grounding systems per the Standard Specifications. Grounding cables and tops of grounding rods shall be placed a minimum of 1 foot below finished ground.

If, due to temperature effects on the beams/girders, the position dowels for elastomeric bearings at abutment or pier locations are misaligned in relationship to the centerline of bearings, holes in the elastomeric bearings shall be centered on the dowels.

Concrete inserts for precast components shall not be field-installed.

Surfaces of Bridge railings shall receive a rubbed surface finish per Section 706.03.R.2 of the Standard Specifications.

13.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Removal Procedure	Acceptance	0	1	Before Release for Construction Documents	13.4.1
Temporary Support Details	Acceptance	0	1	Before Release for Construction Documents	13.4.1
Jacking Procedure	Acceptance	0	1	With or before Release for Construction Documents	13.4.1.1

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Pier Construction Concept Drawings	Acceptance	0	1	Before Release for Construction Documents	13.4.1.5
Vibration Consultant’s Qualifications	Acceptance	1	1	With or before Release for Construction Documents	13.4.1.6
Vibration Consultant’s Plan	Acceptance	0	1	With or before Release for Construction Documents	13.4.1.6
Vibration Consultant’s Daily Reports	Acceptance	1	1	Final Acceptance	13.4.1.6
Video Documentation	Acceptance	0	1	Final Acceptance	13.4.1.6

The electronic submittal shall be submitted on a CD or DVD. All files for each structure shall be located in a folder bearing the structure name.

EXHIBIT 2-13-A

11 Axle Design Truck

This exhibit is provided as an electronic file.

File name: Exhibit 2-13-A 11 Axle Design Truck.pdf

14 LANDSCAPING

Not Used.

15 AESTHETICS

Not Used

16 SIGNING AND PAVEMENT MARKING

16.1 General

The Contractor shall conduct all Work necessary to meet the requirements for permanent signing and pavement marking for the Project.

16.2 Administrative Requirements

16.2.1 Standards

16.2.1.1 General Standards

In the event of a conflict among the standards set forth in Book 3 relating to signing and pavement marking, the order of precedence shall be as set forth below, unless otherwise specified:

National

- AASHTO A Policy on Geometric Design of Highways and Streets
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
- AASHTO Roadside Design Guide

Michigan

- Michigan Manual on Uniform Traffic Control Devices (MMUTCD)
- MDOT MMUTCD Correspondence/Guidelines
- MDOT Traffic and Safety Special Provisions
- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT Standard Specifications for Construction
- MDOT CAD Standards
- MDOT Guidelines for Plan Preparation, Road Sample Plans
- Remaining standards set forth in Book 3

16.2.1.2 Permanent Signing Standards

- MDOT Standard Highway Signs
- MDOT Sign Support Standard Plans
- MDOT Sign Support Special Details
- Traffic Signing - Correspondence/Guidelines
- MDOT Traffic and Safety Notes
- Remaining standards set forth in Book 3

16.2.1.3 Permanent Pavement Marking Standards

- MDOT Pavement Marking Standard Plans
- MDOT Pavement Marking Special Detail Plans
- Pavement Markings - Correspondence/Guidelines
- MDOT Pavement Marking Convoy Typical Plans
- MDOT Traffic and Safety Notes
- Remaining standards set forth in Book 3

16.2.1.4 Permanent Traffic Signal Standards

- MDOT *Statewide Special Details*
- MDOT *Miscellaneous Special Details*
- Traffic Signals – Correspondence/Guidelines
- MDOT *Traffic and Safety Notes*
- Remaining standards set forth in Book 3

16.2.2 Software

The Contractor shall use the latest version of SignCAD, by SignCAD Systems, Inc., to design non-standard signs.

16.2.3 Meetings

The Contractor shall meet with MDOT to resolve issues during design and construction of signing and pavement marking. The Contractor should discuss these issues during Concept Meetings and/or Over-The-Shoulder Review Meetings as described in Book 2, Section 2.

16.2.4 Contractor's Personnel

Personnel completing permanent freeway signing tasks shall be prequalified by MDOT in Permanent Freeway Traffic Signing Plans.

Personnel completing permanent non-freeway signing tasks shall be prequalified by MDOT in Permanent Non-Freeway Traffic Signing Plans.

Personnel completing permanent pavement marking tasks shall be prequalified by MDOT in Pavement Marking Plans.

16.3 Design Requirements

16.3.1 Permanent Signing

For the purposes of permanent signing, the 4/3 Roadway shall be considered an urban arterial and the Truck Road shall be considered a freeway ramp. All permanent signing shall have MDOT's Approval prior to fabrication and placement.

For changes in the Truck Road or 4/3 Roadway alignment, number of lanes, or intersections, all applicable warning, regulatory, and guide signs shall be provided.

The Contractor shall place R5-15 "AUTHORIZED VEHICLES ONLY" signs on the Southern Special Return Route at the intersection with the 4/3 Roadway, at the Cell Tower access driveway on the Truck Road, and at the employee parking area under the existing Bridge to Canada.

The Contractor shall place regulatory signs at any one-way roads to deter vehicles from going the wrong way.

The Contractor shall place W3-4 "BE PREPARED TO STOP" signs on each MDOT ramp leading into the Ambassador Bridge Plaza. The signs shall have black lettering on a yellow background. The sign size shall be a 48-inch by 48-inch diamond shape. Each sign shall be mounted on two steel posts and shall be equipped with two 12-inch solar-powered flashing beacons. The flashing beacons on each sign shall flash in a WIGWAG pattern.

The Contractor shall place two R3-7R "RIGHT LANE MUST TURN RIGHT" signs on the 4/3 Roadway where the right lane must turn to the duty free shopping area. One sign shall be placed at the mandatory turn

location and one in advance. A supplemental plaque shall be placed under each R3-7R sign with the legend “TO AUTO DUTY FREE”. The supplemental plaque shall have minimum 3-inch, Type D font. The sign shall have black lettering on a white background.

The Contractor shall replace any signing outside the Project limits that is damaged by the Contractor’s activities. All replaced sign panels, sign sheeting, and sign supports shall be new.

16.3.1.1 Plan Requirements

The Contractor shall develop a Permanent Signing Concept Plan for the Project that includes all necessary guide, warning, and regulatory signs on I-75, MDOT ramps, 4/3 Roadway, Truck Road, Access Drive, and within the Ambassador Bridge Plaza.

The Permanent Signing Concept Plan shall include, at a minimum, the following:

- Existing and proposed sign locations, including offsets from bridge piers or other permanent features
- Sign codes and sizes
- Sign panel and sign face types
- Panel legends for guide signs
- Types of proposed sign structures/supports

In addition to other requirements of the Contract Documents and the Permanent Signing Concept Plan, the RFC Documents shall include the following:

- Design drawings showing non-standard sign details

16.3.1.2 Exceptions to MDOT Standard Specifications

The Contractor shall provide signs that conform to the requirements of Standard Specifications Section 810, except as modified below:

- *Reuse of Existing Sign and Sign Structure Materials:* The Contractor shall not reuse any existing sign or sign structure Materials as part of the new permanent signing installation.
- *Existing Signs and Sign Structures:* all signs, supports, and all attaching or fastening devices for these items are the property of the Detroit International Bridge Company (DIBC) and shall be carefully removed, hauled, and stockpiled on Site.

The Contractor shall contact DIBC at commandcenter@ambassadorbridge.com a minimum of three Working Days to arrange for the delivery of these items. Temporary stockpiling (on-Site), loading, unloading, and hauling of these items is the responsibility of the Contactor.

16.3.1.3 Material Requirements

Traffic signs shall be constructed in accordance with the provisions of Standard Specifications Section 919, except as specified below:

Sign Face and Sign Legend Materials

Sign Category	Material Type
Yellow Warning Signs W series (non school related), E13-1, E13-2, E11-1, OM-1, OM-2, OM-3	ASTM Type IX Fluorescent yellow

Freeway Guide Signs White legends; borders; arrows; and white portion of route markers, shields, and auxiliaries Background	ASTM Type IX White ASTM Type IV Green, brown, or blue
Non-freeway guide signs	ASTM Type IV
Regulatory signs	ASTM Type IV

Signing sheeting shall meet the requirements of MDOT Traffic and Safety Special Provision 03T810(B20).

16.3.2 Permanent Pavement Marking

Install all applicable pavement markings on newly built portions of the 4/3 Roadway, Truck Road, Special Southern Return Route and Access Drive.

The Contractor shall place pavement markings on the 4/3 Roadway to delineate the right-turn only lane to the duty free shopping area.

16.3.2.1 Plan Requirements

The Contractor shall develop a Permanent Pavement Marking Concept Plan that shows edge line striping, lane line striping, arrows, legends, symbols, stop bars, cross walks, object markers, delineation, and other markings consistent with the needs of the Project. Pavement markings shall be provided within the Project limits and on all roadways where pavement markings are damaged due to Contractor operations.

