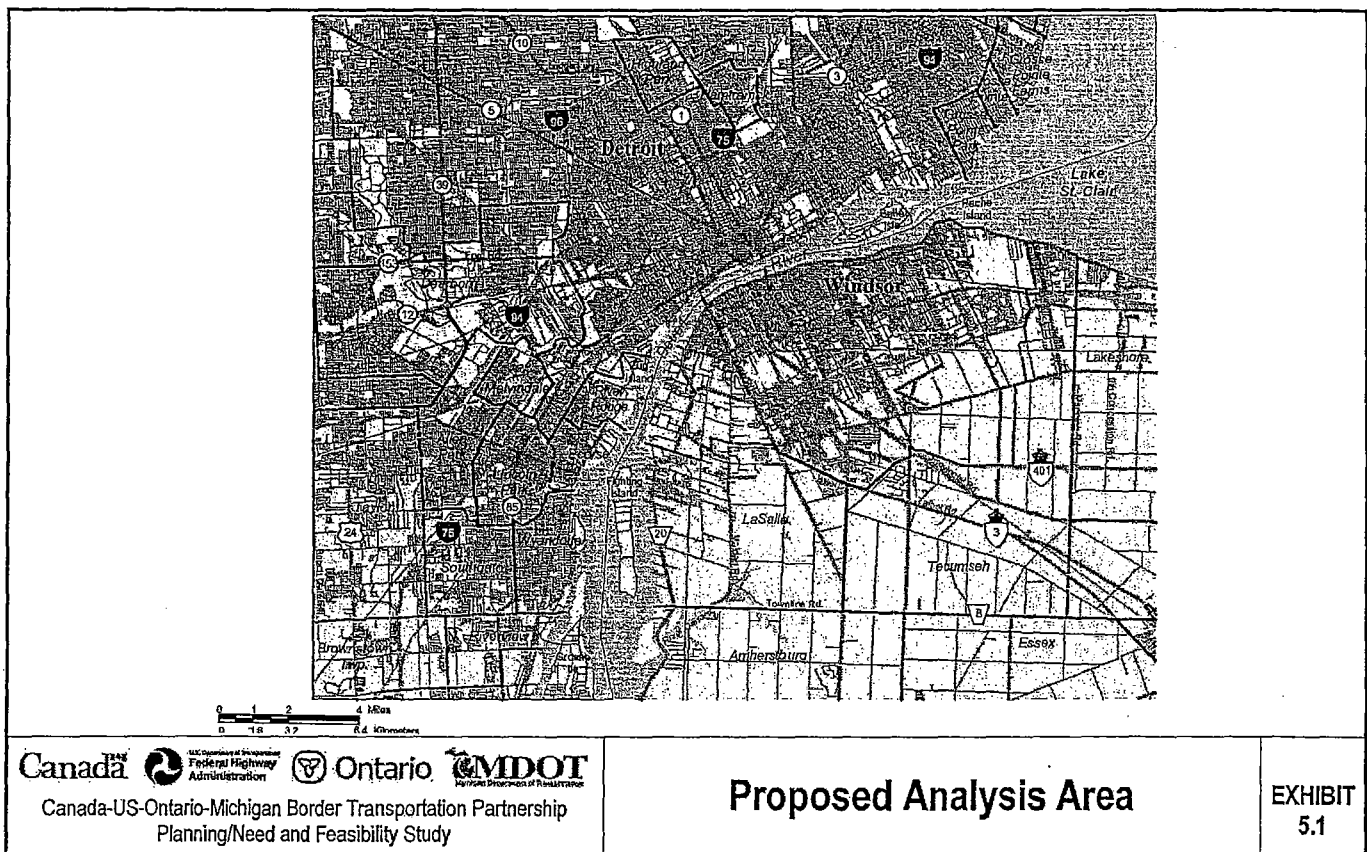


# APPENDIX A

## Exhibit 5.1, Study Map Detroit River International Crossing (DRIC) STUDY



## APPENDIX B

### Working Group Members Detroit River International Crossing (DRIC) STUDY

<b>Working Group Members</b>			
<b>Name</b>	<b>Organization</b>	<b>Position</b>	<b>Location</b>
Dave Wake	MTO	Supervisor, Environmental Unit Southwest Region	London, ON, Canada
Roger Ward	MTO	Senior Project Manager	London, ON, Canada
Joel S. Foster	MTO	Environmental Planner	Lansing, MI, USA
Margaret Barondess	MDOT	Project Manager	Lansing, MI, USA
Andy Irwin	MDOT	Manager, Project Planning Section	Lansing, MI, USA
Mohammed Alghurabi	MDOT	Associate Project Manager	Lansing, MI, USA
Andy Zeigler	MDOT	Regional Planner	Southfield, MI, USA
Paige Williams	MDOT	Project Development Engineer	Southfield, MI, USA
Kaarina Stiff	Transport Canada	Environmental Assessment Project	Ottawa, ON, Canada
Jim Kirschensteiner	FHWA	Assistant Division Administrator	Lansing, MI, USA

## APPENDIX C

### Notice of Intent (March 24, 2003) Detroit River International Crossing (DRIC) STUDY

#### DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

ENVIRONMENTAL IMPACT STATEMENT: WAYNE COUNTY, MICHIGAN

AGENCY: Federal Highway Administration (FHWA), DOT

ACTION: Notice of Intent.

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**SUMMARY:** The FHWA is issuing this notice to advise the public that an Environmental Impact Statement will be prepared for proposed international border crossing improvements in Wayne County, Michigan, including improvements to existing infrastructure, new border crossing(s) and new or expanded border processing facilities. The study is being undertaken in partnership with Transport Canada, the Michigan Department of Transportation, and the Ontario Ministry of Transportation referred to below as the Border Partnership.

