

CHECKLIST TO DESIGNATE AREAS OF EVALUATION FOR REQUESTS FOR PROPOSAL (RFP)

	REQUISITION NUMBER	DUE DATE	
MDOT PROJECT MANAGER	JOB NUMBER (JN)	CONTROL SECTION (CS)	
DESCRIPTION			
MDOT PROJECT MANAGER: Check all items to be included in RFP WHITE = REQUIRED GRAY SHADING = OPTIONAL Check the appropriate Tier in the box below		CONSULTANT: Provide only checked items below in proposal	
<input type="checkbox"/> TIER I (\$25,000-\$99,999)	<input type="checkbox"/> TIER II (\$100,000-\$250,000)	<input type="checkbox"/> TIER III (>\$250,000)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Understanding of Service
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Innovations</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Organizational Chart
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Qualifications of Team
Not required as part of Official RFP	Not required as part of Official RFP	<input type="checkbox"/>	Quality Assurance/Quality Control
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location: The percentage of work performed in Michigan will be used for all selections unless the project is for on-site p=inspection or survey activities, then location should be scored using the distance from the consultant office to the on-site inspection or survey activity.
N/A	N/A	<input type="checkbox"/>	Presentation
N/A	N/A	<input type="checkbox"/>	Technical Proposal (if Presentation is required)
3 pages (MDOT Forms not counted) (No Resumes)	7 pages (MDOT Forms not counted)	14 pages (MDOT forms not counted)	Total maximum pages for RFP not including key personnel resumes. Resumes limited to 2 pages per key staff personnel.

PROPOSAL AND BID SHEET EMAIL ADDRESS – mdot-rfp-response@michigan.gov

GENERAL INFORMATION

Any questions relative to the scope of services must be submitted by e-mail to the MDOT Project Manager. Questions must be received by the Project Manager at least five (5) working days prior to the due date and time specified above. All questions and answers will be placed on the MDOT website as soon as possible after receipt of the questions, and at least three (3) days prior to the RFP due date deadline. The names of vendors submitting questions will not be disclosed.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

MDOT FORMS REQUIRED AS PART OF PROPOSAL SUBMISSION

5100D – Request for Proposal Cover Sheet

5100J – Consultant Data and Signature Sheet (Required only for firms not currently prequalified with MDOT)

(These forms are not included in the proposal maximum page count.)

REQUEST FOR PROPOSAL

The Michigan Department of Transportation (MDOT) is seeking professional services for the project contained in the attached scope of services.

If your firm is interested in providing services, please indicate your interest by submitting a Proposal, Proposal/Bid Sheet or Bid Sheet as indicated below. The documents must be submitted in accordance with the latest (Consultant/Vendor Selection Guidelines for Services Contracts" and "Guideline for Completing a Low Bid Sheet(S)*, if a low bid is involved as part of the selection process. **Reference Guidelines are available on MDOT's website under Doing Business > Vendor/Consultant Services >Vendor/Consultant Selections.**

RFP SPECIFIC INFORMATION

BUREAU OF HIGHWAYS BUREAU OF TRANSPORTATION PLANNING OTHER

THE SERVICE WAS POSTED ON THE ANTICIPATED QUARTERLY REQUESTS FOR PROPOSALS

NO YES DATED _____ THROUGH _____

Prequalified Services – See page ____ of the attached Scope of Services for required Prequalification Classifications.

Non-Prequalified Services – If selected, the vendor must make sure that current financial information, including labor rates, overhead computations, and financial statements, if overhead is not audited, is on file with MDOT's Office of Commission Audits. This information must be on file for the prime vendor and all sub vendors so that the contract will not be delayed. **Form 5100J is required with Proposal for firms not currently prequalified with MDOT**

Qualifications Based Selection – Use Consultant/Vendor Selection Guidelines

For all Qualifications Based Selections, the section team will review the information submitted and will select the firm considered most qualified to perform the services based on the proposals. The selected vendor will be contacted to confirm capacity. Upon confirmation, that firm will be asked to prepare a priced proposal. Negotiations will be conducted with the firm selected.

For a cost plus fixed fee contract, the selected vendor must have a cost accounting system to support a cost plus fixed fee contract. This type of system has a job-order cost accounting system for the recording and accumulation of costs incurred under its contracts. Each project is assigned a job number so that costs may be segregated and accumulated in the vendor's job-order accounting system.

Qualification Review / Low Bid – Use Consultant/Vendor Selection Guidelines. See Bid Sheet instructions for additional information.

For Qualification Review/Low Bid selections, the selection team will review the proposals submitted. The vendor that has met established qualification threshold and with the lowest bid will be selected. The selected vendor may be contacted to confirm capacity.

Best Value – Use Consultant/Vendor Selection Guidelines, See Bid Sheet Instructions below for additional information. The bid amount is a component of the total proposal score, not the determining factor of the selection.

Low Bid (no qualifications review required – no proposal required.) See Bid Sheet Instructions below for additional instructions.

BID SHEET INSTRUCTIONS

Bid Sheet(s) must be submitted in accordance with the "Guidelines for Completing a Low Bid Sheet(s)* (available on MDOT's website). Bid Sheet(s) are located at the end of the Scope of Services. Submit bid sheet(s) separate from the proposal, to the email address: mdot-rfp-response@michigan.gov. Failure to comply with this procedure may result in your bid being rejected from consideration.

**NOTIFICATION
MANDATORY ELECTRONIC SUBMITTAL**

Proposals submitted for this project must be submitted electronically.

The following are changes to the Proposal Submittal Requirements:

- Eliminated the Following Requirements:
 - Safety Program
 - Communication Plan
 - Past Performance as *a separate section*
 - Separate section for DBE Statement of goals. Include information in Qualification of Team section

- Implemented the Following Changes:
 - All proposals require an Organization Chart
 - Resumes must be a maximum of two pages
 - Only Key (lead) staff resumes may be submitted
 - Tier III proposal reduced from 19 to 14 pages
 - Forms 5100D, 5100I, and 5100G combined – 5100D
 - Forms 5100B and 5100H combined – 5100B
 - RFP's will be posted on a weekly basis -- on Mondays

The following are Requirements for Electronic Submittals:

- Proposals must be prepared using the most current guidelines
- The proposal must be bookmarked to clearly identify the proposal sections (See Below)
- For any section not required per the RFP, the bookmark must be edited to include “N/A” after the bookmark title.
Example: Understanding of Service – N/A
- Proposals must be assembled and saved as a single PDF file
- PDF file must be 5 megabytes or smaller
- PDF file must be submitted via e-mail to MDOT-RFP-Response@michigan.gov
- MDOT's requisition number and company name must be included in the subject line of the e-mail. The PDF shall be named using the following format:
 - Requisition#XXX_Company Name.PDF
- MDOT will not accept multiple submittals
- Proposals must be *received* by MDOT on or before the due date and time specified in each RFP

If the submittals do not comply with the requirements, they may be determined unresponsive.

The Consultant's will receive an e-mail reply/notification from MDOT when the proposal is received. Please retain a copy of this e-mail as proof that the proposal was received on time. **Consultants are responsible for ensuring the MDOT receives the proposal on time.**

****Contact Contract Services Division immediately at 517-373-4680 if you do not get an auto response****

Required Bookmarking Format:

- I. Request for Proposal Cover Sheet Form 5100D
 - A. Consultant Data and Signature Sheet, Form 5100J (if applicable)
- II. Understanding of Service
 - A. Innovations
- III. Qualifications of Team
 - A. Structure of Project Team
 - 1. Role of Firms
 - 2. Role of Key Personnel
 - B. Organization Chart
 - C. Location
- IV. Quality Assurance / Quality Control Plan
- V. Resumes of Key Staff
- VI. Pricing Documents/Bid Sheet (if applicable)

2/14/12

MICHIGAN DEPARTMENT OF TRANSPORTATION

**SCOPE OF SERVICE
FOR
EARLY PRELIMINARY ENGINEERING
DESIGN SERVICE**

CONTROL SECTION(S): 11016

JOB NUMBER(S): 115206

PROJECT LOCATION:

The project location is centered on the I-94 over Pipestone Road (Exit 29) interchange in Benton Township, Berrien County. The project area extends along I-94 from Nickerson Avenue for 1.75 miles northeasterly to Napier Avenue and along Pipestone Road from Sodus Parkway for 1.5 miles northerly to Napier Avenue.

PROJECT DESCRIPTION:

The purpose of this study is to identify the optimal concept for bridge replacement and interchange traffic operation for the I-94 over Pipestone Road (Exit 29) Interchange. This study is to follow a Planning and Environmental Linkage (PEL) process and result in an outcome that meets National Environmental Policy Act (NEPA) regulations and guidance.

ANTICIPATED SERVICE START DATE: December 19, 2012

ANTICIPATED SERVICE COMPLETION DATE: September 30, 2013

PREQUALIFICATION CLASSIFICATION(S):

A. PRIMARY PREQUALIFICATION CLASSIFICATION(S)

1. Project Development Studies

B. SECONDARY PREQUALIFICATION CLASSIFICATION(S)

1. Complex Urban Freeway Design
2. Traffic Capacity Analysis and Geometric Studies
3. Environmental Assessment and Impact Statements – Surface Transportation
4. Simple Traffic Signal Operations
5. Safety Studies
6. Right-of-Way Surveys
7. Road Design Surveys
8. Structure Surveys
9. Hydraulic Surveys
10. Hydraulics
11. Bridge Project Scoping

12. Short & Medium Span Bridges
13. Geotechnical Engineering Services

DBE REQUIREMENT: N/A

MDOT PROJECT MANAGER:

Kyle Rudlaff, Cost & Scheduling Engineer
Coloma TSC
3880 Red Arrow Hwy
Benton Harbor, MI 49022
Phone: (269) 849-2347
E-Mail: Rudlaffk@michigan.gov

REQUIRED MDOT GUIDELINES AND STANDARDS:

Work shall conform to current MDOT, FHWA, and AASHTO practices, guidelines, policies, and standards (i.e., Road Design Manual, Standard Plans, Drainage Manual, Roadside Design Guide, A Policy on Geometric Design of Highways and Streets, Michigan Manual of Uniform Traffic Control Devices, etc.).

Consultant is required to use MDOT's current version of Bentley MicroStation for CADD applications and Bentley GEOPAK for road design. Consultant shall comply with all MDOT CADD standards and file naming conventions.

PROJECT INFORMATION:

The service requested consists of all activities related to this bridge replacement and interchange traffic operations study. The below listed items provide a supplemental description of the project and deliverables to be provided by the Consultant. The project includes, but is not limited to the following Consultant tasks:

1. Study Outcome

The goal of this study is to provide the optimal replacement concept for the I-94 bridges over Pipestone Road and achieve effective long term interchange traffic operations. The outcome of the Planning and Environmental Linkage (PEL) study is a recommended alternative for the new bridge and accompanying road improvements. The final Consultant report shall include answers to the "Federal Highway Administration Planning and Environmental Linkages Questionnaire". The Consultant shall provide the PEL Study and submit it for MDOT and FHWA review. See the following FHWA web site for details:

http://www.fhwa.dot.gov/hep/pel/pelrpt_final.pdf

2. Bridge Study.

- a. Consultant services will include a structure study of the existing I-94 over Pipestone Road (S03-11016-3&4) bridges. The structure study shall provide coverage on

- rehabilitation treatment alternatives and serve to justify replacement of the structures should that be included in the recommended alternative. See scope Attachment A for structure study details.
- b. The 15' x 9.6' elliptical culvert carrying I-94 over the Yore-Stoeffler County Drain is located 600 feet northeast of the I-94 over Pipestone Road Bridges. The structure study shall include a study of this culvert.
 - c. Opportunities for accelerated bridge construction will be identified in the bridge replacement alternatives.
3. Interchange Traffic Operations Analysis.
- a. Traffic counts for ramp and intersection movements will be provided by MDOT Planning Division.
 - b. Crash data shall be provided by MDOT.
 - c. Crash analysis, modeling for current and future levels of service for existing and proposed roadway alternatives, and submitting a report describing the analysis shall be provided.
4. Survey Work.
- a. A road design survey will capture I-94 roadway features from Nickerson Avenue to Napier Avenue and Pipestone Road features from Townline Road to 1500 feet north of the I-94 legal alignment.
 - b. A structure survey shall be performed for the existing I-94 over Pipestone road bridges. The structural components of the existing 15' x 9.6' elliptical culvert carrying I-94 over the Yore-Stoeffler County Drain are to be located.
 - c. A hydraulic survey shall be performed for the Yore-Stoeffler County Drain.
 - d. See Attachment B for details.
5. Planning Documentation, Illustrative Alternatives, and Public Involvement.
- a. The public involvement concept is to announce to the public that a study is being conducted after a meeting between local officials and MDOT officials is arranged. An informational public meeting on the Study will be held. Meetings between stakeholders and MDOT will continue as necessary until several illustrative alternatives are developed. A public meeting will be held and comments will be sought on the illustrative alternatives. The recommended alternative will be chosen after the public meeting that reviews the illustrative alternatives.
 - b. A version of the existing interchange configuration will be included in the illustrative alternatives.
 - c. PPMS Task 2160 Prepare and Review EIS Scoping Document applies, but will be in a condensed form suitable for a PEL Study. The title of the document can be changed to avoid misrepresenting it.
 - d. PPMS Task 2310, Conduct Technical SEE Study will be completed by MDOT, but the Consultant will be responsible for incorporating the MDOT parts provided into more comprehensive coverage on environmental impacts in PPMS Task 2160 and 2525.