The Contractor shall use pavement marking materials in compliance with the MDOT *Material Source Guide – Qualified Products List*.

The Permanent Pavement Marking Concept Plan shall include at a minimum, the following:

Long Line type:

- Color
- Width
- Location
- Material

Special Marking Legends and Symbols:

- Location
- Material

In addition to other requirements of the Contract Documents and the Permanent Pavement Marking Concept Plan, the RFC Documents shall also include the following:

- Existing pavement markings identified by material type, color, and width and completely dimensioned pavement markings
- Identification of pavement markings to be removed
- All new pavement markings identified by material type, color, line width and completely dimensioned pavement markings, tying the pavement markings to permanent feature
- Location or dimensions for all pavement arrows, legends, crosswalks, and other pertinent features

- Location or dimension for all lane tapers, storage lengths, and other pertinent features

16.3.2.2 Material Requirements

Pavement markings shall be constructed in accordance with the provisions of Standard Specifications Section 920.

16.4 Construction Requirements

The Contractor shall use Materials listed in the Qualified Products List in the MDOT Materials Source Guide for Pavement Markings and Traffic Signs. The Contractor shall obtain from MDOT the Approved Products List current at the Proposal Due Date.

16.4.1 Permanent Signing

The Contractor shall mark in the field locations of the proposed signs and conduct a construction design review with MDOT before installation. The Contractor shall obtain MDOT Acceptance of all sign locations in the field prior to installation.

The W3-4 “BE PREPARED TO STOP” signs with solar-powered flashing beacons shall be constructed per Section 820 of the Standard Specifications and Special Detail “SIG-027-A”.

16.5 Deliverables

16.5.1 General

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Permanent Signing Concept Plan	Acceptance	0	1	20 Working Days after the last scheduled permanent signing concept meeting.	16.3.1
Permanent Pavement Marking Concept Plan	Acceptance	0	1	20 Working Days after the last scheduled permanent pavement marking concept meeting	16.3.2

17 ELECTRICAL, SECURITY, TOLL BOOTHS, AND LIGHTING

17.1 General

The Contractor shall conduct all Work necessary to meet the requirements for electrical, security, toll booths and lighting for the Project.

17.2 Administrative Requirements

17.2.1 Standards

17.2.1.1 General Standards

In the event of a conflict among the standards set forth in Book 3 relating to electrical, security, toll booths, and lighting, the order of precedence shall be as set forth below, unless otherwise specified:

Michigan

- *Michigan Manual on Uniform Traffic Control Devices (MMUTCD)*
- MDOT MMUTCD Correspondence/Guidelines
- MDOT Traffic and Safety Special Provisions
- MDOT Frequently Used Special Provisions
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- MDOT CAD Standards
- MDOT Guidelines for Plan Preparation, Road Sample Plans

National

- National Fire Protection Agency *National Electric Code*
- Institute of Electrical and Electronic Engineers *National Electrical Safety Code*
- AASHTO *A Policy on Geometric Design of Highways and Streets*
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*
- AASHTO *Roadside Design Guide*
- National Electrical Manufacturers Association (NEMA) Standards
- Electronics Industries Alliance (EIA) Standards
- Telecommunications Industries Association (TIA) Standards
- Remaining standards set forth in Book 3

17.2.1.2 Permanent Traffic Signal Standards

- MDOT *Statewide Special Details*
- MDOT *Miscellaneous Special Details*
- Traffic Signals – Correspondence/Guidelines
- MDOT *Traffic and Safety Notes*
- Remaining standards set forth in Book 3

17.2.1.3 Permanent Lighting Standards

City of Detroit Power and Lighting Department

- PLD Standard Plans and Details

National

- AASHTO *Roadway Lighting Design Guide*
- Illuminating Engineering Society of North America, *Roadway Lighting, ANSI Approved*
- Remaining standards set forth in Book 3

17.2.2 Software

Contractor will use AGI32 lighting software to show existing lighting levels will be maintained through construction.

17.2.3 Meetings

The Contractor shall meet with MDOT to resolve issues during design and construction of electrical, security, toll booth, and lighting systems. The Contractor shall discuss these issues during Concept Meetings and/or Over-The-Shoulder Review Meetings as described in Book 2, Section 2.

17.2.4 Contractor's Personnel

Personnel completing lighting (permanent or temporary) design tasks shall be prequalified by MDOT in Freeway Lighting.

Personnel completing toll booth and security design and integration shall demonstrate to MDOT at least 5 years of successful experience in the respective area.

17.3 Design Requirements

17.3.1 Toll Booths

The Contractor shall relocate a minimum of eight existing toll booths and associated systems to their permanent location in the southwest corner of the plaza. A minimum of five booths shall be utilized by traffic on the 4/3 Roadway and a minimum of three booths shall be utilized by traffic exiting the Duty Free Plaza. All booths shall be located after access to the Duty Free Plaza, and prior to the S01 of DIBC structure, near the southwest corner of the 4/3 Roadway.

Toll booths shall be relocated with all features, systems (including associated power and communications systems), and capacities that exist in their current location under S01 of DIBC. This applies to both relocations to a temporary position, and relocations to a permanent position. Known systems and features include, but are not limited to:

- Toll booth shelters with air conditioning and heating units, communications outlets, and power outlets
- Communications systems including cabling, Internet Protocol (IP) telephones, and intercoms
- Toll collections systems including a computer and receipt printer
- Dynamic Messaging Signs (DMS) mounted on bollards
- Radio Frequency (RF) readers for the "Fast Pass" system
- Manual and traffic-loop controlled access gates
- Security cameras

The Contractor shall design and provide necessary power to the toll booths. The Contractor shall design and provide necessary communications links back to the Detroit International Bridge Company (DIBC) Command Center in the Duty Free building. Aerial cable installation for power and communications is acceptable. Currently, power is provided to the toll booths from a 70kVA 480-208Y/120V transformer and distribution equipment located on Pier 12. Existing transformers and distribution equipment may be re-used provided the Contractor maintains the minimum number of booths in operation at all times; contractor may use quiet running generators to provide supplemental power. Contractor shall furnish a commitment letter from a generator supplier to have supplemental power on-site within 4 hours of any unplanned outage; commitment shall be on vendor's letterhead.

The Contractor shall provide a two week load study on three booths and a two week load study for any proposed power source from DIBC. Load studies must chart 15 minute averages and peak power draws. New sources may not be loaded beyond 80 percent of the two week peak draw plus the largest booth peak load; or beyond 95 percent of the two week peak draw plus the largest booth peak load if the proposed power source main and load breakers are rated for 100% operation. The Contractor shall provide a load study on proposed power sources, load study on existing booths, and calculations showing that they will not exceed the 80%/95% criteria.

Existing equipment and systems not utilized in the permanent condition shall be salvaged and provided to the DIBC.

Permanent toll booths and associated systems shall be designed and installed on platforms and with appurtenances as detailed in Exhibit 2-17-A (Toll Booth Detail) and Exhibit 2-17-B (Bollard Detail). The Contractor shall provide mounting hardware to mount relocated dynamic message signs on the top of approach bollards. Booths in a temporary condition may be configured to the existing layout and dimensions.

Traffic loops shall be installed on the departure side of the gate at each inspection booth. A minimum of two traffic loops is required for each inspection booth. The placement, size, and spacing of the traffic detector loops in relationship to one another, the gate, and the inspection booth shall be per the requirements of the gate manufacturer and the existing conditions. The traffic detection loops shall be connected to the traffic gate control hardware per the requirements of the gate manufacturer.

17.3.2 Lighting

17.3.2.1 DIBC Lighting

The Contractor shall provide an average maintained illumination level (E_{avg}) of at least 2.0 foot-candles (fc), and a uniformity ratio (E_{avg}/E_{min}) of no more than 4.0 fc across the proposed temporary travel lanes through the plaza. Photometric calculations created in AGI32 will be provided which show two points across a lane, and at 10 foot increments along the travel lane. Separate grids shall be created for each direction of travel. When temporary lighting is no longer needed, the Contractor shall remove the temporary lighting, provide salvaged materials to MDOT, and restore the plaza parking area. Luminaires are to be powered by aluminum aerial conductors in accordance with MDOT temporary lighting standards.

The average maintained illumination at the existing booths shall be no less than 9.0 fc for all booths in service. As long as the existing lighting is in service the average maintained illumination will be measured in the field by a light meter. One reading is to be taken off each booth in every direction at a distance between 3 and 5 feet from the edge of the booth; the readings for all booths in service will be included in the average.