**FOR FURTHER INFORMATION CONTACT:** In the United States, James A. Kirschensteiner, Assistant Division Administrator, Federal Highway Administration, 315 West Allegan Street, Room 207, Lansing, Michigan 48933, Telephone: (517) 702-1835, Fax: (517) 377-1804, email: [james.kirchensteiner@fhwa.dot.gov](mailto:james.kirchensteiner@fhwa.dot.gov). Or, Margaret Barondess, Manager, Environmental Section, Michigan Department of Transportation,

P.O. Box 30050, Lansing, Michigan 48909, Telephone: (517) 335-2621, Fax: (517) 373-9255, email: [barondessm@michigan.gov](mailto:barondessm@michigan.gov).

In Canada, James Lothrop, Manager Highway Programs, Transport Canada, Tower C, Place de Ville 18<sup>th</sup> Floor, 330 Sparks Street, Ottawa, ON K1A 0N5, Telephone: (613) 998-1902, Fax: (613) 990-9636, email: [lothroj@tc.gc.ca](mailto:lothroj@tc.gc.ca). Or, Fred Leech, Project Coordinator Ontario Ministry of Transportation (MTO), MTO Head Office, Garden City Tower, 4<sup>th</sup> Floor 301 St. Paul Street, St. Catherines, Ontario, L2R 7R4, Telephone: (905) 704-2218, Fax: (905) 704-2007, email: [Fred.Leech@mto.gov.on.ca](mailto:Fred.Leech@mto.gov.on.ca).

**SUPPLEMENTARY INFORMATION:** The FHWA, as a member of the Bi-National Border Partnership, will prepare an Environmental Impact Statement for a proposal to develop transportation improvements to alleviate traffic congestion and address future travel demand and capacity between Southeast Michigan and Southwest Ontario as identified in a Planning Needs and Feasibility study. The project would identify the purpose and evaluate needs, potential improvements to existing infrastructure, including new crossings, the potential for expansion or implementation of all modes of transportation (rail, highway, marine, etc.) and the need for new or improved border processing facilities to improve the safe and secure flow of people, goods, and services across the international border. Improvements are considered necessary to provide for increased international movement efficiencies both regionally and nationally.