- e. PPMS Task 2340 Develop and Review Practical Alternatives applies to the one recommended alternative, except the public hearing step described in the task description does not apply.
- f. PPMS Task 2510 Determine and Review Recommended Alternative is applicable for the purpose of the review work steps for the recommended alternative, but the works steps to determine the recommended alternative do not apply to this task since that has been done earlier.
- g. PPMS Task 2525 Prepare and Review Engineering Report is applicable, but will be condensed to fit the more limited planning activities of a PEL study. The report title may be changed to Alternatives Analysis Document to avoid misrepresenting it.
- h. PPMS Milestone 252M Final Submission to FHWA shall be performed by MDOT. The Consultant services are expected to expire near the time of Consultant submission to MDOT. MDOT will be responsible for addressing FHWA comments on the PEL Study final submission.

6. Geotechnical .

Data collection will occur in a single phase. After the recommended alternative is identified, an estimated 10 structure borings, 10 soil borings, and 10 pavement core/soil borings will be collected. MDOT Region Bridge and Soils staff will identify the desirable locations. A geotechnical report shall be prepared.

7. Geometric Concept Diagrams.

- a. The Consultant shall prepare geometric concept diagrams that outline and label the limits of future project work that includes bridge work, paving, drainage, sidewalks, geometric improvements, and otherwise. The concept diagrams are to be provided within MDOT sheet borders for display purposes. Larger scale displays with aerial imagery background shall be prepared for public meeting displays. The illustrative alternatives shall be developed to the detail sufficient for this process step, while the recommended alternative will be further developed with detail that stays in phase with a more detailed cost estimate developed for the recommended alternative.
- b. Prepare required, typical cross-sections, and details as required to identify all Right-of-Way and environmental impacts.
- c. Existing utility location information will be solicited from utility owners by MDOT and provided to the Consultant. The Consultant shall post utility locations on concept diagrams, document utility impacts, recommend relocations, and incorporate MDOT directed utility comments.
- d. Selected aspects of the illustrative alternatives and recommended alternative shall have their designs advanced as necessary to determine environmental impacts and contrast features between the alternatives. This is most likely to occur with features for ramp alignments and bridge concepts.

8. Real Estate.

All impacts that occur off the existing road Right-of-Way will be outlined and labeled on the concept diagram for illustrative alternatives. The concept diagrams for the recommended

alternative will have dimensions and locations for the project impacts that occur off existing road Right-of-Way. The real estate cost estimate will be performed by the assigned MDOT appraiser.

9. Drainage Study.

- a. The Consultant shall perform a drainage study of the project area.
- b. The concept diagrams for illustrative alternatives shall label the major drainage elements that exist and proposed.
- c. MDOT will provide design flows for the Yore-Stoeffler Drain with a drainage area over 2 square miles.

10. Construction Staging and I-94 Mobility Analysis

- a. Concept diagrams and cost estimates for construction staging shall be prepared by the Consultant for illustrative alternatives.
- b. The Consultant shall complete a mobility analysis for the construction staging in the recommended alternative.

11. MDOT Scoping Documentation

- a. The MDOT Scoping Manual is available as a resource to guide the scoping activities.
- b. The MDOT Scoping Master Checklists and back-up documents shall be assembled as described in the procedures contained in Chapter 7 of the MDOT Scoping Manual.
- c. The cost estimates shall be made available in *.csv format.

12. Road Safety Audit.

- a. A road safety audit will be conducted.
- b. Crash maps will be prepared.
- c. The event schedule shall start after lunch on one day and be concluded before lunch on the next day.
- d. A limited amount of follow-up will be performed after the event to complete a report that adds context or analysis to the recommendation made during the event.

CONSULTANT RESPONSIBILITIES:

Complete the design of this project including, but not limited to the following:

The Consultant must adhere to all applicable OSHA and MIOSHA safety standards, including the appropriate traffic signs for the activities and conditions for this job and perform field operations in accordance with the Department's Personal Protective Equipment (PPE) policy as stated in the MDOT Guidance Document #10118.

Meet with the MDOT Project Manager to review project, location of data sources and contact persons, and review relevant MDOT operations. The Consultant shall review and clarify project issues, data needs and availability, and the sequence of events and team meetings that are essential to complete the design by the project plan completion date. Attention shall be given to critical target dates that may require a large lead time,

such as geotechnical requirements, ROW submittal dates, Railroad coordination requirements, utility conflict resolution, local agency meetings, etc.

- A. Perform design surveys.
- B. Prepare required illustrations, typical cross-sections, details, and geometric concept diagrams required for achieving planning tasks.
- C. Compute and verify all cost estimate quantities.
- D. Prepare staging concept diagrams and narrative descriptions for illustrative alternatives.
- E. Provide solutions to any unique problems that may arise during the project planning.
- F. Maintain a Design Project Record which includes a history of significant events (changes, comments, etc.) which influenced the development of the plans, dates of submittals and receipt of information.
- G. Submit planned excavation locations in the illustrative alternatives, to the MDOT Project Manager. The MDOT Project Manager then can proceed in requesting a Preliminary Project Assessment (PPA).
- H. The Consultant shall be required to prepare and submit a CPM network for the construction of this recommended alternative.
- I. The Consultant representative shall record and submit type-written minutes for all project related meetings to the MDOT Project Manager within two weeks of the meeting. The Consultant shall also distribute the minutes to all meeting attendees. MDOT will provide and distribute official meeting minutes for the Plan Review Meeting.
- J. The Consultant will provide to MDOT at the scheduled submittal dates, electronic copies of the required materials for distribution by MDOT for all reviews. Reproduction and distribution of black and white review sets of 11" x 17" or 8.5" x 11" size will be done by MDOT. Reproduction and distribution of materials utilizing color graphics for illustrative purposes shall be done by the Consultant. The strategy will be to use mostly electronic and black and white paper for review distributions, while selected color illustrations can be distributed at meetings and events.
- K. Prepare and submit electronically (native format or Adobe PDF) any information, calculations, hydraulic studies, or drawings required by MDOT for acquiring any permit (ie. NPDES, DEQ, etc), approvals (i.e. county drain commission) and related mitigation. MDOT will submit permit requests.

- L. Attend any project-related meetings as directed by the MDOT Project Manager.
- M. Attend information meetings (i.e., public hearings, open houses, etc.) with the public and public officials to assist in responding to concerns and questions. Perform the preparation of displays such as maps, marked-up plans, etc.
- N. The Consultant shall assist in the review of utility permit requests, incorporate the information in the design plans, and respond within 2 weeks from receipt of the permit.
- O. The MDOT Project Manager shall be the official MDOT contact person for the Consultant **and shall be made aware of all communications regarding this project**. The Consultant must either address or send a copy of all correspondence to the MDOT Project Manager. This includes all Subcontractor correspondence and verbal contact records.
- P. The Consultant shall contact the MDOT Project Manager whenever discoveries or design alternatives have the potential to require changes in the scope, limits, quantities, costs, or right-of-way of the project.

UTILITIES

The Consultant shall be responsible for obtaining and showing on the plans the location and names of all existing utilities within the limits of the project. In the course of resolving utility conflicts, the Consultant shall make modifications to the concept diagrams or details and provide assistance as directed by the MDOT Utility Permits Engineer and/or Project Manager. The Consultant shall attend any utility meetings called to ensure that the concerns are addressed on the plans involving utilities. The Consultant shall assist in the review of utility permit requests to ensure compatibility with the project.

TRAFFIC CONTROL

The Consultant shall be responsible for all traffic control required to perform the tasks as outlined in this Scope of Design Services.

MDOT PERMITS

The Consultant shall be responsible for obtaining up to date access permits and pertinent information for tasks in MDOT Right of Way (ROW). This information can be obtained through Joe Rios, Utilities/Permits Section, Real Estate Division at (517) 241-2103.

MONTHLY PROGRESS REPORT

On the first of each month, the Consultant Project Manager shall submit a monthly project progress report to the Project Manager.

MDOT RESPONSIBILITIES:

- A. Schedule and conduct meetings.
- B. Furnish Special Details and pertinent reference materials.
- C. Furnish prints of an example of a similar project and old plans of the area, if available.
- D. Obtain all permits for the project as outlined in previous section.
- E. Coordinate any necessary utility relocation.
- F. Furnish FTP site for software download and instructions for the MDOT Stand Alone Proposal Estimator's Worksheet (SAPW).

DELIVERABLES:

The Consultant shall deliver all computer files associated with the project in their native format (spreadsheets, CADD files, GEOPAK files, etc.) on DVD, CD or uploaded to ProjectWise, as directed by the MDOT Project Manager. All CADD/GEOPAK files shall be created and identified with standard MDOT file names as shown in Appendix A of the Road Design Manual. It is the Consultant's responsibility to obtain up to date MicroStation and GEOPAK seed/configuration files necessary to comply with MDOT's CADD standards which are posted to the bulletin board system. When the use of GEOPAK road design software is necessary to develop plans all pay items shall be placed into the CADD file using GEOPAK's Design and Computation Manager so that Quantity Manager can be used to transfer pay item information to SAPW/Trns*port. Any CADD/GEOPAK files that do not conform to MDOT standards will be returned to the Consultant for correction at the Consultant's expense.

Planning documents shall be submitted in their native format with standard naming conventions as well as combined into one Adobe PDF file in the sequence specified by MDOT. To provide text search capabilities files shall be created by converting native electronic files to PDF. Scanning to PDF is discouraged except in instances where it is necessary to capturing a legally signed document or a hard copy version of a document is all that exists.

Plan files shall be submitted in their native dgn format with standard naming conventions as well as plotted into a combined Adobe PDF file. Plan sheets shall be plotted to Adobe PDF with full text search and level on/off capabilities in half size (11" x 17") formats.

Stand Alone Proposal Estimator's Worksheet (SAPW) shall be used to generate the txt and csv files necessary for import into the Trns*port bid letting software. The SAPW files shall be transmitted electronically by the method specified by the MDOT Project Manager.

Geometric concept diagrams for Pipestone Road and the I-94 interchange vicinity shall have a scale of **1:40 (English Units)**.

Other planning diagrams that are required for this project shall be completed by the Consultant. These include, but are not limited to the following plan sheets:

- A. A planning title sheet.
- B. Note Sheet.
- C. Typical Cross-Section concept diagrams
- D. Project specific Special Details.
- E. Construction staging and traffic control concept diagrams.
- F. Geometric Concept Diagrams
- G. Witness and benchmark sheet(s).
- H. Soil boring log sheet(s).
- J. Structure concept diagrams.