If the existing light source is modified while existing booths are in service then the Contractor will be required to provide an average maintained illumination of no less than 10.0 fc. For relocated booths, the Contractor will be required to provide an average maintained illumination of no less than 10.0 fc. Proposed illumination levels are to be determined by photometric calculations created in AGI32 before the existing

light source is modified or before a booth is relocated. Calculation grids will include two points across a lane, and a total of seven point-pairs separated by 5 feet, centered on the booth transaction window. After construction, actual illumination values shall be confirmed with direct light meter readings.

Proposed lighting along the 4/3 Roadway shall be designed in accordance with RP-8 for a major roadway with low pedestrian conflict, and R3 type of pavement using DIBC standard materials and construction. Contractor shall submit AGI32 calculations with grids covering entire proposed 4/3 Roadway. All design criteria must be achieved in the statistical area: average maintained illuminance, average maintained luminance, illuminance uniformity ratio, both luminance uniformity ratios, and veiling luminance. Average maintained illumination shall be field verified after construction across three separate luminaire cycles; a luminaire cycle being one light pole-to-light pole span. Readings shall be taken at 20' intervals down the center of each lane in the luminaire cycle. The Contractor shall provide the same photometric calculations and field readings after construction, using DIBC standard materials and construction, along the Truck Road as along 4/3 Roadway.

17.3.2.2 PLD Lighting

City of Detroit Power and Lighting Department (PLD) street lights along Fort Street impacted by construction of the Truck Road shall be relocated to the proposed concrete barrier wall between the Truck Road and Fort Street. Conduit and cable shall be installed in the proposed concrete barrier. All Work associated with the PLD street lighting system shall be performed according to PLD standards.

Proposed lighting along Fort Street shall be designed in accordance with RP-8 for a collector roadway with low pedestrian conflict, and R3 type of pavement using PLD standard materials and construction. Contractor shall submit AGI32 calculations with grids covering entire roadway impacted by construction, plus two luminaire cycles on each end. All design criteria must be achieved in the statistical area: average maintained illuminance, average maintained luminance, illuminance uniformity ratio, both luminance uniformity ratios, and veiling luminance. Average maintained illumination will be field verified after construction across one luminaire cycle. Readings shall be taken at 20' intervals down the center of each lane in the luminaire cycle.

17.3.2.3 Span 19 Lighting

Two existing light poles and three luminaires on Span 19 will need to be removed in order to allow demolition of the existing span. These poles shall be salvaged for re-installation. If damaged while in storage, then contractor shall replace with new and provide the existing materials to DIBC.

Temporary lighting must be provided that maintain the existing average maintained illumination fc lighting level on the traveled pavement. Existing lighting levels are to be determined by photometric calculation rather than field measurements; calculation to encompass the existing travel pavement two cycles in either direction of the Span 19 light poles. Temporary poles shall be powered by aluminum aerial conductors in accordance with MDOT standards. Temporary poles shall be supported by 4'x4'x4' reinforced concrete blocks with embedded anchor rods and lifting hooks. Temporary pole foundations shall be submitted for review and sealed by a Professional (Structural) Engineer licensed in the State of Michigan.

See Section 17.3.2.1 for photometric calculation for proposed lighting. One of the luminaire cycles included in field investigation along 4/3 Roadway must include a cycle on either side of Span 19. Wire and conduit for proposed lighting shall be routed in barrier,

17.3.2.4 Old Auto Fueling Canopy

Work on the Old Auto Fueling Canopy may impact the existing lighting. Prior to any construction, the Contractor shall take illuminance field measurements under any area impacted by construction; measurements shall be taken in a 5'x5' grid pattern, omitting any points falling within areas blocked from vehicular traffic, and extending 10' beyond the work area as long as the area is under the canopy. The Contractor shall submit photometric calculations showing a proposed lighting solution that provides the same

maintained average fc illumination level. Photometric grid shall match the area included in the field measurements. The Contractor shall use all current DIBC materials and construction methods, if none are specified then contractor shall match existing.

17.3.2.5 Lighting Field Records and Photometric Calculations

Light meter readings to be taken at no more than 12” above grade and in a direct vertical direction – light meters shall not be directed toward light sources. Light meter calibration records shall be available upon request. Field measurements shall be recorded on a form that includes the following:

- Scaled sketch with direction of travel and booth identification clearly visible
- Time and date readings taken
- Who was involved in taking the readings
- Hand calculation results

Photometric calculations created in AGI32 shall include the following information:

- Plan view of the calculation area with direction of travel and booth identification clearly visible
- Every grid and statistical summary area name shall be clearly visible
- Separate grids and statistical areas will be created for each direction of travel
- When illuminance, luminance, and veiling luminance calculations are required, separate reports must be submitted
- Luminaire make, model, mounting height, lumens, and light loss factor
- Labeled statistic area isolines are recommended
- Designer and reviewer name and dates
- Design criteria and calculation summary tables

17.3.3 Customs and Border Protection (CBP) Security Gates

The Contractor shall install one steel chain-link fence sliding gate and retrofit additional components, including operators and rollers, of the existing chain-link steel gate at the Cargo Inspection Facility (CIF) in each of the following locations:

- Northern Special Return Route (old Howard Street CIF ingress driveway)
- Truck Return to Canada Lane (CIF egress driveway)

The Contractor’s design shall comply with the general layout shown in Exhibit 2-17-C (CBP Security Gate General Layout). The Contractor shall provide a gate system at both locations using matching Equipment and integrated to the same platform; the system shall be controlled from the CBP control room within the CIF. The Equipment shall be configured to operate as described below:

At the Northern Special Return Route, the Contractor’s design shall position the proposed gate and sliding gate operator upstream (in advance) of the existing gate to accommodate a single WB-67 design vehicle between the gates. The Contractor shall modify the existing south parallel fence to provide an opening (less than 1 foot total) for the new gate to slide through, as necessary. An in-pavement inductive detector loop shall be installed in front of the proposed gate and a sensor shall be installed within the gate latch per the manufacturer’s recommendation. The detector loop will activate the gate operator upon sensing an incoming vehicle. A matching gate operator shall be installed on the existing gate. The existing gate operator may be reused if it is compatible with new system with Approval by the MDOT Project Manager. The Contractor shall install a detector loop in front of the existing gate; this detector shall activate the gate operator upon both confirming closure of proposed gate and sensing vehicle’s arrival at existing gate. The existing and proposed gates shall be designed to prohibit opening at the same time without remote override from CBP in

the control room. Both gate operators shall be capable of manual override to open or lock/close sliding gates from the CBP control room inside the CIF. Secure wireless interconnect is acceptable and preferred.

At the Truck Return to Canada Lane, the Contractor shall design and install a gate operator on the existing gate that matches the gate operator on the proposed gate. The existing gate operator may be reused if it is compatible with the proposed system with Approval by the MDOT Project Manager. The Contractor shall install the proposed gate downstream of the existing gate to accommodate a single WB-67 design vehicle between the gates. Align the new gate with openings in the temporary barrier to facilitate operation. The existing and proposed gates shall be designed to prohibit opening at the same time without remote override from CBP. Both gate operators at the egress lane shall be designed to open only by remote command from the CBP control room.

Both gate systems shall be designed to close the entire clear opening of each respective roadway. 72-inch fence with three barbed-wire strands may be installed parallel to the gate at one or both ends according to Section 808 of the Standard Specifications to provide closure.

17.3.4 DIBC Security Systems

The Contractor shall relocate the existing DIBC security gate at the Southern Special Return Route to operate as close to the 4/3 Roadway as possible, while accommodating a WB-67 design vehicle on the Southern Special Return Route prior to the gate without overhang into the 4/3 Roadway. All existing components including key pads, card readers, security cameras, and light poles shall be relocated with the security gate.

DIBC security cameras shall be relocated as necessary to accommodate the Work. Security camera coverage shall be provided after relocation to the same degree as existing coverage. Relocated security cameras shall be integrated into the DIBC security system in the control room of the Duty Free building.

17.3.5 Electrical Calculations

For all electrical work, including relocation of existing equipment, Contractor shall submit electrical calculations for the following:

- Wire sizing
- Conduit sizing
- Junction box sizing
- Over Current Protection Device Sizing
- Transformer Sizing

Calculations shall be in accordance with the latest revision to the National Electric Code (NEC). Electrical Calculations to be bound, indexed, revision controlled, and provided with a cover sheet that includes a State of Michigan Professional (Electrical) Engineer's Seal. Calculation's shall be provided prior to the start of construction, field revisions significantly impacting any of the above calculations shall be accompanied by an updated revision control sheet and updated calculation. Note – not every field change requires an updated calculation, the following table specifies the magnitude of change which will result in a need to submit a revised calculation:

- Wire sizing- change of length or load greater than 10%, change in ampacity derating.
- Conduit sizing – change of conduit material or the addition of three more conductors
- Junction box sizing – addition of three or more conductors
- Over Current Protection Device Sizing – change of load greater than 10%
- Transformer Sizing – change of load greater than 10%

17.3.6 Span 19 Conduits

Suspended from the deck between Span 18 and Span 19 is a back of four suspended conduits of different sizes. Contractor shall remove the conduits back to Span 18 and then can within 3 feet of an existing hanger. Cap shall be of same material as the conduit and shall be considered permanent but also designed for future removal.