The existing geographical international ways and means in Southeast Michigan and Southwest Ontario include the Blue Water bridges, the Detroit-Windsor Tunnel, the

Ambassador Bridge, and railroad tunnels between Windsor and Detroit and Port Huron, Michigan, and Sarnia, Ontario, as well as a ferry that operates on the Detroit River.

Alternatives under consideration include: (1) taking no action; (2) improving existing facilities to increase their capacity to move goods, services, and people; (3) construction of a new crossing or crossings to increase capacity and provide redundancy; (4) expansion or implementation of non-highway modes of transportation (rail, marine, etc.); or (5) some combination of (2), (3), and (4). As part of the EIS, an Enhanced Scoping Information Package will be prepared. The Scoping Information Package will describe alternative locations for improving international crossing activity in southeast Michigan; inventory and map known resources; identify and map social, economic, and environmental constraints; and select practical alternatives. Letters describing the proposed action and soliciting comments will be sent to appropriate federal, state, and local agencies, and to private organizations and citizens who have previously expressed, or are known to have, an interest in this proposal. Cooperating Federal Agencies will be solicited.

A series of public meetings were held in Detroit, Michigan, Windsor, Ontario, and Sarnia, Ontario, on November 12-14, 2002. Other public meetings are planned as is a formal public hearing for the draft environmental impact statement. Public notice will be given of the time and place of the meetings and hearing. Meetings to review the enhanced Scoping Information Package will be held on dates yet to be determined.

To ensure that the full range of issues related to this proposed action are addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments or questions concerning this proposed action should be

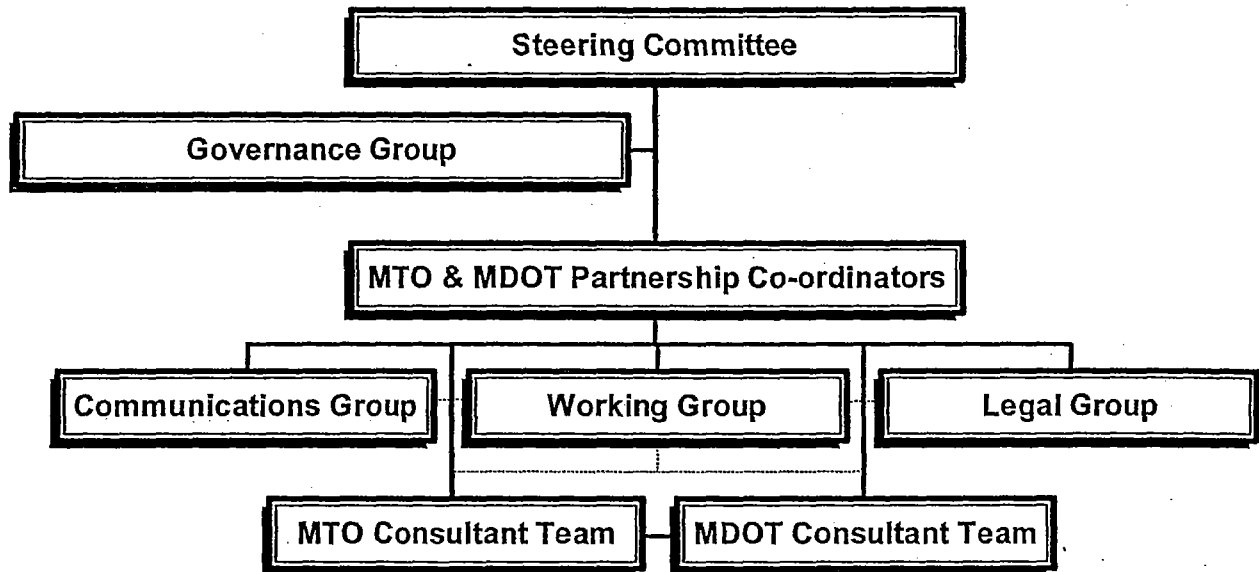
directed to the FHWA at the address provided above. (Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation of Federal programs and activities apply to this program).