Diagram detailing (i.e., format, materials, symbols, patterns, and layout) are to be compatible with MDOT practices or as otherwise directed by the Project Manager. All submitted items are subject to review and approval by MDOT.

PROJECT SCHEDULE:

The Consultant shall use the following events to prepare the proposed implementation schedule as required in the Guidelines for the Preparation of Responses on Assigned Design Services Contracts. These dates shall be used in preparing the Consultant's Monthly Progress Reports.

PPMS Task List

		P/PMS TASK NUMBER AND DESCRIPTION	DATE TO BE COMPLETED BY
YES	NO		(MM / DD / YYYY)
EARLY PRELIMINARY ENGINEERING – STUDY			
<u>EPE Scoping Analysis</u>			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2120 Prepare Traffic Analysis Report	5/1/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2130 Prepare Purpose of and Need for Project	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>213M Concurrence by Regulatory Agencies with the Purpose and Need</i>	/ /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2140 Develop and Review Illustrative Alternatives	4/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2155 Request/Perform Safety Analysis	5/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2160 Prepare and Review EIS Scoping Document	7/31/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>211M Public Information Meeting w/Illustrative Alternatives</i>	5/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Special Task – Conduct Road Safety Audit	
		2/20/2103	
<u>EPE Draft Analysis</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2310 Conduct Technical SEE Studies	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2321 Prepare for Aerial Photography	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2322 Finish/Print Aerial Photography	/ /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2330 Collect EPE Geotechnical Data	7/31/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2340 Develop and Review Practical Alternatives	7/31/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>233M Aerial Photography Flight</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2360 Prepare and Review EA or DEIS	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>231M Draft Submission to FHWA</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2380 Circulate EA or DEIS	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>232M Public Hearing</i>	/ /
<u>EPE Final Analysis</u>			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2510 Determine and Review Recommended Alternative	8/31/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>250M Concurrence by Regulatory Agencies with Recommended Alternatives</i>	/ /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2525 Prepare and Review Engineering Report	8/31/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2530 Prepare and Review Request for FONSI or FEIS	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>252M Final Submission to FHWA *For Information only. Not a Consultant task</i>	9/30/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2550 Obtain FONSI or ROD	/ /
CONSULTANT FINAL SUBMISSION OF STUDY TO MDOT			8/31/2013

P/PMS TASK NUMBER AND DESCRIPTION		DATE TO BE COMPLETED BY
YES	NO	(MM / DD / YYYY)
Contamination Investigation		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2810 Project Area Contamination Survey (PCS) / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2820 Preliminary Site Investigation (PSI) for Contamination / /

PRELIMINARY ENGINEERING - DESIGN		
Design Scope Verification And Base Plan Preparation		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3130 Verify Design Scope of Work and Cost / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3310 Prepare Aerial Topographic Mapping / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3320 Conduct Photogrammetric Control Survey / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3321 Set Aerial Photo Targets / /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3330 Conduct Design Survey 5/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3340 Conduct Structure Survey 4/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3350 Conduct Hydraulics Survey 4/1/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3360 Prepare Base Plans / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>331M Utility Notification</i> / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3361 Review and Submit Preliminary ROW Plans / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>331M Preliminary ROW Plans Distributed</i> / /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3370 Prepare Structure Study 4/1/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3375 Conduct Value Engineering Study / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3380 Review Base Plans / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>332M Base Plan Review (Pre-GI Inspection)</i> / /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3390 Develop the Maintaining Traffic Concepts 7/15/2013
Preliminary Plans Preparation		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3510 Perform Roadway Geotechnical Investigation / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3520 Conduct Hydraulic/Hydrologic and Scour Analysis / /
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3522 Conduct Drainage Study, Storm Sewer Design, and use Structural Best Management Practices 5/1/2013
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3530 Conduct Structure Foundation Investigation 7/15/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3535 Conduct Structure Review for Architectural and Aesthetic Improvements / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3540 Develop the Maintaining Traffic Plan / /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3551 Prepare/Review Preliminary Traffic Signal Design Plan / /

		P/PMS TASK NUMBER AND DESCRIPTION	DATE TO BE COMPLETED BY
YES	NO		(MM / DD / YYYY)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3552 Develop Preliminary Pavement Marking Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3553 Develop Preliminary Non-Freeway Signing Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3554 Develop Preliminary Freeway Signing Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3555 Prepare/Review Preliminary Traffic Signal Operations	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3570 Prepare Preliminary Structure Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3580 Develop Preliminary Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3581 Review and Submit Final ROW Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>351M Final ROW Plans Distributed</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3590 Review Preliminary Plans (Plan Review Meeting)	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>352M THE Plan Review (Grade Inspection)</i>	/ /

PRELIMINARY ENGINEERING – DESIGN (Cont'd)			
<u>Utilities</u>			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3610 Compile Utility Information	4/1/2013
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3650 Coordinate RR Involvement for Grade Separations	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3655 Coordinate RR Involvement for At-Grade Crossings	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3660 Resolve Utility Issues	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>360M Utility Conflict Resolution Plan Distribution</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>361M Utility Meeting</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3670 Develop Municipal Utility Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3672 Develop Special Drainage Structures Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3675 Develop Electrical Plans	/ /
<u>Mitigation/Permits</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3710 Develop Required Mitigation	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3720 Submit Environmental Permit Applications	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3730 Obtain Environmental Permit	/ /
<u>Final Plan Preparation</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3821 Prepare/Review Final Traffic Signal Design Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3822 Complete Permanent Pavement Marking Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3823 Complete Non-Freeway Signing Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3824 Complete Freeway Signing Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3825 Prepare/Review Final Traffic Signal Operations	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3830 Complete the Maintaining Traffic Plan	/ /

P/PMS TASK NUMBER AND DESCRIPTION			DATE TO BE COMPLETED BY
YES	NO		(MM / DD / YYYY)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3840 Develop Final Plans and Specifications	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>380M Plan Completion</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3850 Develop Structure Final Plans and Specifications	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3870 Hold Omissions/Errors Check (OEC) Meeting	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>387M Omissions/Errors Checks Meeting</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>389M Plan Turn-In</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3880 CPM Quality Assurance Review	/ /

PRELIMINARY ENGINEERING – RIGHT OF WAY			
<u>Early Right of Way Work</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4120 Obtain Preliminary Title Commitments	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4130 Prepare Marked Final Right Of Way Plans	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>413M Approved Marked Final ROW</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4140 Prepare Property Legal Instruments	/ /
<u>Right of Way Acquisition</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4411 Preliminary Interviews	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>441M Post-Decision Meeting</i>	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4412 Real Estate Services Assignment Proposal and Fee Estimate (Form 633s) for Appraisal Work Authorization	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4413 Appraisal Reports	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4420 Appraisal Review Reports	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4430 Acquire Right Of Way Parcels	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4510 Conduct Right Of Way Survey & Staking	/ /
<u>Right of Way Relocation</u>			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4710 Relocation Assistance	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4720 Prepare Improvement Removal Plan	/ /
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>442M ROW Certification</i>	/ /

FOR YOUR INFORMATION

For questions on specific tasks, refer to the P/PMS Task Manual located on the MDOT Bulletin Board System.

For assistance in accessing this manual, please contact:

Dennis Kelley: (517) 373-4614

CONSULTANT PAYMENT – Actual Cost Plus Fixed Fee:

Compensation for this project shall be on an **actual cost plus fixed fee** basis. This basis of payment typically includes an estimate of labor hours by classification or employee, hourly labor rates, applied overhead, other direct costs, subconsultant costs, and applied fixed fee.

All billings for services must be directed to the Department and follow the current guidelines. The latest copy of the "Professional Engineering Service Reimbursement Guidelines for Bureau of Highways" is available on MDOT's website. This document contains instructions and forms that must be followed and used for billing. Payment may be delayed or decreased if the instructions are not followed.

Payment to the Consultant for services rendered shall not exceed the maximum amount unless an increase is approved in accordance with the contract with the Consultant. Typically, billings must be submitted within 60 days after the completion of services for the current billing. The final billing must be received within 60 days of the completion of services. Refer to your contract for your specific contract terms.

Direct expenses, if applicable, will not be paid in excess of that allowed by the Department for its own employees in accordance with the State of Michigan's Standardized Travel Regulations. Supporting documentation must be submitted with the billing for all eligible expenses on the project in accordance with the Reimbursement Guidelines. The only hours that will be considered allowable charges for this contract are those that are directly attributable to the activities of this project.

The use of overtime hours is not acceptable unless prior written approval is granted by the MDOT Region Engineer/Bureau Director and the MDOT Project Manager. Reimbursement for overtime hours that are allowed will be limited to time spent on this project in excess of forty hours per person per week. Any variations to this rule should be included in the priced proposal submitted by the Consultant and must have prior written approval by the MDOT Region Engineer/Bureau Director and the MDOT Project Manager.

The fixed fee for profit allowed for this project is 11.0% of the cost of direct labor and overhead.

ATTACHMENT A
CS 11015 - JN 115206

GENERAL DESCRIPTION OF BRIDGE SCOPING WORK

The work for each bridge in this scope of work is broken down into three main components: A) Site Review, B) Engineering Analysis of Findings, and C) Report Preparation.

A. SITE REVIEW

1. General

Each bridge must be visited by the CONSULTANT PM. The purpose of this visit is to locate all areas of deterioration, determine feasible repair options, associated approach work, maintenance of traffic options, and ascertain quantities. Where necessary, high-reach equipment or an under bridge inspection crane must be used to get close enough to evaluate the structural components (See Section EQUIPMENT AND SAFETY, below).

The information collected in the field must be sufficient to determine quantities and locations of repairs and improvements. This information must be detailed in the field notes and/or sketches and these notes are to be included in the report.

- a. During the site review of the bridge, the following will be done, at a minimum:

(1) Sound all concrete elements (deck, superstructure, substructure, etc.) for delaminations and unsound areas. All delaminated areas are to be marked with paint that will be evident in the photographs. (Delaminations are to be marked with chalk or Kiel, per the direction of the MDOT PM.) All delamination surveys are part of the site review work (not part of testing). If a substructure unit needs to be replaced, a plan view of the substructures must be made showing the specific location of the areas to be replaced. The approximate size and location of areas needing substructure patching should also be shown on a sketch of the substructure unit. **The underside of the deck must be sounded whether there is any evidence of deterioration or not.** Pictures of the area must be taken and a written description of the deterioration and location must be documented for inclusion into the report.

(2) Note the type and condition of the bridge railing. Is the railing up to standard? Is a thrie beam retrofit necessary, or a railing

replacement? If pedestrian fencing is present, note its condition. Guardrail on the approaches should also be evaluated.

(3) All dirt, debris, and rust scale must be removed from the ends of each of the steel beams under the joints so that the steel can be inspected for section loss. Thickness readings on the web and the bottom flange are to be taken at the thinnest locations within 12 inches of the end of the beam. These thickness readings will be compared with the original thickness and the percentages of section loss will be calculated. This data will be tabulated in a specific form and sketches will be prepared, of major components, showing the location of the deteriorated areas. These are to be freehand drawings, not to scale but in relative proportion and dimensioned, on 8.5" x 11" sheets. Specifically, if beam end repairs are necessary, then a plan of the superstructure must be made showing the location of the beam ends needing repair. This information will be presented in the Appendix of the report.

(4) In other areas of heavy flaking rust, the CONSULTANT will clean as necessary to measure for any section loss. Thickness readings will be taken at the thinnest locations and recorded. Areas of section loss are to be sketched showing location and dimension.

(5) The vertical clearance of the bridge must be field verified, noted on the checklist and stated in the report. Point out any evidence of high load hits. A picture of any vertical clearance signs attached to the bridge must be taken. If the bridge has less than the minimum vertical clearance, as defined in the current MDOT Bridge Design Manual (note the section regarding minimum underclearance on "Special Routes"), then this must be considered in selecting the repair option and the options to correct the situation stated in the report. Keep in mind that raising the grade of the bridge to obtain acceptable underclearance will require additional approach work.