17.4 Construction Requirements

The Contractor shall use Materials listed in the Qualified Products List in the MDOT Materials Source Guide for Traffic Signals. The Contractor shall obtain from MDOT the Approved Products List current at the Proposal Due Date.

17.4.1 Toll Booths

The Contractor shall provide a Toll Booth Migration Plan for Approval. The Migration Plan shall include all features and systems associated with the toll booth operation.

Prior to decommissioning the toll booths for relocation (temporarily or permanently), the Contractor shall inventory all existing equipment and document the status and condition of all systems and features associated with revenue collections. Damage to toll booths and associated systems during construction shall be repaired or replaced as Approved by MDOT, at the Contractor's expense. See Book 2, Section 18 for more relocation requirements.

The traffic detector loops shall be constructed per Section 820 of the Standard Specifications and Special Detail "SIG-170-A". The number of turns of wire for each traffic loop shall be per the manufacturer's requirement and the existing conditions.

The Contractor shall provide a Toll Booth Acceptance Test Plan. The plan shall list singular, step-by-step instructions with passing criteria to demonstrate proper function of each of the toll booth systems. The plan shall be successfully executed before the commissioning the toll booths for use by DIBC. The Contractor shall provide 24-hour technical support for installed toll booth systems for the first five Calendar Days of toll booth operations.

17.4.2 Lighting

Temporary light poles made of wood or otherwise non-frangible construction must be installed to such that they meet the more restrictive of AASHTO or MDOT frangibility/set back/barrier requirements.

Permanent light poles and fixtures along 4/3 Roadway and Truck Road must match existing DIBC light standards. Permanent light poles and fixtures along the Fort Road must match PLD light standards.

17.4.3 Customs and Border Protection (CBP) Security Gates

The existing steel gates are 60-inch high steel chain-link security fence on rolling wheels mounted 1 foot above grade, opening utilizing a sliding mechanism. The proposed steel gates shall be 60 inches high, constructed of 1-inch by 1-inch vertical steel bars with steel cross-bracing, mounted 1 foot above grade. Proposed gates shall match existing materials to the extent possible. Each gate shall allow 16 feet of clear access when open. Each gate shall be fitted with rollers intended for heavy-duty commercial use.

Gate operators shall be procured from products listed in GSA schedule 084, SIN 246-35-3. Operators shall have a minimum 1 horsepower motor and be designed for heavy-duty commercial use. Acceptable manufacturers include Camberlain, Liftmaster, and DoorKing. All four gate operators must be of the same type and model, and capable of master/slave control, sequenced access management, remote control, manual override, and loop input. Operators shall be compliant with UL325.

Wireless remote communications to a single keypad or access control unit located in the CIF control room is required. 26/30 bit Wiegand coding, auto-code scrambling, or another type of security for the wireless remotes is required, and shall be approved by CBP prior to the purchase of any equipment.

Power feeds are available at both existing gates, however separate circuits must be provided for each gate operator. Install a breaker box to accommodate splitting the power feeds for each gate operator. All conduit paths shall be Approved by MDOT and CBP prior to construction.

Install, integrate, and test all components and sub-systems to provide a complete and operational gate system.

17.4.5 DIBC Security Systems

Relocate, integrate, and test all components and sub-systems to provide complete and operational security gates.

Relocate, integrate, and test all components to provide complete and operational security cameras as necessary.

Coordinate all security camera and gate outages and relocations with the DIBC through MDOT.

17.5 Deliverables

17.5.1 General

All submittals shall be made in PDF format. In addition, photometric calculations completed in AGI32 software shall be submitted as electronic AGI files that can be imported into Version 2.3.

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Toll Booth Migration Plan	Approval	0	1	5 Working Days before toll booths are decommissioned	17.4.1
Toll Booth Acceptance Plan	Approval	0	1	5 Working Days before Acceptance Testing	17.4.1
Lighting Calculations	Approval	0	1	10 Calendar Days before relocating a booth or revising area lighting	17.3.2.1 17.3.2.2, 17.3.2.3, 17.3.2.4
Generator Vendor Commitment Letter	Acceptance	0	1	5 Calendar Days before start of field work	17.3.1
Load Studies for 3 Booths	Approval	0	1	10 Calendar Days before	17.3.1

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
and Proposed Power Source(s)				using a new power source for booths	
Lighting Field Measurement – Existing Conditions	Approval	0	1	10 Calendar Days before relocating a booth or revising area lighting	17.3.2.1, 17.3.2.2, 17.3.2.3, 17.3.2.4
Lighting Field Measurement – New Conditions	Acceptance	0	1	10 Calendar Days after revising area lighting	17.3.2.1, 17.3.2.2, 17.3.2.3, 17.3.2.4
Temporary Concrete Pole Foundation	Approval	0	1	10 Calendar Days prior to installation	17.3.2.3
Electrical Calculation Binder	Approval	0	1	20 Calendar Days after NTP, within 5 Calendar Days of a field change	17.3.5