Issued on: March 14, 2003.

/s/ James J. Steele  
James J. Steele  
Division Administrator  
Lansing, Michigan

## APPENDIX D

### The Working Group Detroit River International Crossing (DRIC) STUDY



## APPENDIX E1

### Photogrammetry and Survey Tasks for Initial Study Base Mapping Deliverables Detroit River International Crossing (DRIC) STUDY

“Base Mapping Deliverables” includes the products and formats to be created and supplied from the “Raw Data Deliverables” obtained by the Michigan Department of Transportation (MDOT) through its consultant, Woolpert Design, LLP, under an initial raw data acquisition contract and covering the entire study area. The “Base Mapping Deliverables” will be created for the purpose of supplying the mapping information needed to conduct a study for the Route Planning and Environmental Impact Statement through the Record of Decision (ROD) for a new Detroit River International Crossing.

**Appendix E1 includes P/PMS Tasks 3310, 3330, 3350, and 4510. Task 3310 is a critical path task. Since Task 3310 will provide the base mapping necessary to begin the study, this task needs to be completed as soon as possible after project authorization.** Tasks 3330, 3350, and 4510, as outlined in Appendix E1, are intended to start once the project is authorized and be utilized for pickup of critical supplemental information within the project area for the period of the project leading to the Selection of Practical Alternatives.

#### **Detailed Project Schedule**

The **Consultant shall prepare and provide** to the MDOT Photogrammetric Project Manager and MDOT Survey Project Manager, a **detailed schedule**, in MS Project 2000 format (or equivalent), including a **breakdown of tasks and sub-tasks** necessary to complete the **work outlined in Appendices E1 and E2**. An **electronic copy** of the detailed schedule **in MS Project 2000 format** (or equivalent) shall also be provided. This **schedule shall also include the relationship to the overall project schedule**. A **detailed work plan** for these tasks and sub-tasks shall also be submitted with the **detailed schedule**.

#### **Monthly Progress Reports**

On the first of each month, the Consultant shall submit a **monthly** project progress report to the MDOT Photogrammetric Project Manager and MDOT Survey Project Manager. The report shall include information **specifically** related to all **Photogrammetric and Survey tasks**. List the items completed each month, contacts made, anticipated problems, work anticipated for the following month and progress related to project schedule.

#### **Limits of Mapping**

Limits of the Base Mapping are to include all U.S. area on the map west of the Detroit River, all islands in the entire width of the Detroit River through the length of the project area, both U.S. and Canadian, and extending easterly to include a 350 meter wide strip of Canadian land along the Easterly side of the Detroit River.



### **Consultant Coordination**

The Ontario Ministry of Transportation (MTO) will be concurrently contracting with a consultant to perform the Canadian portion of the base mapping for the Study. The MTO consultant will be preparing mapping utilizing the MTO CADD symbology and standards based on AutoCAD Land Development Desktop (LDD) 2004. The MDOT consultant shall prepare mapping utilizing the latest MDOT CADD symbology and standards for MicroStation Version 8. It is anticipated that mapping and design files will be shared among the consultants and the Partnership members. To provide for compatibility, the consultant shall provide all CADD files in Micro Station Version 8, AutoCAD LDD Rel 2002, and AutoCAD LDD Rel.2004 file formats. MDOT will utilize the MicroStation Version 8 to read both MicroStation and AutoCAD LDD Rel. 2002 files. MTO and their consultant will use the AutoCAD LDD Rel. 2004 files. It is intended that the MDOT consultant prepare the CADD files to meet MDOT standards and then save out the files in the AutoCAD Rel. 2002 and 2004 formats. It is **not** intended to map/design duplicate files each meeting MDOT and MTO standards. When adjoining files from each consultant are prepared for presentation, the consultants shall coordinate with each other to eliminate overlapping symbology and CADD data.