(6) The width of the structure must be evaluated to determine if widening is necessary to upgrade the structure to current standards (refer to the MDOT Bridge Design Manual), or for maintaining traffic during construction. The CONSULTANT will describe how and where the widening is to take place and provide a plan view sketch showing the proposed widening. Widening may also require

additional approach work to transition between the roadway width and the new bridge width.

(7) The CONSULTANT must determine if part-width construction is possible or if the entire crossing must be closed and a detour used. The CONSULTANT must contact the TSC Traffic and Safety Engineer for assistance estimating the costs for maintaining traffic. Final detailed traffic control costs for construction will be reviewed by the TSC and MDOT PM.

(8) Any work required for the approaches must be included in the report and these items accounted for on the Estimate Sheet. Note that widening the bridge or raising the grade to obtain minimum underclearance will require additional approach work. Please include these associated costs in the scoping cost estimate.

- b. The area immediately around the bridge must be closely evaluated to determine if there are any site issues or constraints that may have an impact during construction. These include items such as:
 - (1) Businesses or driveways close to the approaches.
 - (2) Utilities attached to or near the bridge.
 - (3) Signs or sign brackets attached to the bridge. Are they welded or bolted?
 - (4) Poor alignment or geometrics.
 - (5) Bank erosion or scour. Unusual channel features.
 - (6) Railroad tracks that have been removed from over or under the bridge.
 - (7) Proximity of other bridge structures.
 - (8) Is drainage sufficient? Any evidence of ponding on structure?
 - (9) Is Right-of-Way limited and might additional ROW or easements be required?

- c. Additionally the following items are some that must be considered:
 - (1) Is the bridge historical?
 - (2) Does this bridge have special structural design features which may affect the repair options (e.g., non-redundant or fracture critical)?
 - (3) Are there environmental issues that may impact the project?

- (4) If the structure is a pedestrian bridge, does it's geometrics meet current ADA Guidelines? If not, consider what repair options would be necessary to meet the guidelines set by the ADA.

If, during the site review, the CONSULTANT finds any structural condition that may cause the bridge to be load restricted (such as holes in beams), or which may require other immediate action (such as lane closures or emergency repairs to holes in the deck, etc.), the CONSULTANT will notify the MDOT PM as soon as possible. The CONSULTANT will also provide documentation of the condition (such as beam measurements) to the MDOT PM as quickly as possible.

2. Scoping Checklist and Determining Repair Options

Each bridge will be evaluated to determine the most appropriate repair option based on the physical condition of the bridge, economic considerations, and engineering judgment. An initial determination is to be made in the field and the Scoping Checklist completed accordingly. An MDOT Bridge Scoping Checklist and must be completed before leaving the field.

The following are the types of repair options that are to be considered (See ENGINEERING ANALYSIS for more discussion about the option choices):

- a. "Hold", or defer work three to five years
- b. Selective repairs
- c. Overlay
 - (1) Concrete overlay (Deep or Shallow)
 - (2) Asphalt overlay with waterproofing membrane
 - (3) Thin epoxy overlay
- d. Deck replacement
- e. Superstructure replacement
- f. Bridge removal or replacement

The MDOT Bridge Deck Repair Matrix must be consulted for reasonable deck repair options based on the condition of the deck surface and soffit.

3. Photographs

A photo log of the bridge and the surrounding areas must be included in the report. All of the pictures must be mounted on 8 1/2" X 11" media and are to be captioned with a description of what the picture is intended to show. Each copy

of the bridge report must have this series of pictures showing at least the following items and sequenced in the following order:

- a. Elevation views of both sides of the bridge.
- b. Deck surface (entire deck surface to be photographed, including a typical of the bridge railing and joints).
- c. Approaches.
- d. Underside of deck (to sufficiently show condition of soffit).
- e. Typical superstructure elements (beams, bearings, pin and hangar, etc.).
- f. Abutments, including slope protection.
- g. Piers.
- h. Waterways / railroad tracks.
- i. Major deteriorated areas.
- j. Load posting signs.
- k. Vertical clearance signs.
- l. Utilities.
- m. Quadrant photos, showing businesses or other items that could affect the cost of the construction.

In addition, pictures must be taken which will support the CONSULTANT's recommendations. All pictures must be captioned to describe the picture's general view (such as north elevation, etc.) and to describe the pertinent item or deterioration. The deck surface photos will be an "aerial view" taken from a height of at least 12 feet above the surface of the deck. These photos will be taken after the deck delamination survey and the areas of delamination are expected to show clearly in the photo.

4. Testing

During the site review phase, the CONSULTANT may feel that material testing is needed to better understand the condition of the deck to evaluate the best repair option. Advance approval by the MDOT PM is required prior to initiating any testing.

If the CONSULTANT PM feels that material testing is needed, a testing proposal must be submitted to the MDOT PM for approval. The testing proposal will show the bridges for which testing is proposed, what tests are to be performed, what specific information is to be gained from the testing, how this information is to be used, and the cost of testing and necessary traffic control. Proposals submitted with insufficient justification for testing will be denied. Where the deck is beyond saving, as judged by visual indications, or where the appropriate repair option is clearly indicated, material testing will not be performed.

The results and analysis of any testing that is approved and performed will be discussed in the Site Review Findings section of the report and the actual test reports will be included in the Appendix.

B. ENGINEERING ANALYSIS

The engineering analysis phase will include an evaluation of the site review findings; the preparation of and evaluation of two or three repair strategies, including the estimate of cost of the repair strategies and the selection of the best repair option.

An initial repair option will have been determined during the site review in the field. The CONSULTANT is required to perform an engineering analysis of this option and on the options above and below it from the list in the section Scoping Checklist and Determining Repair Options. For example, if deck replacement is determined in the field to be the most appropriate repair option, the engineering analysis will also be performed on the overlay and superstructure replacement options.

For the superstructure replacement and bridge replacement options, the CONSULTANT will also analyze eliminating or correcting undesirable or deficient design characteristics (e.g., insufficient structural capacity, underclearance, width, etc.). Analysis of the load carrying capacity of the bridge will not be required.

If the final recommended repair option is different from the one determined in the field, a second Scoping Checklist for the final recommendation will be completed and included in the report.

1. Estimating Various Repair Options

Cost estimates for each of the Repair options will be prepared for each bridge. A standard form Estimate Sheet with unit prices will be used titled Bridge Cost Estimate Worksheet and Key. The updated Estimate Sheet, on 8 1/2" x 11" paper, will be provided by MDOT PM. Calculations for the paint area will be prepared by the CONSULTANT and included in the Appendix of the report.

It is recommended that a line item be provided on the Cost Estimate for "bridge aesthetics", in the amount of 1% of the construction estimate (before mobilization or inflation is figured in).

The estimates required are "early preliminary estimates" and not the more detailed "engineering estimates." The object is to determine the most economical method of treatment and to establish the budget. The unit prices on the attachment are averages of various types of repairs, and a description of what is included in the unit price can be found in the "key". The more detailed estimates will be determined in the design phase (not a part of this scope of work).

If additional information is necessary for a unit price not on the list, contact the MDOT PM or Linda Reed, Bridge Scoping Engineer in Construction and Technology at (517) 322-5622. Questions regarding utilities and scour are to be directed to MDOT PM.

C. REPORT

The deliverables for this scope of work will be the reports, photographs, printed worksheets, sketches, and notes. The electronic files will be submitted for the entire estimate sheets included in the report on CD.

For each bridge, a three-ring binder containing the scoping reports as described below will be submitted. The binder will contain all information pertaining to the site review findings and recommendations for each bridge. Two sets of each binder will be submitted, first in draft form, then revised as necessary and submitted in final form.

The Report will be submitted in two phases: draft version and final version. The draft report will be a complete report, with 3 copies (without binder) submitted to the MDOT PM. These will be reviewed by the Region MDOT PM, Lansing Bridge Scoping Engineer and TSC Manager. Comments and questions arising from those reviews will be given to the CONSULTANT to be incorporated into the final report if appropriate or addressed separately and submitted with the final report.

Incomplete final reports or reports with errors will be returned to the CONSULTANT for revision. Failure to make the required changes will be considered a failure to meet the terms of the scope of work.

1. Table of Contents

For complete document.

2. General Site Review Procedures

This section will summarize the general procedures used during the site reviews. This information will include a table showing the site review dates for each bridge, typical equipment used, typical traffic control procedures, typical site review procedures, etc. Any significant variations from this typical information can be stated under the section for a specific bridge.

3. Executive Summary

This is to include a statement of the recommended treatment for the bridge and the cost of the initial repair. The executive summary will be a "stand alone" section and will not refer to other sections of the report, nor will the main text refer to information in the executive summary.

4. Field Site Review Findings

This section will include, as a minimum, discussion of the following areas:

- a. Overall assessment of the condition of the bridge including an evaluation of the beam end thicknesses (webs and bottom flanges) taken during the site review.
- b. Site issues, i.e., geometrics, maintenance of traffic, utilities, scour, etc. In case of the situation where no site issues that would impact the rehabilitation of the structure were identified, a statement will be made that all areas were investigated and no issues were found.
- c. Testing results and implications to the repair options. If no testing was performed, this will be stated in the report.
- d. The following outline may be used for a consistent presentation format for the body of this section of the report:
 - (1) Approaches
 - (2) Deck (surface, soffit, joints, sidewalk, and railing)
 - (3) Superstructure (beams, diaphragms/cross frames, paint, bearings, pin and hangar)
 - (4) Substructure (abutments, wingwalls, piers, slope protection, scour)
 - (5) Site Issues
 - (a) Maintaining Traffic
 - (b) Geometrics
 - (c) Vertical Clearance
 - (d) Signs
 - (e) Utilities
 - (6) Material Testing

5. Rehabilitation Options

This section will include a discussion of the rehabilitation options, as described in Sections Scoping Checklist and Determining Repair Options. For each option evaluated, a discussion of the necessary improvements and the associated costs (initial construction costs) will be included. The report must discuss and state the

reasoning and judgment for selection of the recommended option. This discussion will also include the reasoning for the elimination of all other options, as appropriate.

A table summarizing the initial construction cost for each of the options considered will be included in this section for ease of comparison.

6. Summary with Repair Recommendation

This section will state the recommended course of action for the bridge and the factors used in determining this recommendation. This section will also briefly discuss the effects of postponing the recommended improvements.

7. Maintenance Strategies

This section will state the recommended actions to further extend the life of the bridge and ensure the safety of the structure before a major repair project scheduled.

8. Appendix

- a. Mounted photos with descriptions
- b. Scoping Checklist(s)
- c. Estimate Sheets
- d. Field notes and sketches, including sketches of beam end repair areas, substructure repair areas, and widening options.
- e. Paint calculations
- f. Table of beam end thickness readings

The CONSULTANT will be responsible for obtaining and operating the high reach equipment for inspection under the bridge. During the inspection, the CONSULTANT is responsible for traffic control and all aspects of personal safety of his or her staff. Traffic control will follow standard MDOT procedures.

All other inspection equipment and personal safety equipment such as hard hat, steel toed shoes, reflective vest and eye protection will be the responsibility of the CONSULTANT.

ATTACHMENT B
SURVEY SCOPE

A. SURVEY PREQUALIFICATIONS: Road Design Surveys, Hydraulic Surveys, and Bridge Design Surveys

B. MAPPING LIMITS: A PORTFOLIO as outlined in this section IS REQUIRED.

C. NOTES:

1. The Consultant shall discuss the scope of this survey with the MDOT Project Manager / Region Surveyor before submitting a Price Proposal:
 - MDOT Project Manager: Kyle Rudlaff
(269) 337-3920
rudlaffk@michigan.gov
 - MDOT Region Surveyor: Erik J. Schnepf, PS
(269) 337-3922
SchnepfE@michigan.gov
2. The Consultant surveyor must contact the Region Traffic & Safety Engineer for work restrictions and traffic control in the project area prior to submitting a proposal.
3. A **detailed Survey Work Plan** showing timeframe with a **spreadsheet estimate** of hours by specific survey task such as DTM creation, traversing, leveling, mapping, etc., **must** be included in the project Price Proposal. This hour estimate will be scored by the selections team to aid in determining the consultant understanding of service expected for this project. This hour estimate will be included by the consultant for scoring by the selection team.
4. It is the responsibility of the Professional Surveyor to safeguard all corners of the United States Public Land Survey System, published Geodetic Control and any other Property Controlling corners that may be in danger of being destroyed by the proposed construction project.
5. At the end of the project a submittal meeting will be set up between the Southwest Region Surveyor and other MDOT staff to review the survey

D. BI-WEEKLY PROGRESS REPORT

Every 2 weeks the Consultant shall submit a project progress report to the Region surveyor and the MDOT project manager. The progress report shall address the following items:

1. Work accomplished during the previous weeks.
2. Anticipated work and goals for the coming weeks.
3. Real problems which occurred during the weeks, and anticipated problems for the coming weeks.
4. Any updates on the project schedule including explanations for any delays or changes in schedule, scope, or work plan.
5. Any early reviews or submittals such as adjustments, computations, or alignment. For this project the timeline is critical. It is important to meet the proposed schedule as listed above.
6. Copy of Verbal Contact Records for the period giving details for the item discussed and date.