EXHIBIT 2-17-A

Toll Booth Detail

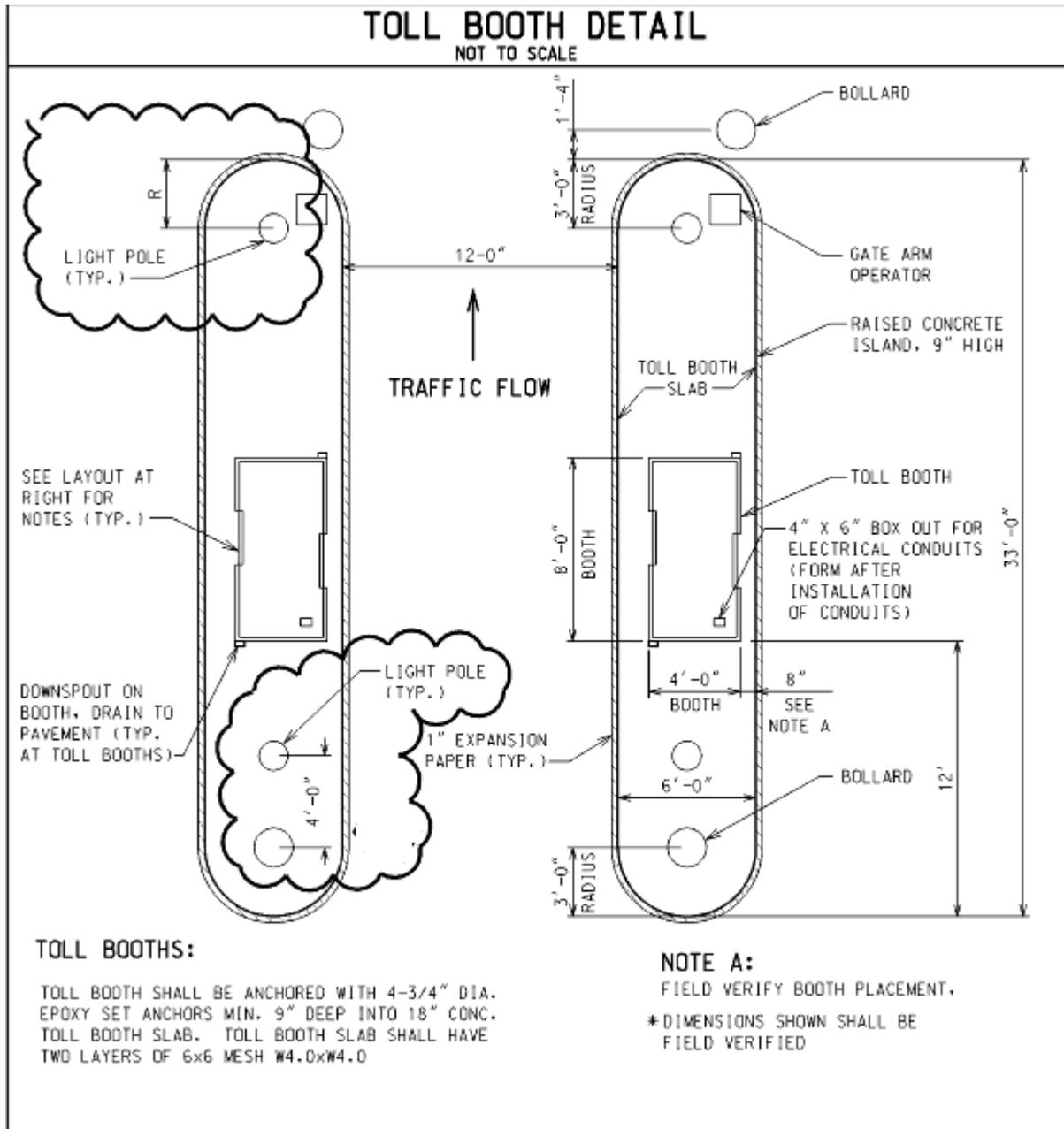


EXHIBIT 2-17-B

Bollard Detail

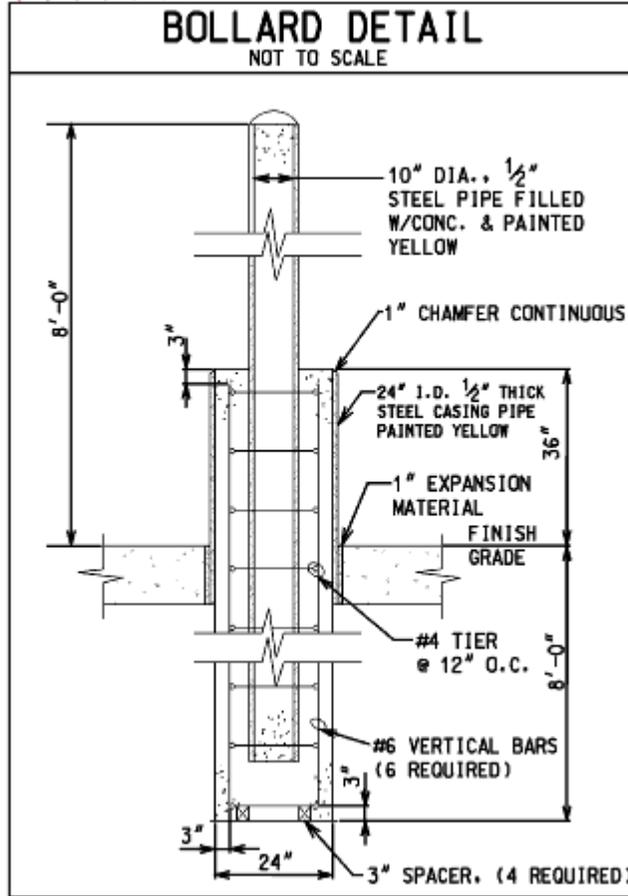


EXHIBIT 2-17-C

CBP Security Gate General Layout

18 MAINTENANCE OF TRAFFIC

18.1 General

The Contractor shall conduct all Work necessary to meet the requirements associated with maintenance of traffic (MOT), including providing for the safe and efficient movement of people, goods, and services to and from the Bridge to Canada and around the Project while minimizing negative impacts to residents, commuters, and businesses.

The Contractor shall notify MDOT of any changes in Project staging five Working Days in advance of these changes. Project staging changes include additional ramp closures, traffic switches, lane restrictions, shoulder restrictions, changes in detours, and any Approved traffic closures. Written Approval is required by the MDOT Project Manager for any changes prior to implementation. Notification and coordination with the Detroit International Bridge Company (DIBC) Command Center is required prior to implementation of any changes.

18.2 Administrative Requirements

18.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to maintenance of traffic, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Special Provision – Temporary Concrete Barrier Ending, Detail
- MDOT Special Provision – NTCIP-Compliant Portable Changeable Message Sign
- MDOT Special Provision – Audio-Visual Filming
- MDOT *Work Zone Safety and Mobility Manual*
- MDOT *Work Zone Safety and Mobility Policy*
- *Michigan Manual on Uniform Traffic Control Devices (MMUTCD)*
- MDOT Frequently Used Special Provisions
- MDOT *Maintaining Traffic Typical*s
- MDOT Work Zones - Correspondence/Guidelines
- MDOT Work Zone Devices
- MDOT Standard Highway Signs
- MDOT *Geometric Design Guides*
- MDOT *Road Design Manual*
- AASHTO *Roadside Design Guide*
- MDOT Standard Plans
- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- Remaining standards set forth in Book 3

18.2.2 Transportation Management Plan

This Project has been identified as “significant” for potential mobility impacts. The Contractor shall develop, implement, and maintain a Transportation Management Plan (TMP) according to the MDOT *Work Zone Safety and Mobility Manual* and the MDOT *Work Zone Safety and Mobility Policy* that includes the following items:

- Temporary Traffic Control Plan (TTCP)

- Maintaining traffic plan sheets, detail sheets, maintaining traffic typicals, the Special Provision for Maintaining Traffic, and other direct components relating to the maintenance of traffic
- Procedures to modify the plans as needed to adapt to current Project circumstances.
- Transportation Operations Plan (TOP)
 - Coordination with emergency service providers, DIBC law enforcement entities, and other related users.
 - Descriptions of the duties of a Traffic Engineering Manager or designee and other personnel with MOT responsibilities. These duties shall include responsibility of all traffic control, maintenance and modifications to traffic control during construction, and availability 24 hours per day, 7 days per week.
 - Methods and frequency of inspection and maintenance of all traffic control devices within the Project limits.
 - Contact names and information for after-hours incident response with anticipated response times
 - Items of Work that must be completed prior to opening the Roadway or a portion of the roadway to traffic.
- Public Information Plan (PIP)
 - Refer to Book 2, Section 3 Public Information
- Work Zone Management
 - Work zone safety, mobility, and mitigation impacts shall be monitored and documented using field observations, crash data analysis, and other pertinent operational information. The Contractor shall be responsible for any revisions or modifications necessary to improve the TMP during construction.
- Performance Assessment Plan (PAP)
 - Work zone safety and mobility shall be monitored, measured, and documented during the construction phase of the Project by the Contractor to verify the mitigation measures and strategies are performing as expected. This documentation to be prepared by the Contractor and provided to MDOT will be the basis for the Project-specific PAP and will include documentation of the traffic delays, travel times, queues, volumes, and associated information.

Due to the expedited nature of the Project, the Contractor may close one lane on the Bridge to Canada, the existing Southern Special Return Route, and lanes on Fort Street per Book 2, Section 18.3.2 for Pier 19 demolition, Span 19 demolition, and construction of the Truck Road prior to TMP Approval by MDOT. During Span 19 demolition, the Contractor shall provide alternative access to Fort Street Approved by MDOT. If additional closures are necessary, a written request shall be submitted to MDOT for Approval prior to implementation.

The TMP must be Approved by MDOT prior to any restriction in traffic on I-75 or any restriction in traffic or pedestrian access within the Ambassador Bridge Plaza. The TMP shall be signed by the Traffic Engineering Manager and sealed by the Contractor's designer.

18.2.3 Personnel

The design engineer preparing the MOT plans shall be prequalified with MDOT in Maintaining Traffic Plans and Provisions.

The Contractor and any Subcontractor(s) shall provide a list to the MDOT Project Staff, on company letterhead, of the names of any person(s) working within the Ambassador Bridge Plaza. This list should also

be provided to the DIBC Command Center (commandcenter@ambassadorbridge.com) so DIBC may promptly respond to the U.S. Customs and Border Protection's (CBP) requesting information regarding the workers on Site. All personnel are required to carry this list and photo identification at all times and must produce these items upon CBP request. The DIBC Command Center is available 24 hours a day, 7 days a week and may be contacted directly at 313-989-0136.

The Contractor shall provide CBP with the names, dates of birth, and social security numbers of all construction personnel who will be working on or within CBP property, which at this time is identified as the Cargo Inspection Facility (CIF). The CIF perimeter is defined by the Bridge to Canada on the west, St. Anne Street on the east, Fort Street on the south, and Porter Street on the north. CBP reserves the right to deny entry to the CIF to any worker. If any of the Contractor's personnel have a criminal record that is unacceptable to CBP, the Contractor shall find a replacement(s) that are Acceptable to CBP.

The Contractor shall provide the written information to CBP five Working Days prior to accessing CBP property. Contact information for CBP is below.

John Nowak
Assistant Port Director, Tactical Operations, Port of Detroit
US Department of Homeland Security
2810-B West Fort Street
Detroit, MI 48216
313-964-7833 tel
313-318-0984 cell
313-964-7877 fax
John.nowak@dhs.gov

18.3 Design Requirements

18.3.1 MOT Design Standards

18.3.1.1 Design and Posted Speeds

Bridge to Canada

The speed limit on the Bridge to Canada during construction shall not be reduced.

Fort Street

The speed limit on Fort Street during construction of the Truck Road shall not be reduced.

Ambassador Bridge Plaza

The speed limit during construction shall be 25 mph within the Ambassador Bridge Plaza.

18.3.1.2 MOT Design Vehicle

The MOT design vehicle for this Project shall be a WB-67.

18.3.1.3 Cross-Section

A minimum 2-foot paved shy distance shall be maintained from the traveled lanes to all traffic control devices, including temporary concrete barrier, plastic drums, and signs.

I-75 and Ramps

The traveled lanes on I-75 and exit ramps to the Ambassador Bridge Plaza shall be at least 12 feet wide.