The following map and image files can be found on an attached CD:

- A. High Altitude Image background of project area - MI\_Border.sid/.sdw
- B. Photogrammetric Control Survey Target
- C. Aerial Triangulation Model Index
- D. LiDAR Data Model Index/Layout

### **“Raw Data Deliverables”**

As a background to understanding the request for the new “Base Mapping Deliverables” listed below, the following is a list and description of some of the parameters related to the “Raw Data Deliverables”. The “Raw Data Deliverables” were obtained by MDOT from April through August, 2004 and are to be made available in mid-September, 2004. The “Raw Data Deliverables” will be used to prepare the “Base Mapping Deliverables”. The raw deliverables are to be made available to the consultant within approximately one week after authorization.

The “Raw Data Deliverables” are as follows:

1. Study area flight at 1:5000 photo scale and flown at 2500 feet (762 meters) above ground
  - a. Flight map showing 36 flight lines with exposure numbers
  - b. Raw image scans in Intergraph Tiff (\*.cmp) format of the flight exposures. The Photogrammetric digital image scans are assumed to be used for softcopy photogrammetry to compile the supplemental terrain data to enhance the LiDAR and to use in processing the digital

- ortho-photos. Film diapositives are not anticipated to be needed for the initial study mapping as part of Appendix E1.
- i. Photo Scale is 1:5000
  - ii. 1445 exposures were scanned at 14 microns
- c. Camera calibration reports
- d. Raw LiDAR data in ASCII format
- i. Flight altitude was nominally 3000 feet (914.4 meters) above ground
  - ii. Average Flight speed was 219 feet/second (66 meters/second)
  - iii. Number of flight lines = 80
  - iv. Ground grid spacing was (1 meter x 1 meter)
  - v. Scan frequency was 36 Hz.
  - vi. Half angle was 20 degrees
  - vii. Swath width = 2183.8 feet (665.6 meters)
  - viii. Side lap was 30% (yielding 1529 feet (466 meters) of swath coverage per flight line)
  - ix. LiDAR raw data was processed into 3 groups – First return, Last Return and Ground
- e. Ground control survey report with coordinates, adjustment data, sketches and descriptions
- i. Horizontal Datum and Coordinates = NAD83(CORS/NSRS) based on 2002 Epoch adjustment, UTM Zone 17 N in Meters
  - ii. Vertical Datum = NAVD88 in Meters
- f. Aerial Triangulation Report including External Orientation values and support files.
- i. Aerial triangulation utilized airborne GPS data and the ground control survey to facilitate adjustment of the photogrammetric pass points and tie points.
- g. Bare Earth DEM (Digital Elevation Model) data in ASCII format and in 3D MicroStation format. (Limited field checks were performed by comparing the LiDAR surface to the existing ground control targets and through comparing the pass and tie points from the aerial triangulation adjustment against the LiDAR terrain. Further checks are intended to be part of this project as part of the photogrammetric work to compile data to enhance the present LiDAR product.)
- i. DEM is the filtered LiDAR data that has been QC'd against the aerial triangulation pass/tie points and the ground control values.
  - ii. This DEM is to be considered an intermediate deliverable product that is to be used as the basis of work to be done in the next phase of the study.
  - iii. This DEM is intended to be enhanced in the future work phase by adding photogrammetric breakline data from the 1:5000 photography supplied
- h. Interim Digital Image product created from the 1:5000 photography raw image scans