E. GENERAL REQUIREMENTS

1. Surveys must comply with **all Michigan law** relative to land surveying.
2. Surveys must be done under the **direct supervision** of a Professional Surveyor licensed to practice in the State of Michigan.
3. Work in any of the following categories of survey: Road Design, Bridge, Hydraulic, Right-of-Way, Ground Control (Photogrammetric), and/or Geodetic control, must be completed by a survey firm which is pre-qualified by MDOT.
4. Surveys must meet all requirements of the Michigan Department of Transportation (MDOT) Design Surveys *Standards of Practice* dated January 2012. Please contact the Design Survey office to clarify any specific questions regarding these standards.
5. The Consultant is responsible for using the latest MDOT GeoPak Feature Codes, files and tugboat (macro), available on the MDOT File Transfer Protocol (FTP) site. **The Consultant must also use MicroStation Version 8i/ Power GeoPak with Data Acquisition or newer.**

6. Consultants must obtain all necessary permits required to perform this survey on any public and/or private property. This includes an up-to-date permit from the MDOT Utilities Coordination and Permits Section
7. Prior to performing the survey, the Consultant must contact all landowners upon whose lands they will enter. The contact may be personal, phone or letter, but must be documented. This notice must include the reasons for the survey on private land, the approximate time the survey is to take place, the extent of the survey including potential brush cutting, and an MDOT contact person (the MDOT Project Manager).
8. The Consultant must contact any and all Railroads prior to commencing field survey on railroad property. The cost for any permit, flaggers and/or training that is required by the Railroad will be considered as a direct cost, but only if included in the Consultant's proposal.
9. The Consultant must adhere to all applicable OSHA and MIOSHA safety standards, including the appropriate traffic signs for the activities and conditions for this job.
10. Consultants are responsible for a comprehensive and conscientious research of all records, including MDOT records, essential for the completion of this project.
11. Measurements, stationing, recorded data, and computations must be in International Feet.
12. Coordinate values must be based on the Michigan Coordinate System of 1983 (MCS 83), Appropriate Zone. All elevations must be based on the North American Vertical Datum of 1988 (NAVD88).
13. Specific requirements concerning the Control, Alignment, property, mapping, misc., of each survey portfolio is described below.
14. Current MDOT QA/QC CERTIFICATION CHECK LIST dated Jan. 2012 will be used. This can be obtained on the MDOT FTP site.
15. Current MDOT symbology must be used exclusively as shown on the MDOT FTP site.

The FTP site for consultants is:

<ftp://ftp.michtrans.net>

username: survcons

password: \$urvcon\$

16. All data, whether electronic or paper, must be recorded on non-rewritable Compact Discs (CD's). All paper files, including MicroStation files, must be scanned and/or converted to Adobe Acrobat (.pdf) format. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. A Table of Contents in Adobe Acrobat format is required that has all .pdf pages of the CD bookmarked/linked so each place in the .pdf archive can be accessed with a single click of the computer mouse. Specified format files such as ASCII text, and MicroStation must have separate access.
17. CD's must be labeled with the route, location, control section, job number, Consultant name, and data type.
18. Each category of survey must be packaged separately (i.e., Structure survey separate from Road survey). All sheets in a portfolio must be marked with the control section, job number, portfolio section name, and page number.
19. The Consultant representative shall record and submit typewritten minutes for all project related survey meetings to the MDOT Project Manager within two weeks of the meeting. The Consultant shall also distribute the minutes to all meeting attendees.
20. The MDOT Project Manager is the official contact for the Consultant. The Consultant must either address, or send a copy of all correspondence to the MDOT Project Manager. The MDOT Project Manager shall be made aware of all communications regarding this project. Any questions regarding this award or any subsequent project should be directed to the Region Surveyor.
21. Use static terrestrial laser scanning and mobile mapping (mobile terrestrial laser scanning or of LiDAR) methods may be used for completion of portions of this project providing a savings in schedule, time and costs, improved safety and reduced traffic control and costs, among other benefits can be shown. Any use of these technologies shall conform to and utilize the **2012 MDOT Standards of Practice for Design Surveys** and the existing terrestrial scanning standards in **Appendix E (MDOT Laser Scanning Standards and Guidelines** and the Specifications/Guidelines based on the **Caltrans Survey Manual Chapter 15 Terrestrial Laser Scanning Specifications** **Project deliverables and reports shall include the information, electronic files and reports. Project referred to in the Caltrans Specifications under MTLs Documentation.**
22. All field survey notes, all electronic data, and all research records obtained for this project will be considered the property of MDOT and must be sent to:

MDOT Design Division
Erik J. Schnepf, PS

1501 E. Kilgore,
Kalamazoo, MI. 49001

Please use MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL" for all transmittals. A copy of this transmittal form must also be sent to the MDOT Project Manager for Design.

F. WORK RESTRICTIONS

The Consultant must call the MDOT Region or TSC Traffic & Safety Engineer before submitting the Priced Proposal to inform him/her of surveying activity in the area. The Consultant must discuss a Traffic Control and Safety plan with the Traffic & Safety Engineer prior to submitting a proposal. A copy of the Traffic Control and Safety plan must be submitted with the Price Proposal and used as a basis of bid for traffic control devices by at least three sources.

Traffic shall be maintained by the Consultant throughout the project to the satisfaction of the Traffic & Safety Engineer at all times. Any deviation from the Traffic Control and Safety plan without the Traffic and Safety Engineer approval can result in project delays.

The Consultant must call the MDOT Region or TSC Traffic & Safety Engineer before beginning work to inform him or her of surveying activity in the area. The selected consultant will also contact the TSC Traffic and Safety Engineer prior to the price proposal to obtain safety restrictions. For this project there will be no lane closures allowed on I-94. It is anticipated that mobile scanning or other innovative method to collect roadway data remotely. This new method will be used to collect the hard surface data along Westbound & Eastbound I-94, Pipestone, and Meadowbrook Road. Collecting the hard surface pavement by reflector less methods using a total station will not be acceptable.

G. FIELD SURVEY

The purpose of the field survey is to obtain all information and data required by the project design engineer, to leave control in the field for future construction staking, and to provide a sufficient history of the area to enable the MDOT Design Survey Unit to perform dependable surveys in the future.

H. HORIZONTAL CONTROL

A three dimensional coordinate system must be established based on the North American Datum of 1983, NAD83 (CORS96), Michigan State Plane Grid Coordinates- South Zone (2113) in international feet units for this project. The horizontal least squares adjustment statistics must be reported at the 95% confidence level. Additional control will need to be set in this area following current MDOT standards.

There will be two primary control monuments set for this project. These points do not need to be inter-visible. The horizontal project control for this project will be classified as intermediate project control according to the MDOT Standards of Practice dated April 1, 1998. For the placement of control the interstate project scenario shall apply. These control points are intended for mapping and should be located outside the proposed construction area to insure their availability for all phases of construction. Each control point must be accurately described and witnessed to at least four nearby features. Please refer to MDOT Standards of Practice for the minimum requirements for these points. Prior to any mapping the horizontal and vertical control must be approved by the Southwest Region Surveyor

OPUS positioning may be used, as long as there are checks, redundancies and controls built into the Consultant's horizontal control system. For any and all OPUS solutions, a RINEX format file with a minimum of two hours of GPS data must be included, as well as the OPUS solution from NGS. All OPUS solutions must be verified within 0.10 foot, either by a separate OPUS position from an independent occupation, or by a NGS/CORS adjustment. OPUS-RS is not acceptable for establishing the control on the project.

A closed traverse must be run and adjusted between two or more known points on the project control traverse. Open traverses are NOT acceptable. Unadjusted traverse measurements must produce an error of closure of not greater than 1:20,000. Any permissible error of closure shall be distributed throughout the traverse by means of a suitable least squares adjustment software program.

All data collection traverse points and the plan centerline alignment must be tied to the control established for this project. All field observations, unadjusted traverse computations and final adjusted coordinates must be included in the notes. A list of all horizontal control points must be developed which includes datum, point designations, descriptions, horizontal coordinates with standard errors, station and offset, witnesses and appropriate scale factors (grid to ground). This list must be printed on 8.5" x 11" sheets and placed on CD in ASCII format. All data relating to the horizontal component of the system must be included in the control section of the portfolio.

Before any mapping begins the control will be reviewed by the Southwest Region Surveyor.

VERTICAL CONTROL

Final Posted Scope: 10/8/2012

The vertical component of this project must be based upon the North America Vertical Datum of 1988 (NAVD 88). The vertical least squares adjustment statistics must be reported at the 95% confidence level.

New bench marks must be set on massive structures outside the proposed construction area. Each bench mark must be accurately described and its horizontal position referenced by measurement (Northing Easting) and by station plus and offset from the alignment stationing. Additional benchmarks per MDOT guidelines will be required for this project. For this project the benchmarks should be set on a variety of items. For example all the benchmarks should not be on signs bases. For this project vertical control from a previous MDOT photogrammetric project along I-94 beginning is available. The control information is listed below. This project will be based on this control datum. The vertical control will be converted from meters to international feet.

BM 12-83 MDOT disc in West abutment wall in centerline
Median at bridge over Scottdale Road stamped 12-83

Elevation: 193.338 meters (NAVD 88)

Southwest corner concrete abutment wall	190d	6.83m
Northeast corner concrete abutment wall	10d	6.51m
Metal guard rail	280d	1.15m
Westerly edge concrete abutment wall 0.24m	280d	

164 0.10 km Northeasterly from bridge over Scottdale Road
Chiseled square in North concrete post support of Exit 28th sign,
at STA 1274+67

Elevation: 192.474 meters (NAVD 88)

Edge asphalt shoulder East bound I-94	340d	2.80m
--	------	-------

	East asphalt Exit 27, off ramp	160d	
10.05m			
	Reflector	58d	18.85m
	Reflector	236d	11.90m
165	0.01 km North from centerline of Nickerson bridge Chiseled square in North concrete slab 1.0 m North of Nickerson Road, about level with Nickerson Road		
	Elevation: 198.616 meters (NAVD 88)		
	Edge asphalt shoulder East bound I-94	310d	15.00m
5.57m	Centerline Nickerson Road	220d	
1.00m	Highway right-of-way fence	32d	
	Catch Basin	290d	13.80m
166	0.69 km Northerly of Nickerson bridge Chiseled "X" in North bolt of Pipestone Road sign At STA 1341+75		
	Elevation: 192.040 meters (NAVD 88)		
	Edge asphalt shoulder East bound I-94	358d	7.60m
	12" Ash	80d	51.85m
18.55m	Highway right-of-way fence	158d	
	Reflector	290d	13.80m

BM 14-83 MDOT disc stamped 14-83
 In median, South wall for Pipestone Road

Elevation: 196.752 meters (NAVD 88)

Manhole	280d	2.10m
South corner front of curb	190d	7.10m
North corner front of curb	10d	11.10m
Reflector	330d	6.63m

BM 15-83 MDOT disc in top, concrete wingwall,
 Northeast side I-94 bridge over abandoned
 Railroad

Elevation: 201.148 meters (NAVD 88)

6.70m	Edge of Asphalt East bound I-94	310d	
	Edge of concrete Southeast	120d	1.70m
16.15m	Napier Avenue highway sign	40d	
	Catch Basin	20d	4.40m

167 0.50 km Northerly on I-94 East from Railroad bridge
 Set spike in North face of power pole

Elevation: 193.545 meters (NAVD 88)

0.85m	Highway right-of-way fence	295d	
	8" tree	280d	16.75m
	12" Maple	20d	7.05m

Edge asphalt shoulder East bound I-94	295d	25.40m
168 Chiseled square in Northeast corner concrete abutment for Napier Avenue on East side I-94, North side Napier Avenue, about level with Napier		
Elevation: 200.670 meters (NAVD 88)		
South catch basin	140d	9.75m
North catch basin	80d	7.05m
Edge asphalt shoulder East bound I-94	295d	13.80m
Centerline Napier Road	180d	5.10m

Any error of closure must be distributed throughout the level runs by means of a suitable least squares adjustment software program. Open level loops are NOT acceptable.