Bridge to Canada

The traveled lanes on the Bridge to Canada shall be at least 12 feet wide.

Fort Street

The traveled lanes on Fort Street shall be at least 12 feet wide.

Ambassador Bridge Plaza

The traveled lanes on the 4/3 Roadway during construction shall be at least 12 feet wide.

18.3.1.4 Security

The Contractor shall maintain a secure plaza at all times. The north/south fence separating the traffic to the U.S. and traffic to Canada shall not be breached. The east/west fence along Fort Street shall be moved to the north during construction of the Truck Road.

18.3.1.5 Entrance and Exit Ramps

The northbound and southbound I-75 ramps with direct access to the Ambassador Bridge Plaza shall remain closed during construction. Access to the Ambassador Bridge Plaza shall be maintained in the current 2 lane configuration from the northbound I-75 service drive.

18.3.1.6 Detours

No detours are anticipated. If required, all detours shall have the prior Approval of MDOT.

18.3.2 Lane RestrictionsI-75 and Ramps

The Contractor may close one lane of the northbound I-75 service drive to the Ambassador Bridge Plaza during non-peak travel times as Approved by the MDOT Project Manager. The northbound I-75 exit ramp to Clark Street and eastbound I-96 exit ramp to Vernor Highway shall remain open at all times.

Bridge to Canada

The Contractor may close one lane of the roadway on S01 of DIBC and the Bridge to Canada during construction of the permanent concrete barrier and placement of the temporary concrete barrier for Span 19 demolition.

Following Span 19 demolition and Truck Road completion, no lane closures are allowed on the Bridge to Canada unless Approved by the MDOT Project Manager.

Fort Street

During Span 19 demolition and Truck Road construction, Fort Street shall be one 12-foot lane in each direction. The dedicated truck lane exiting the CIF onto Fort Street shall also be maintained.

After completion of the Truck Road, Fort Street shall be a minimum of one 12-foot lane in each direction and a 12' center turn lane.

Ambassador Bridge Plaza

Eight toll booths shall be in operation at all times during construction. The Contractor shall move toll booths during off-peak hours, defined as 6:00 a.m. through 2:00 p.m. Monday through Friday.

Two lanes shall be maintained at all times from the Ambassador Bridge Plaza to S01 of DIBC. This may be temporarily reduced to one lane south of S01 for paving operations. Access to the Truck Return to Canada Lane, the Auto Return to Canada Lane, and Northern Special Return Route shall be maintained at all times.

Flag control may be used during construction to maintain access. Access to the Southern Special Return Route shall be provided as described in Book 2, Section 18.3.3.2.

18.3.3 Incident Management

18.3.3.1 Coordination with Emergency Responders

The Contractor shall inform MDOT Project staff and emergency responders of any changes in staging that may impact the response time of any emergency service, including police, fire, first responders, and potential HAZMAT response. The Contractor shall hold one meeting during the design process with the emergency responders to describe emergency access to/from the Ambassador Bridge Plaza during construction. The Contractor shall incorporate emergency access into the Design Documents, Incident Management Plan, and Maintenance of Traffic Plans.

18.3.3.2 Emergency Access

The Contractor shall assist emergency vehicles in gaining access to the Ambassador Bridge Plaza at all times. The Contractor shall provide at least two of the following emergency vehicle access points at all times:

- Southern Special Return Route
- Northern Special Return Route
- Fort Street access gates

The Southern Special Return Route is located in the southeast quadrant of the Ambassador Bridge Plaza and connects the 4/3 Roadway to the Truck Road. Prior to completion of the Southern Special Return Route, the Contractor shall install an access gate at the location defined in Book 2, Section 17, which shall be operational at all times. The Contractor is responsible for coordinating the operation of the existing and proposed access gates with DIBC. Prior to the beginning of the Truck Road construction, access gates shall be installed and operational on the Northern Special Return Route and the Truck Return to Canada Lane as described in Book 2, Section 17. Gate installation shall be Approved by MDOT and CBP.

During Truck Road construction, the Fort Street access gates shall be maintained. Following Truck Road completion, the two Plaza emergency egress locations shall be the Southern Special Return Route and the Northern Special Return Route. The Truck Return to Canada Lane shall be maintained at all times.

The Contractor shall maintain the Auto Return to Canada Lane from the Auto Plaza area and the Truck Return to Canada Lane from the CIF area at all times. Access from these two lanes to Canada shall be maintained at all times.

The emergency vehicle access roadway shall meet the following design standards:

Design Standards	Emergency Vehicle Access
Roadway Type	6 inch minimum Class 21AA, compacted per standards
Turning Radius	55 feet minimum
Clear Roadway Width	20 feet minimum
Special Features: Security	Gates must be in place prior to use of emergency vehicle access
1. The maximum grade shall not exceed 8 percent, with 4 percent as the maximum allowable in turnaround areas.	
2. The vertical clearance shall meet at a minimum 17.00 feet.	

3. Emergency vehicle access roadway must be free from obstructions at all times to minimize emergency response times. No parking of vehicles or Equipment or stockpiling of Materials shall be allowed along the emergency access roadway. The Contractor is permitted to use the access roadway as a haul road, but shall remove vehicles from the emergency path and stop using the emergency access roadway at the first notice of an approaching emergency vehicle. The Contractor shall not use the emergency access roadway until the emergency vehicle leaves the Plaza.

18.3.3.3 Incident Management Plan (IMP)

The Contractor shall submit an Incident Management Plan (IMP) for every stage of construction for Approval by MDOT. The IMP must direct traffic to the U.S., unless directed otherwise by the MDOT Project staff. The IMP must include the following items:

- Plans for Site access by emergency services personnel
- Resources required for each type of incident including accidents, disabled vehicles, Utility disruptions and roadway impedances including debris or any other traffic disruptions.
- Contact information of one individual and a designated alternate who are available 24 hours per day, seven days per week, for incident response to MDOT prior to the start of construction.
- Notification of emergency responders, school districts, and Project staff of all incidents within the work zone, or in immediate areas outside of the work zone, that may influence Project traffic flow including any accidents, disabled vehicles, Utility disruptions and roadway impedances including debris or any other traffic disruptions. These notifications shall be made to Project staff within 15 minutes of incident.
- Notification of emergency responders, school districts, and Project staff of any changes in Project staging three Working Days in advance of these changes. Project staging changes include traffic switches, additional lane restrictions, and any approved closures of the roadway or any arterial adjacent to, or leading to, the roadway of influence.

18.3.4 Temporary Concrete Barrier and Mobile Attenuators

Contractor shall be responsible for using temporary guardrail, barricades, or barrier to protect the traveling public and to provide security of the Project Site.

The approach end of the Temporary Concrete Barrier (TCB) shall be tapered at a 1:6 flare rate or flatter. TCB shall be placed in accordance with the current version of MDOT Standard Plan R-126.

The cross-slope on the traffic side of the TCB shall be 1:10 or flatter. TCB shall not be placed on a cross-slope steeper than 1:10.

When the blunt end of the TCB falls within the clear zone a temporary concrete barrier ending shall be placed at the approach end of the TCB per Standard Plan R-126 (Detail 2). All TCB endings shall be installed in accordance with the MDOT Special Provision – Temporary Concrete Barrier Ending, Detail. Traffic shall not be exposed to the blunt end of TCB or permanent barrier wall without attenuation. When using a Detail 2 end treatment, omit the sloped barrier end section.

Appropriate signs and traffic control devices shall be placed in advance of the TCB to draw attention to the presence of the TCB.

Mobile Attenuators (MAs) shall be required on this Project for placement, adjustment, and relocation of the TCB. MAs shall also be used when placing construction zone signing on freeways. MAs shall be removed from the roadway when not in use. Placement of the attenuators shall provide maximum coverage of the work area. Placement shall be provided by the Contractor during design and Approved by MDOT.

MAs shall not be used as TCB attenuation devices.

18.3.4.1 Temporary Concrete Barrier on the Bridge to Canada and S01 of DIBC

TCB shall be placed to protect the blunt end of the proposed permanent concrete barrier along the Bridge to Canada. The TCB shall remain in place. The TCB shall be tapered at a 1:6 flare rate or flatter until it reaches the existing west bridge barrier railing of S01 of DIBC.

18.3.5 Channelizing Devices

Channelizing devices used on this Project shall be plastic drums with high intensity sheeting from MDOT's Approved list. The use of cones or other channelizing devices will not be allowed on this Project. All channelizing devices on this Project shall be new.

The spacing of channelizing devices shall not exceed those specified in the MMUTCD.

Placement of double-sided lighted type III barricades shall be as shown on the staging plans and typicals.

18.3.6 Temporary Signing

All temporary signs on this Project shall be new.

I-75 and Ramps

Diamond warning signs shall be 48 inches x 48 inches on I-75 and exit ramps. All fonts on temporary special signs shall be a minimum of 8 inches high on I-75 and the exit ramps leading to the Ambassador Bridge Plaza.