- i. Raw image exposure scans from every other exposure will be geo-referenced together using the exterior orientations from the aerial triangulation
  - ii. Raw image exposures will be mosaicked together but not corrected for all radial displacements and miss-match along flight lines.
  - iii. Digital Image Product will not be fully rectified nor fully scalable
  - iv. Initial set of images will use the 0.076 meter ground pixel resolution from the raw image 14 micron scans
  - v. A second set of reduced resolution scans produced have a 0.15 meter ground pixel resolution
  - vi. The downtown areas of Detroit and Windsor will have every image included (adding about 100 additional images) and some manual seaming to minimize the radial displacement and lean for some of the tall objects.
  - vii. MrSid file format with compression ratio of 10:1, of the entire study area using the mosaicked, geo-referenced, image scans
2. High altitude flight to extend previous study mapping [photo scale = 1:36000 at 5486 meters(18000 feet) above ground]
- a. Negatives, uncut, of the exposures for one flight line to extend the previous high level mapping to the south
  - b. Digital rectified mosaic image of the entire new high altitude area delivered as
    - i. 114 Geo-referenced Tiff images at 0.6 meter ground pixel resolution
    - ii. MrSid Image at 8:1 compression
    - iii. Mapping scale 1:4800
    - iv. Horizontal Datum = NAD83(CORS/NSRS)/(CSRS) based on 2002 Epoch adjustment
    - v. Coordinates = UTM Zone 17 N Meters

## “Base Mapping Deliverables”

To complete the base mapping needed to prepare the Route Planning and Environmental Impact Study for the DRIC, the deliverables discussed below shall be completed.

The intention of the work for the survey and photogrammetric tasks is to provide a digital terrain model surface accurate to 0.15 meters (0.5 feet) covering the entire study area. In addition, this work will provide digital ortho-photos with a ground pixel resolution of 0.076 meters (0.25 feet). These digital ortho-photos are intended to be used in place of planimetric vector mapping. No planimetric vector mapping will be provided as part of the base mapping. It is intended that the digital ortho-photos be used as a reference for route planning, CADD layout and design.

### Survey and Mapping Deliverables

Final deliverables for survey and mapping products shall conform to MDOT survey and photogrammetric standards. Deliverables shall also include files in GEOPAK format per MDOT Survey deliverables formats.

### Design Deliverables

All design files and project deliverables throughout the study needs to use and include electronic files adhering to MDOT’s CADD standards and in the standard version of GEOPAK and MicroStation used by MDOT at the time of delivery.

“Base Mapping Deliverables” of the new work phase **TASK 3310** are intended to be as follows:

1. Aerial triangulation to establish the photogrammetric mapping control parameters may be required as part of this scope. Consultant is responsible to provide any additional aerial triangulation necessary to perform the photogrammetric mapping required in this scope.
  - a. Aerial Triangulation Deliverables (Note: **This task was completed by consultant under the previous contract.** Any additions and revisions to the previous aerial triangulation (AT) required to complete the work tasks for this contract and including a copy of the AT from the previous contract shall be delivered as part of this contract. The reports for the aerial triangulation for the mapping area have been reviewed by MDOT and appear to be of good quality. The consultant is ultimately responsible by MDOT for providing a good quality AT solution for the project. If additional controls or revisions to the previous AT solution are necessary, the AT report shall be updated and revised and a new AT report delivered to MDOT. A copy of the final AT solution used to prepare all photogrammetric deliverables shall be supplied to MDOT.)
    - i. Hard copy and electronic data file containing a listing of interior orientation results for each photo.
    - ii. Listing of relative orientation results for all strips.
    - iii. Listing of the final least squares adjustment including files of:
      - (a) Initial run with all control points in solution unless previous runs have

- been removed.
- (b) Final run that will be used to determine the exterior orientation parameters.
  - (c) Report explaining the reasons for withholding each point.
- iv. Listing of the final exterior orientation parameters.
  - v. Electronic orientation files necessary to set up the study's models on an Intergraph Image station (Bluh, Bingo, Patb, Patm, PEX, Phorex, BCPI & SD BCPI).
- 2. Digital Terrain Model DTM data.
    - a. Spatial data accuracy of 0.076 meter (0.25 feet) (rmse) [0.186 meter (0.60 feet) (95%)] for all terrain data.
  - 3. Contour generation from DTM.
    - a. Contour Interval shall be computed at 0.50 meter.  
(Note: Contour interval is for display only and shall not be used as criteria for the determination of vertical accuracy of mapping being requested.)
  - 4. **Photogrammetric Mapping Deliverables**