The bench mark notes must include all field observations, the unadjusted loop closures and the final adjusted elevations. A bench mark list must be developed that includes datum, bench mark designations, descriptions, elevations, and station and offset (left or right) out from centerline. This bench mark list must be printed on 8.5"x 11 sheets and placed on CD, in ASCII format. All data relating to the vertical component of the system must be included in the control section of the portfolio.

The methods used to establish the horizontal and vertical components of the project coordinate control system must be fully discussed in the Surveyor's Project Report.

The consultant will prepare a Survey Information Sheet showing the witnesses and control point locations in relation to the legal alignment.

I. ALIGNMENTS/ROW

A legal alignment for I-94 will be determined for this project. The legal alignment will begin at the South line of section 5 of T4S, R18W by the approximate station 1271+19 the legal alignment will end at the North line of Section 28 of T4S, R18W by approximate station 1427+88 A legal alignment for Pipestone road will also be determined for this project. The legal alignment of Pipestone will start at Townline Road

and then proceed Northerly until approximately 1500 feet Northwesterly of the legal alignment of I-94.

A construction alignment will be determined ramps A, B,C, and D by Pipestone Road. A legal alignment will also be determined for the Service Road

A legal alignment of Meadowbrook Road will also be determined beginning at station 61+00 and heading westerly until the road's intersection with I-94..

The legal ROW lines will be determined for this project for all mapping areas. The ROW determination would include the legal ROW lines by the Pipestone I-94 interchange, legal ROW of Pipestone Road, legal ROW of Meadowbrook Road, legal ROW by the Service Road, and the legal ROW of I-94 Southwesterly and Northeasterly of the Pipestone Road interchange.

A detailed write up will also be required in the Surveyor's Project Report on how the legal alignment and ROW was determined.

J. GOVERNMENT CORNERS/PROPERTY

Any government corner used to establish the legal alignment / legal ROW lines must meet the MDOT's Design Survey Standards.

Any government corners/alignment points within the mapping limits will be located/witnessed following MDOT design survey standards. At a minimum the following government corners will need to be located: C1, C2, D-1, E-1, F-1 of T5S, R18W, C-13, D-13, D-12, C-12, E-11, E-12, E-13, F-11, F-12, F-13, G-12, F-9, & G-9

The parcel lines within the mapping limits will be determined by the consultant. If available the parcel lines will be based on the deed descriptions.

Tax maps with property owners shown will be obtained by the selected consultant.

K. MAPPING

1. Begin mapping along both Eastbound and Westbound I-94 at the Southwesterly face of the Nickerson Road bridge (S02 of 11016). Mapping along I-94 will proceed Northerly until 100' North of the 22 foot point of the ramps to Napier Ave. Mapping along I-94 will be ROW to ROW.
2. The following items at a minimum will be located on the Nickerson Road bridge(S02 of 11016): the piers, wing walls, and abutment walls. The under clearance and reference lines are not needed on this structure.

3. The complete Pipestone Road and I-94 interchange will be mapped from ROW line to ROW line. This would include ramps A,B,C, & D, and the service road.
4. Mapping will begin on Meadowbrook Road at station 61+00 and end at I-94. Mapping will be from ROW to ROW along Meadowbrook.
5. Mapping along Pipestone Road will be 1200 feet each side of the I-94 centerline. Along Pipestone mapping will be from building face to the other building face on the opposite side of Pipestone.
6. A sample of features to be collected would include: edge of shoulder bit, pavement marking lines, sidewalks, driveways, piers, all terrain points/lines, drainage features, all visible utilities (overhead electric lines, gas line markers, hydrants, etc), sanitary manholes, guardrail, every cable barrier foundation, building numbers, finish floor elevations of buildings, etc. This list is but a short sample of the possible features/codes located within the mapping limits.
7. The mobile scanning or other innovative technology will be used to collect only the hard surface visible mapping data. The scanning technology will not be used to collect the vegetation areas.

L. Bridge Design Survey

1. At S03 of 11016 Pipestone Road and I-94 the following bridge survey data will need to be obtained by the consultant.
 - Bridge Seat Elevations at all 4 quadrants of the bridge
 - Reference point coordinates, stations, elevations, and describe how determined in surveyor's report.
 - Under clearance elevations at all 4 quadrants of the bridge
 - Top of footing elevations
 - Sketch showing dimensions of existing superstructure elements.
 - Reference point stationing
 - Angle of Crossing of existing substructure units
 - Bridge Schematic (Plan and Elevation Views)
 - 3D laser scan of bridge showing elements of bridge.
 - Create as constructed alignment of bridge based on existing plans.
 - The bridge survey data can be included in the overall survey portfolio.
 - Have the bridge data (abutments, piers, wing walls, etc in the PL dgn file.

M. Hydraulic Survey

- a. See attached scope for Yore-Steffen County Drain.

N. DRAINAGE / SEWER

The following information is required for all surface and subsurface drainage and sewer structures:

1. **The station and offset, type, condition, location, size and invert elevation of each drainage structure and culvert.** End treatments must be noted for each culvert. This information must be printed on 8.5" x 11" sheets and submitted on a CD in **ASCII format or spreadsheet format**.
2. **The station and offset, type, condition, location, size and invert elevation of the pipes of each sanitary manhole.** This information must be printed on 8.5" x 11" sheets and submitted on a CD in **ASCII format or spreadsheet format**.
3. The **location and connectivity** of all catch basins, manholes, and culverts must be shown on the topographic map (PL.dgn). It may be necessary to prepare a separate plot to clearly show the surface drainage systems. Underground storm systems must be mapped to show the connectivity of the structures. Underground sewer lines must be mapped to show connectivity. This will be added to the CADD file and submitted on a separate topographic plot made specifically for this purpose.
4. **Photographs** must be submitted for each culvert, labeled by station and offset. Digital photographs are required.

O. FINAL REPORT

One complete portfolio and four complete sets of CD's or DVD's must be assembled and delivered in the format outlined in the *Standards of Practice* dated Jan. 2012. A copy of the MDOT Checklist dated Jan. 2012 must be included in the final report. This document shall be signed and certified by the Professional Surveyor responsible for the project. It is highly recommended that the consultant become familiar with this document prior to preparing the proposal and again prior to assembling the final portfolio. **Failure to use and include this document shall result in the immediate return of the project portfolio for completion.**

Copies of the final deliverables shall be provided to the Survey Project Manager and to Lansing Design Surveys and shall include the following:

- Project report describing the mobile mapping project, equipment used, and results.
- Complete listing of the Registration processing reports listed above.
- Comparison spreadsheet showing the differences (fit) of the final project DTM surface to the validation points. This spreadsheet shall include a resultant summary in NSSDA format showing the 95% difference in horizontal X and Y, and Vertical Z for the project. The check shot coordinates will be obtained independently.
- 3D Microstation DGN file containing all mapping named 115206PL.
- 3D Microstation DGN containing the terrain surface triangle file.
- Terrain surface saved as a Geopak .TIN file generated from the point cloud data.

- Terrain surface saved as an InRoads .DTM file.
- LiDAR data tiled and saved as .POD (Point Tools/Microstation point cloud file) files.
- LiDAR data collected shall be submitted in .LAS format with RGB values and intensity values.
- Photo mosaic/Images along route that support the LiDAR .LAS point cloud.
- When other methods of survey and mapping are also employed for the project, the data shall be combined and merged with the mobile mapping data and the merged information provided in the appropriate electronic files per the project's scope and requested deliverables.

The Consultant is responsible for using the latest MDOT Resource files, color table, and cell files, available on the MDOT File Library site under CAD_V8. Go to <http://mdotwas1.mdot.state.mi.us/public/bbs/> The scale of the map will be 1 inch to 40'.

For a comprehensive list of MicroStation level designations, contents and line attributes, refer to the "MDOTV8LEVEL.pdf" table located on the MDOT ftp site at <ftp://ftp.michtrans.net/>. The consultant Username is "survcons." The consultant password is \$urvcon\$. This table replaces the former Attachments AA, C & D. Also in the ftp site, the Consultant should refer to the V8GROUP&ALPHA LIST.pdf file for Data Collection Codes.

Any information that would not be appropriately placed in the control, property or mapping sections should be included in this section. General photographs, local newspaper articles and project-related comments from residents are example of miscellaneous data.

The surveyor must describe, in the final report, the data included in this section.

The final report for this project shall meet the current guidelines outlined in the MDOT Survey Standards of Practice dated Jan. 2012.

P. SURVEY INFORMATION SHEET

The Consultant shall prepare a MDOT Survey Information Sheet in Microsoft Word (.doc) named 115206_I194_SURVEY.doc. The Survey Information Sheet shall include the following, as applicable:

- Survey Notes (Coordinate system, Zone, Horizontal & Vertical Datum, etc.)
- Control Points (Primary & Intermediate)
- Control Point Witnesses
- Benchmarks
- Government Corners

Alignment(s) Points

The MDOT Survey Information Sheet template can be found here:

http://www.michigan.gov/documents/mdot/MDOT_SURVEYINFOSHEET_302553_7.doc

SCOPE FOR HYDRAULIC SURVEY
PPMS Task 3350
6.20.11

C.S. 11016 Job No. 115206
I-94 over Yore-Stoeffler Drain (Tributary of Ox Creek)
Berrien County

The Consultant shall perform a hydraulic survey, which provides geometric data on the stream channel upstream and downstream of the structure. **Two weeks** prior to starting the hydraulic survey, the Consultant surveyor shall schedule a site visit with an MDOT Hydraulics engineer by contacting the Design Engineer-Hydraulics/Hydrology Chris Potvin at 517-335-1919 or Assistant Design Engineer-Hydraulics/Hydrology Larry Wiggins at 517-373-1713. The purpose of the site visit is to discuss details of the survey and to clarify the intent of the survey. Notes must be taken at the site visit and submitted promptly to the MDOT Project Manager, and MDOT Survey Coordinator or Region Surveyor.

Prior to performing the survey, the Consultant must contact all landowners upon whose lands they will enter. The contact may be personal, phone or letter, but must be documented. This notice must include the reasons for the survey on private land, the approximate time the survey is to take place, the extent of the survey including potential brush cutting, and an MDOT contact person (the MDOT Project Manager or Consultant Survey Coordinator or Region Surveyor).

The Consultant must make every effort to minimize brush cutting on private property. The use of paint on private property is prohibited.

Cross-sections shall be taken at the limits and intervals specified by the MDOT Design Engineer-Hydraulics/Hydrology. Channel cross-sections shall be taken normal to the direction of *flood* flow and tied to the project coordinate system so they can be accurately plotted. The sections shall be extended to the edge of the floodplain, to the elevation of the top of the road at the structure, or to a distance beyond the river bank agreed upon with the MDOT Hydraulics engineer at the site visit. Shots must be taken at approximately six foot intervals through the stream, and at significant break points. Any high water marks and date of occurrence (if available) shall be noted.