Bridge to Canada

Diamond warning signs shall be 48 inches x 48 inches on the Bridge to Canada. All fonts on temporary special signs shall be a minimum of 6 inches high on the Bridge to Canada.

Fort Street

Diamond warning signs shall be 48 inches x 48 inches on Fort Street. All fonts on temporary special signs shall be a minimum of 6 inches high on Fort Street.

Ambassador Bridge Plaza

Diamond warning signs shall be 36 inches x 36 inches within the Ambassador Bridge Plaza. All fonts on temporary special signs shall be a minimum of 5 inches high within the Ambassador Bridge Plaza.

All temporary signs used on this Project shall be fabricated utilizing prismatic retro-reflective sheeting Type VII or higher per the Standard Specifications.

All temporary signs shall be fabricated to meet NCHRP 350 and as defined in MDOT Frequently Used Special Provision 03SP812H.

All temporary signs shall have a minimum bottom height of 7 feet. The minimum bottom height of any supplemental plaque shall be 6 feet.

All temporary signs in place for more than three Calendar Days shall be installed on driven supports. In areas where driven supports are not possible, the Contractor shall propose options for MDOT Approval.

All sign supports used for temporary signs shall be designed and installed in accordance with MDOT Traffic Special Detail WZD-100-A, including meeting all requirements for breakaway supports.

The Contractor shall remove the driven sign supports or post studs when the sign is removed.

No signs shall be attached to type III barricades.

The Contractor shall place W20-1 (ROAD WORK AHEAD) signs on all ramps and intersecting roadways where construction activities may be encountered.

All applicable existing/proposed ground-mounted and overhead signs are assumed to be in place during construction. All existing ground-mounted and overhead signs in conflict with temporary traffic control devices shall be covered by the Contractor. Conflicting signs shall be identified in the field by MDOT and the Contractor. Signs shall be covered in accordance with the Standard Specifications.

All signs, temporary or permanent, that are damaged as a result of improper sign covering shall be replaced by the Contractor.

A minimum of three Portable Changeable Message Signs (PCMS) shall be included in this Project as specified in the MDOT Special Provision - NTCIP-Compliant Portable Changeable Message Sign. Messages displayed on the PCMS shall conform to MDOT's policy on PCMS and shall be Approved by MDOT prior to installation. Locations of the PCMS shall be as directed by MDOT.

18.3.6.1 Special Signs for Separated Traffic

When traffic is separated in the Ambassador Bridge Plaza between through traffic to Canada and traffic to duty free/fueling, the Contractor shall place special signs directing traffic. The special signs shall have a legend "TO CANADA" or "TO DUTY FREE/FUELING" and appropriate directional arrows.

18.3.7 Haul Roads

The Contractor shall have haul roads Approved by the appropriate governing agency prior to use. The Contractor shall be responsible for all restoration of haul roads to levels specified by the appropriate governing agency.

18.3.8 Pedestrian Access

The Contractor shall maintain safe and accessible pedestrian access at all times along the following paths, at minimum:

- Between the Duty Free parking and the Duty Free shopping building
- Between the Truck/Auto Fueling and the Duty Free shopping building
- Between DIBC employee parking and the Duty Free shopping building and toll booths
- Between the Truck Parking and the Duty Free shopping building

18.3.9 Restricted Hours

No construction work that impacts traffic may begin before April 16, 2012 unless Approved in writing by MDOT.

18.3.10 MOT Plans

The Contractor shall use the procedures in the TMP to provide for all construction staging, construction Site security, and access to the construction Site. The MOT plans shall be prepared under the direction of the Traffic Engineering Manager. The Contractor's MOT plans shall include the following items:

- Complete plan sheets and typicals for construction access, security, and appropriate traffic control
- Plan sheets and/or details for handling construction operations such as Material delivery and storage, access and exit of construction and delivery vehicles, haul roads, and other items that may impact traffic
- Roadway plan sheets showing all In-Place traffic control devices that need to be retained, relocated, or removed and all temporary traffic control devices that need to be installed, retained, relocated, or removed

- Drawings showing dimensions for fabricating any sign not detailed in the MDOT *Standard Highway Signs*, along with the background color and legend
- The size and color of all standard traffic control devices
- Roadway plan sheets with the approximate location of each sign. The sign placement must be easily determined in relation to the roadway and other traffic control devices. No number or letter may be on the roadway plan sheets as a reference for sign placement.
- Provisions for using temporary concrete barrier wall or attenuators to protect the traveling public and to provide security of the Project Site.
- Provisions for opening the new roadways to the traveling public

The MOT plans and typicals shall be submitted to MDOT for Acceptance. The Contractor shall provide Accepted MOT plans, as required, two Working Days prior to implementation to MDOT for distribution to the stakeholders.

18.4 Construction Requirements

18.4.1 Contractor's Responsibility

18.4.1.1 General

The Contractor shall be responsible for maintenance of traffic starting at 12:01 a.m. on the Day Work begins on the Project while traffic control devices are present in the work zone. The traffic control devices must be continually and adequately monitored and maintained to ensure proper placement and the safe and efficient flow of all construction traffic and motorists into and out of the Project as stated in the Mobility Policy. Such responsibility shall continue during all periods where Work is being performed that impacts traffic. MDOT may, in writing, temporarily suspend such responsibility in conjunction with an official suspension.

Prior to opening any lanes, the Contractor shall remove (sweep) all debris created by the construction operation.

Any damage done to pavement within the Project limits due to the Contractor's operations shall be repaired at the Contractor's expense. Videotaping of existing roadway conditions shall be required by the Contractor to confirm pre-existing conditions in accordance with Section 18.4.2.

The Contractor shall provide written notice to MDOT five Working Days prior to closing or restricting traffic. Advanced messaging shall be provided per the Mobility Policy. This signing shall be erected a minimum of two Working Days prior to the closure and shall note the closure duration and covered when not in use or needed.

All traffic control devices shall conform to the current *Michigan Manual on Uniform Traffic Control Devices*.

All temporary signs, plastic drums, and type III barricades used for Maintaining Traffic shall comply with the Standard Specifications.

The Contractor shall be responsible for implementing a field identification system to identify all temporary signs, arrow boards, barricades and PCMS used on this Project. Identification shall be located as allowed by the MMUTCD and shall include the name of the Contractor.

The Contractor shall routinely maintain all traffic control devices. The Contractor shall be responsible for replacing any damaged or lost traffic control devices, including plastic drums, type B signs, type A signs, type III barricades, arrow boards, message boards, mobile attenuators, and TCB endings.

The Contractor shall be responsible for protecting the work area and must supply the necessary traffic control devices apart from those called for on the plans to delineate the work area from the adjacent property.

All Test Level 1, Test Level 2, and Test Level 3 traffic control devices shall be NCHRP 350 compliant. Temporary concrete barrier shall meet MDOT Frequently Used Special Provisions 03SP812W.

- The Truck Road Completion date shall be as specified in Book 1, Section 4.3.3. Truck Road Completion shall be defined as specified in Book 1, Section 12.1.1.
- The 2012 Open to Traffic date shall be as specified in Book 1, Section 4.3.3. 2012 Open to Traffic shall be defined as specified in Book 1, Section 12.1.2.

Liquidated Damages will be assessed per Book 1, Section 17.

18.4.1.2 Truck Road, 4/3 Roadway, and Ambassador Bridge Plaza

The Contractor shall not close or remove the existing CBP gated exit at Fort Street until the gates on the Northern Special Return Route and Truck Return to Canada Lane are installed and fully operational. Due to time constraints, temporary installation and operation will satisfy this requirement. Prior to Open to Traffic, the Contractor shall complete the permanent Northern Special Return Route and Truck Return to Canada Lane gates.

The Contractor shall place TCB on S01 of DIBC and the Bridge to Canada prior to Span 19 demolition.

The Contractor shall remove Pier 19 to allow for the completion of the Truck Road.

The Contractor shall relocate existing toll booths between Piers 12 and 13 prior to starting work to modify Piers 11, 12 and 13.

During toll booth relocation to the final configuration, the Contractor shall separate vehicles between through traffic to Canada and traffic to Duty Free/Fueling. The Contractor shall configure the toll booths so traffic is tolled once.

The Access Drive shall not be used as a haul road after any portion of the permanent roadway section has been constructed.

18.4.1.3 Local Roads

The Contractor shall notify MDOT a minimum of five Working Days prior to any local road Work requiring closures or lane drops. MDOT will then notify the local agencies of this Work.

The Contractor shall submit a plan for protecting all pavement, Utilities, and nearby structures during removal operations. This plan shall be Accepted by MDOT prior to the beginning of any removal operations.

18.4.1.4 Pavement Markings During Construction

The Contractor shall be responsible for logging existing pavement markings on portions of surface streets prior to removing the markings for stage construction. A copy of the log is to be submitted to MDOT prior to removing the markings. Upon completion of the Project, the surface streets shall be returned to their original configuration with material replaced in kind and marked accordingly.

The Contractor shall temporarily delineate all traffic lanes through the Ambassador Bridge Plaza with edge lines and lane lines.

The Contractor shall temporarily delineate all traffic lanes on Fort Street during construction.

The Contractor shall remove conflicting pavement markings prior to placing temporary pavement markings. Over-painting of existing markings with temporary markings will not be allowed.

When existing pavement markings are removed, temporary pavement markings shall be placed before opening lanes to traffic.

Temporary, Type R markings shall be used on all pavements where the traffic patterns are subject to change and on pavements not being removed or resurfaced. Temporary, Type NR markings shall be used on all pavements where the traffic patterns are not subject to change and on pavements being removed in later stages.

All temporary NR markings shall be Type NR, Tape.

When lane closures or shifts are in place for more than three Calendar Days, skip lines in lane closure tapers or shifts shall be removed and an edge line of the appropriate color shall be painted along the taper.

All temporary special markings shall be Overlay Cold Plastic.

18.4.2 Video Record

Before the start of construction, the Contractor shall videotape the entire Project Site, surrounding areas, and other areas as directed by MDOT, to record the pre-construction condition. The video record shall be completed in accordance with the MDOT Special Provision – Audio-Visual Filming. The interior and exterior of all buildings within 200’ of construction limits shall be recorded, including all building foundations. The Contractor shall provide a copy of the video record on DVD to MDOT.

18.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Transportation Management Plan	Approval	0	1 PDF	Prior to traffic restrictions on I-75 or within Ambassador Bridge Plaza	18.2.2
Incident Management Plan	Approval	0	1 PDF	Approval 2 Working Days prior to implementation of temporary traffic control	18.3.3
MOT Plans	Acceptance	1	1 PDF	Prior to traffic restrictions on I-75 or within Ambassador Bridge Plaza	18.3.10
Pavement, Utilities, and	Acceptance	0	1 PDF	Prior to the start of removal operations on	18.4.1.3

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
Nearby Structures Protection Plan				local roads	
Video Record	Acceptance	0	1 MPEG4	Prior to the start of construction	18.4.2

19 PROJECT MAINTENANCE

19.1 General

The Contractor shall conduct all Work necessary to meet the requirements associated with Project maintenance during construction, except for snow and ice control and other responsibilities in Book 2, Section 19.4.2.

19.2 Administrative Requirements

19.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to project maintenance, the order of precedence shall be as set forth below, unless otherwise specified:

- MDOT Supplemental Specifications
- MDOT *Standard Specifications for Construction*
- Remaining standards set forth in Book 3

19.2.2 Maintenance Management Plan

The Contractor shall prepare a Maintenance Management Plan that includes the following:

- List and schedule of all proposed routine maintenance activities
- Name of and 24-hour contact information for the Contractor's maintenance supervisor

19.2.3 Meetings

The Contractor's maintenance supervisor shall attend all scheduled progress meetings.

19.3 Design Requirements

19.3.1 Design Standards

The Contractor shall comply with the Project-specific design standards listed in this Section 19.

19.4 Construction Requirements

19.4.1 Contractor's Responsibilities

The Contractor shall assume maintenance of the entire Project within the project influence area, except for those activities that will be performed by MDOT or DIBC, and the City of Detroit as specified in Section 103.06 of the Standard Specifications, unless otherwise specified in Book 2, Section 19.4.

The maintenance period shall begin April 16, 2012 and shall extend through Substantial Completion or Final Acceptance as described in Book 1, Section 10.2.2. The Contractor shall remove all unnecessary traffic control devices from the Site as a condition of MDOT's Acceptance of the Work. The Contractor shall coordinate and not impede any regular maintenance performed by MDOT, DIBC, and the City of Detroit during the entire duration of the Project. The Contractor shall provide access to the Duty Free Facility loading dock at all times. The Contractor shall maintain access to the Southern Special Return and Northern Return Routes once they are completed and opened to traffic.

The Contractor shall be responsible for maintaining the following:

1. Roadbeds on which construction activities have begun
2. Temporary roads
3. Existing facilities that will be replaced or reconstructed as part of the Work

4. Existing facilities remaining in place that are within or in close proximity to and affected by the Project
5. Haul routes for Project materials
6. Project facilities damaged by normal wear, forces of nature, or acts of third parties

Maintenance on temporary or existing facilities to be replaced shall be performed to provide a safe, effective, and aesthetically pleasing transportation corridor. Effort required on existing facilities to remain shall be for the added criterion of maintaining the service life of that facility.

Where traffic is maintained, the pavements and other facilities shall not have “potholes”. The Contractor shall keep all facilities within the Project area in as good or better condition than the existing or improved conditions. This will be reviewed if necessary by comparing the current conditions against the Project video record collected by the Contractor prior to starting Work.

Responsibilities of the Contractor include the following, at a minimum:

- Patching of existing pavements and structures included in the Project Work.
- Replacement/repair of traffic attenuators
- Maintenance of delineators, signing, and pavement marking
- Repair of approach slabs
- Maintenance of detour routes initiated by the Contractor
- Maintenance of haul routes and temporary roads
- Lighting maintenance
- Maintenance of soil erosion and sedimentation control measures
- Maintenance and cleaning of storm sewer system
- Replacement/repair of temporary and permanent barrier wall
- Maintenance of traffic control devices displaced by MDOT’s or DIBC’s snow removal efforts, if supplied by the Contractor
- Maintenance of sidewalks or walking paths (i.e. Duty Free employee parking lots to the Duty Free Store)
- Maintenance of construction access gates and gravel approaches along Fort Street
- Maintain a clean driving surface along Fort Street, West Grand Boulevard, Local Access to Canada, Eastbound Service Drive as necessary or directed by the Engineer.
- Maintain access to and from the Cargo Inspection Facility
- Maintain access for the Auto Return to Canada Lane
- Maintain access for the Truck Return to Canada Lane
- Maintain access to the Southern Special Return Route
- Maintain access to the Northern Return Route
- Maintain access to the Access Drive when applicable
- Maintain pedestrian access within the DIBC Plaza
- Maintain access to the Duty Free Loading dock area
- Maintain access to and from the parking area west of the Duty Free Facility
- Maintain access to the Truck Fueling Stations
- Maintain access to the Diesel and Auto fuel pumps
- Maintain safe and efficient access to the construction zones

All costs for this work shall be the Contractor’s responsibility; statements in the Standard Specifications regarding extra work shall not apply.

The Contractor shall prepare and submit to MDOT a monthly Maintenance Report detailing all maintenance activities performed. The report shall subdivide the reported activities as detailed in Section 19.4.1 above.

19.4.2 MDOT and DIBC Responsibilities

MDOT, DIBC, and the City of Detroit will be responsible for the following:

- Snow and ice control
- Inspections of existing structures
- Repairs to existing major structures to remain (bridges and overhead sign structures) unless damaged by the Contractor.

19.4.3 Snow and Ice Removal

19.4.3.1 MDOT and DIBC Responsibilities

MDOT, DIBC, and the City of Detroit will be responsible for snow and ice control and/or removal for all active travel lanes that are open to traffic prior to and during a snow event. Such responsibility will only require removal to allow the use of the roadway by the public and will only be accomplished to the degree deemed necessary by MDOT, DIBC, and the City of Detroit. MDOT, DIBC, and the City of Detroit will not remove snow or ice from active or inactive lanes in order to provide access for construction operations or access of construction equipment to the various construction segments. MDOT, DIBC, and the City of Detroit snow and ice removal operations may deposit the snow and ice materials adjacent to the lane being cleaned, even though such adjacent areas may be active work zones. MDOT and DIBC reserves the right, because of equipment, labor, or weather constraints, to forgo any snow and ice removal from all or a portion of the Project for extended periods.

19.4.3.2 Contractor Responsibilities

The Contractor will not be required to perform any snow or ice removal except as necessary to allow or expedite construction operations. Such removal to allow or expedite construction shall be entirely at the Contractor’s expense. Such removal, if undertaken, may require removal of snow and ice placed by MDOT’s or DIBC’s removal operations. Any snow or ice removed by the Contractor shall not be placed or stored adjacent to any active travel way so as to restrict MDOT’s or DIBC’s ability to utilize these areas for placement of material removed by their operations.

19.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies		Submittal Schedule	Reference Section
		Hardcopy	Electronic		
Maintenance Management Plan	Acceptance	0	1-PDF	Within 30 Days after NTP	19.2.2
Maintenance	Acceptance	0	1-PDF	With Monthly Progress Reports	19.4.1

Deliverable	For Acceptance	Number of Copies		Submittal Schedule	Reference Section
Report				during construction	