Final Posted Scope: 10/8/2012

Since the hydraulic analysis is to be performed by Consultant staff, the Consultant shall meet the following requirements for hydraulic cross-sections:

1. Cross-sections shall be submitted electronically in a format acceptable to the Design Engineer-Hydraulics/Hydrology.
2. The highpoints of all berms such as roads, railroads, or driveways that cross the stream must be included as a separate chain. Each highpoints chain must also have a description or comment that identifies the type of centerline, such as “railroad berm” or “farm drive.” Each individual shot in the highpoints chain should have its own identifying Feature Code or description, such as centerline, sidewalk or top of wall.
3. Each cross-section shall be submitted with the points in the chain running all left to right, looking downstream.
4. The cross-sections generally must extend a minimum of 100 feet into the flood plain from the stream top of bank.
5. For each cross-section, the vegetation break point (the “friction point” between the natural channel and the surrounding vegetation) shall be shot. It should have a comment or description of “break point.”
6. Subsequent vegetation break points, if applicable, shall be shot with a comment or description such as “friction point – grass to shrub,” or “friction point – shrub to trees” as appropriate.
7. The water surface elevations at each cross section shall be taken at the left edge of water and right edge of water looking downstream. The Consultant must note if any stream bed cross sections were dry, and water surface elevation shots were unavailable.

The project surveyor must ensure that all required information is legible and in a form which is easily accessible to the Hydraulics/Hydrology Unit. A HEC-RAS file is acceptable. Other formats must be discussed in advance with the Survey Project Manager or MDOT Hydraulics Engineer.

All elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD88), or project datum, if established and different. If a project datum is used, the MDOT Hydraulics Engineer may require a reference to NAVD88 or National Geodetic Vertical Datum of 1929 (NGVD29). Two benchmarks must be established at the stream crossing, one on each side of the stream. All benchmarks must be accurately described. Benchmark leveling shall be a closed loop of at least third-order accuracy, which requires an error of closure between known benchmarks of not more than 0.06 feet times the square root of the distance in Miles.

Note: It is not necessary to provide least squares analyses for horizontal and vertical control for a
Final Posted Scope: 10/8/2012

Hydraulics Survey upstream and downstream from the structure. Electronic evidence of horizontal and vertical closure is required. The surveyor must use professional judgment to determine whether the closures are acceptable for use on a Hydraulics Survey. It is necessary to provide accurate elevations for underclearances, road profiles, weirs, and anything that controls flow. It is not necessary to provide extremely accurate closures for vertical and horizontal control used for hydraulics cross-sections.

It is not necessary to provide a witness list of horizontal control points set for hydraulics cross-sections.

A list containing at least two benchmarks, one on either side of the bridge, with descriptions, elevations and datum, must be provided. Since these benchmarks will be used for road/bridge design and construction, least squares analysis is required.

THE NOTES FOR THE HYDRAULIC SURVEY MUST BE PACKAGED IN A SEPARATE PORTFOLIO. All field measurements, notes, sketches, and calculations must be included in the final transmission. Two separate, identical, and complete portfolios must be provided.

ATTACHMENT C

CONSULTANT TRAFFIC CONTROL

I-94 over Pipestone Road Bridge Replacement

MINIMUM MERGING TAPER LENGTH "L" (FEET)

OFFSET FEET	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										TAPER LENGTH "L" IN FEET
	25	30	35	40	45	50	55	60	65	70	
1	10	15	20	27	45	50	55	60	65	70	
2	21	30	41	53	90	100	110	120	130	140	
3	31	45	61	80	135	150	165	180	195	210	
4	42	60	82	107	180	200	220	240	260	280	
5	52	75	102	133	225	250	275	300	325	350	
6	63	90	123	160	270	300	330	360	390	420	
7	73	105	143	187	315	350	385	420	455	490	
8	83	120	163	213	360	400	440	480	520	560	
9	94	135	184	240	405	450	495	540	585	630	
10	104	150	204	267	450	500	550	600	650	700	
11	115	165	225	293	495	550	605	660	715	770	
12	125	180	245	320	540	600	660	720	780	840	
13	135	195	266	347	585	650	715	780	845	910	
14	146	210	286	374	630	700	770	840	910	980	
15	157	225	307	400	675	750	825	900	975	1050	

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

"L" = $\frac{W \times S^2}{60}$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = S x W WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

- L = MINIMUM LENGTH OF MERGING TAPER
- S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
- W = WIDTH OF OFFSET

TYPES OF TAPERS

UPSTREAM TAPERS

- MERGING TAPER
- SHIFTING TAPER
- SHOULDER TAPER
- TWO-WAY TRAFFIC TAPER

DOWNSTREAM TAPERS

(USE IS OPTIONAL)

TAPER LENGTH

- L - MINIMUM
- 1/2 L - MINIMUM
- 1/3 L - MINIMUM
- 100' - MAXIMUM
- 100' - MINIMUM (PER LANE)



TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006	M0020a	SHEET 1 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn		REV.	08/21/2006

DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D"
AND LENGTH OF LONGITUDINAL BUFFER SPACE ON
"WHERE WORKERS PRESENT" SEQUENCES

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)									
	25	30	35	40	45	50	55	60	65	70
D (FEET)	250	300	350	400	450	500	550	600	650	700

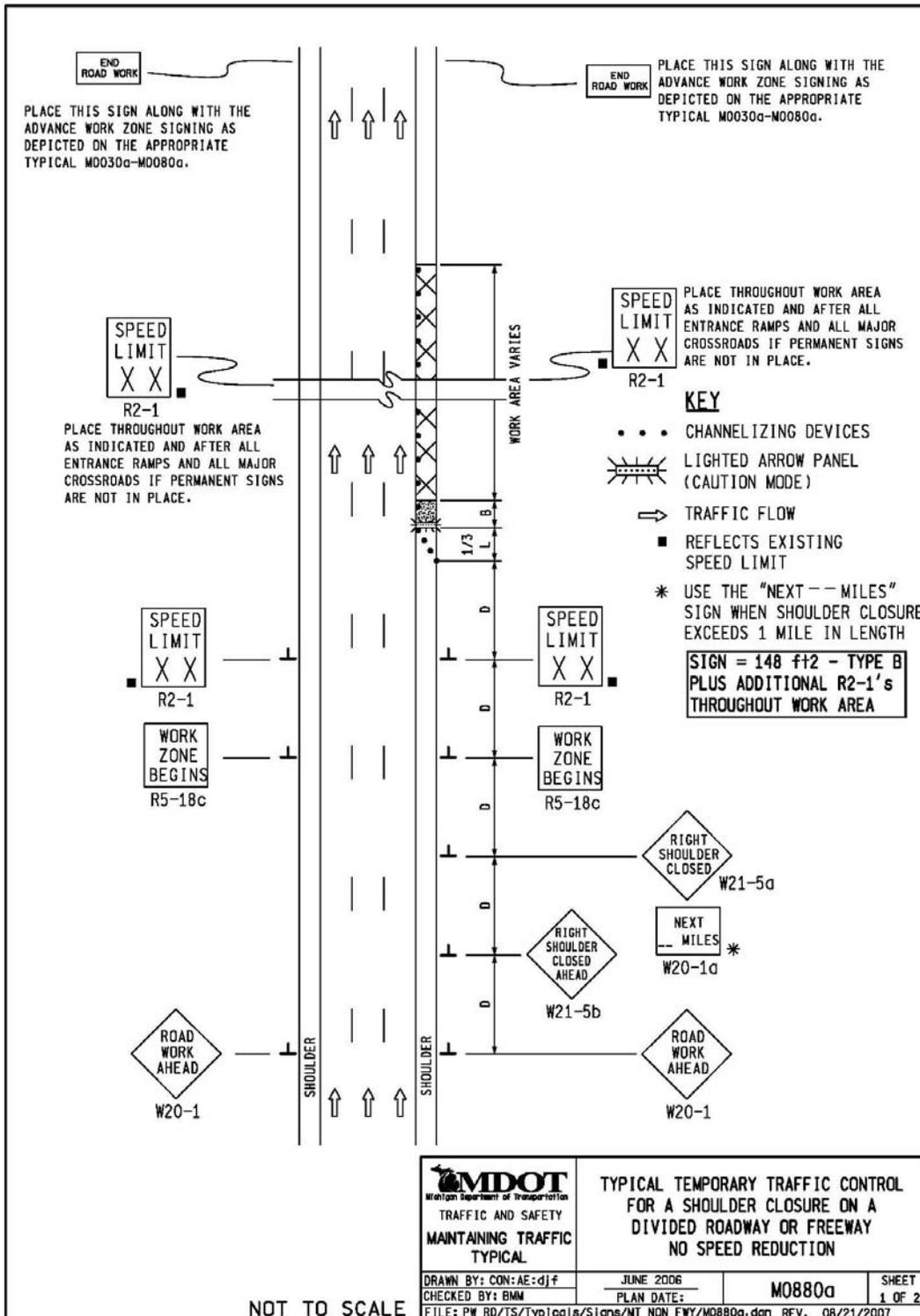
GUIDELINES FOR LENGTH OF
LONGITUDINAL BUFFER SPACE "B"

SPEED* MPH	LENGTH FEET
20	33
25	50
30	83
35	132
40	181
45	230
50	279
55	329
60	411
65	476
70	542

* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TABLES FOR "L", "D" AND "B" VALUES		
	DRAWN BY: CDN:AE:djf CHECKED BY: BMN	JUNE 2006 PLAN DATE:	M0020a
FILE: X:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn REV. 08/21/2006			



NOTES

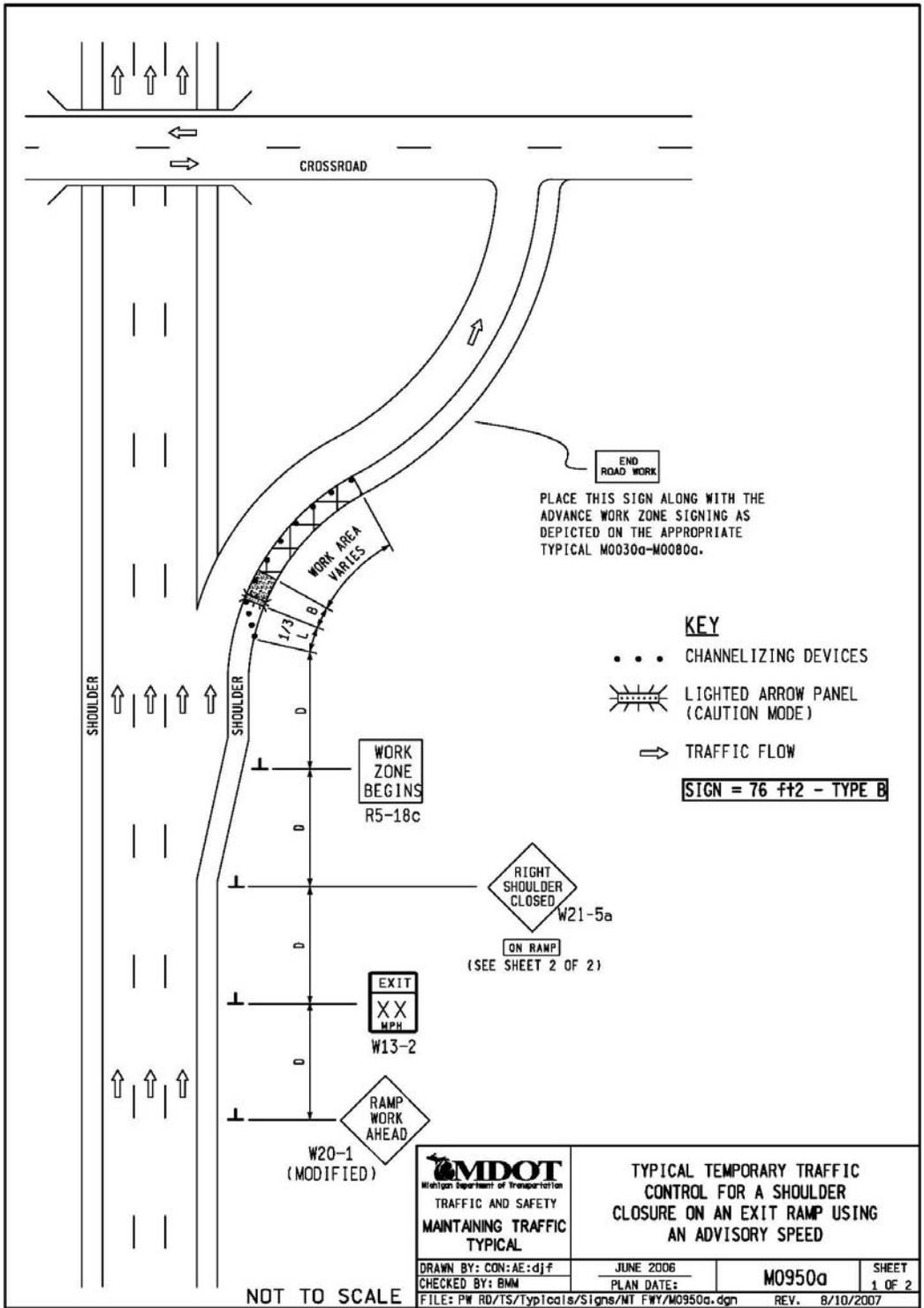
1. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
 1/3 L = MINIMUM LENGTH OF TAPER
 B = LENGTH OF LONGITUDINAL BUFFER
 SEE M0020a FOR "D," "L," AND "B" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 29A. THE TYPE OF REFLECTIVE SHEETING USED FOR THE W20-1a PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

SIGN SIZES

DIAMOND WARNING - 48" x 48"
 W20-1a PLAQUE - 48" x 36"
 R2-1 REGULATORY - 48" x 60"
 R5-18c REGULATORY - 48" x 48"

NOT TO SCALE

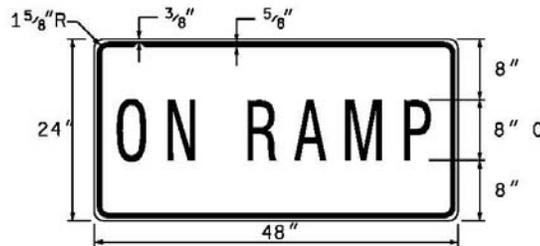
 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON A DIVIDED ROADWAY OR FREEWAY NO SPEED REDUCTION		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM	JUNE 2006 PLAN DATE:	M0880a
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0880a.dgn REV. 08/21/2007			



NOTES

1. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
 1/3 L = MINIMUM LENGTH OF TAPER
 B = LENGTH OF LONGITUDINAL BUFFER
 SEE M0020a FOR "D," "L," AND "B" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
29. THE TYPE OF REFLECTIVE SHEETING USED FOR THE "ON RAMP" PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

SIGN DETAIL



COLORS

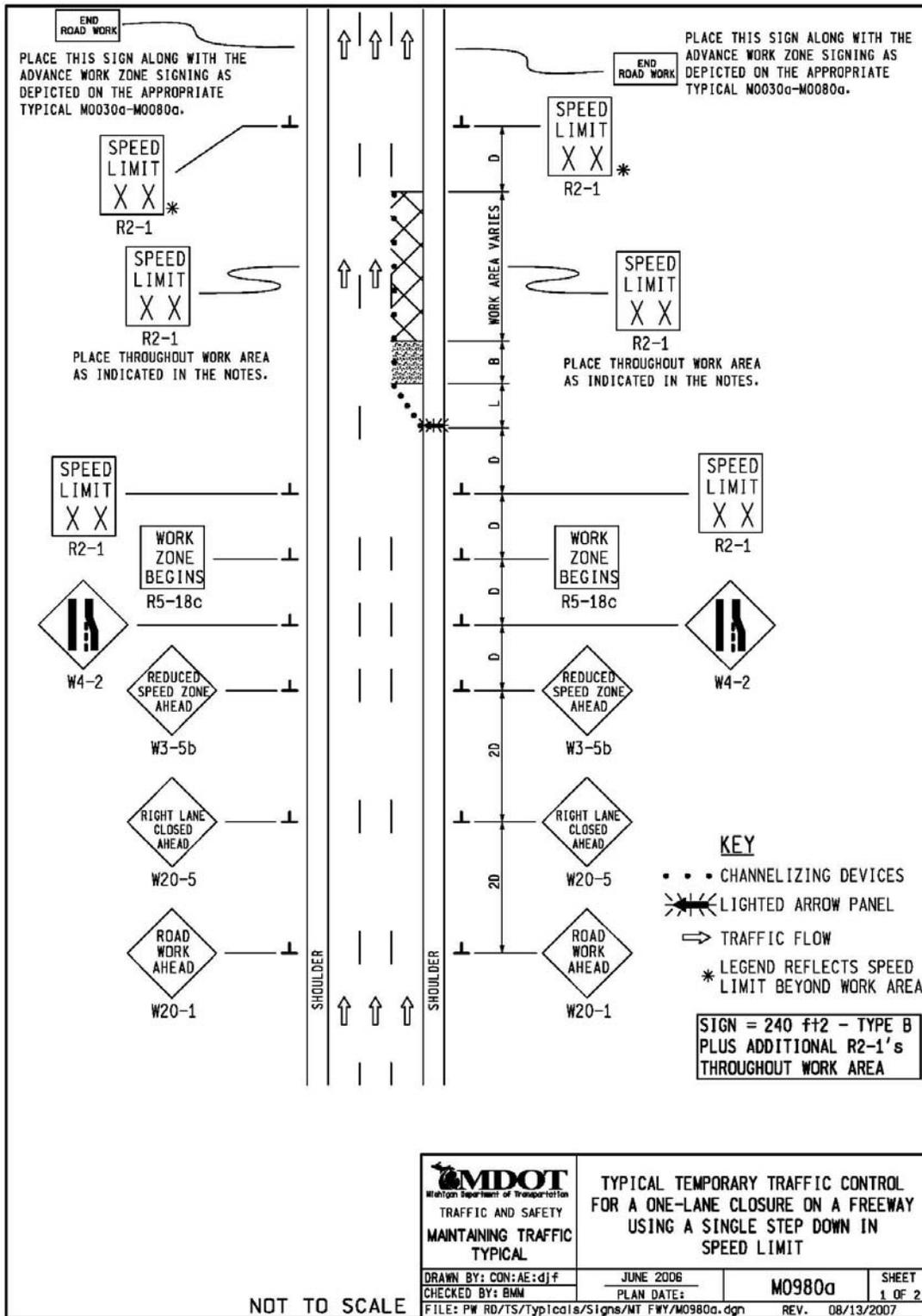
LEGEND AND BORDER - BLACK (NON-REFLECTORIZED)
 BACKGROUND - ORANGE (REFLECTORIZED)

SIGN SIZES

DIAMOND WARNING	- 48" x 48"
W13-2 WARNING	- 48" x 60"
PLAQUE	- 48" x 24"
R5-18c REGULATORY	- 48" x 48"

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON AN EXIT RAMP USING AN ADVISORY SPEED	
	DRAWN BY: CON:AE:djf CHECKED BY: BMM	JUNE 2006 PLAN DATE:
FILE: PW RD/TS/Typ1eals/Signs/MT FWY/M0950a.dgn REV. 8/10/2007		

NOT TO SCALE



NOTES

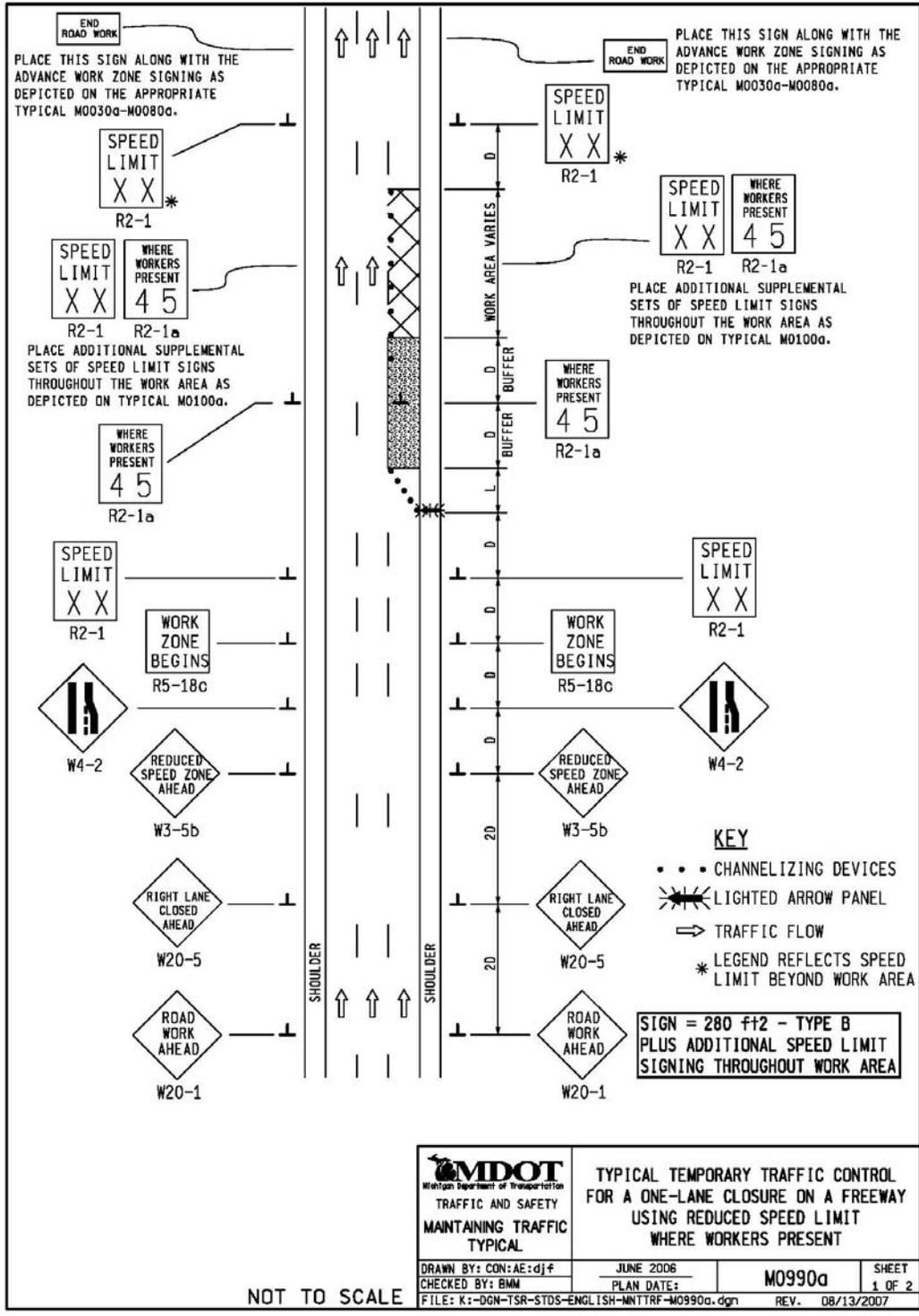
- 1B. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE **M0020a** FOR "D," "L," AND "B" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- 16D. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.
- 16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.
21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.
26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

- DIAMOND WARNING - 48" x 48"
 RECTANGULAR REGULATORY - 48" x 60"
 R5-18c REGULATORY - 48" x 48"

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING A SINGLE STEP DOWN IN SPEED LIMIT	
	DRAWN BY: CON:AE:djf CHECKED BY: BMW	JUNE 2006 PLAN DATE:
FILE: PW RD/TS/Typicals/Signs/MT FWY/M0980a.dgn REV. 08/13/2007		

NOT TO SCALE



NOT TO SCALE

NOTES

11. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.
5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.
26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

DIAMOND WARNING - 48" x 48"
 RECTANGULAR REGULATORY - 48" x 60"
 R5-18c REGULATORY - 48" x 48"

NOT TO SCALE

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT		
	DRAWN BY: CON:AE:dj:f CHECKED BY: BMW	JUNE 2006 PLAN DATE:	M0990a
FILE: K:\DGN\TSR\STDS-ENGLISH-MNTTRF-M0990a.dgn REV. 08/13/2007			