All mapping will be transmitted to MDOT by the scheduled date as set forth in the study scope. The following deliverables shall be submitted as specified:

    - a. A three-dimensional Micro Station Version 8 terrain data file.
    - b. A two-dimensional Micro Station Version 8 contour file.
    - c. A three-dimensional AutoCAD Land Development Desktop Rel. 2004 terrain data file.
    - d. A three-dimensional AutoCAD Land Development Desktop Rel. 2004 contour file.
    - e. A three-dimensional AutoCAD Land Development Desktop Rel. 2002 terrain data file.
    - f. A three-dimensional AutoCAD Land Development Desktop Rel. 2002 contour file.
    - g. Three dimensional Micro Station Version 8, AutoCAD LDD Rel 2002, and AutoCAD LDD Rel.2004 files, each containing the edited triangle surface representing the terrain surface of the LiDAR and photogrammetric data. The terrain surface shall be tiled into blocks of approximately 25 mb files or less. The edges of each block shall be bounded by a 3d breakline snapping to the edge of the triangulated surface. This breakline shall be copied to the adjoining tile block so that the edges of both blocks match identically where they meet. No break or offset in data shall be present when two adjoining blocks are brought together.
    - h. Digital ortho-photos in uncompressed geo-referenced tiff, world tiff or Intergraph tiff format. Images are to be delivered in tiles of between 50 megabytes and 100 megabytes in file size.
      - i. Digital Rectified-Photo maps generated from the aerial photography, utilizing the DTM created from the terrain data from the LiDAR information enhanced by photogrammetric breakline data.
        - (1) Ground Pixel resolution of the final image shall be 0.076 meter (0.25 feet).
        - (2) Horizontal accuracy of Digital ortho-photo shall be 0.3 meter (1.0 feet) or better.

- (3) LiDAR data incorporating the tops of buildings, tall structures and other objects may be used to aid in the rectification and digital ortho-photo production. Data from the original raw LiDAR information previously acquired shall be used.
  - (a) Photogrammetric compiled breaklines may be used if necessary for the structure tops to enhance the LiDAR information or in place of the LiDAR data as deemed appropriate.
- (4) Prepare two dimensional (2-D) digital orthometric images of the subject area, or as defined. The photographs will be digitally scanned, or the digital image may be re-sampled to produce a ground pixel resolution of 0.076 meter (0.25 feet) for the final ortho image. Individual stereo image models or alternate aerial photographs maybe used, to create the orthometric images. The individual orthometric images will be re-projected to their true ground position on the DTM (digital terrain model) for the specified area.
- (5) The individual re-projected orthometric images will be assembled into a digital mosaic to produce one seamless orthometric image for the specified area.
- (6) To accomplish the duties above, the Contractor may also need to provide:
  - (a) Ground control surveying will be the responsibility of the prime consultant and be accomplished by an MDOT qualified firm, if the prime is not pre-qualified for photo control surveys. **Reference PPMS task # 3320**
- i. The three-dimensional MicroStation Version 8, AutoCAD LDD Rel 2002, and AutoCAD LDD Rel.2004 terrain data files used to generate the ortho images if different from the final DTM file listed above under items 4.a, 4.c, 4.e, 4.g, and 4.h.i.
- j. MrSID files of the image mosaic sets with a compression ratio not to exceed 10:1.
- k. Diapositives that were utilized for this study.
- l. A Photogrammetrist's Project Report on company letterhead discussing the study, aerial photography, ground control, AAT, LiDAR data, map compilation, final mapping files, digital ortho-photos, any problems encountered and how they were resolved, and any issues of interest to the next Surveyor, Photogrammetrist, or Engineer that are involved with the study.
- m. A signed statement on company letterhead containing the following information:

Study Description  
 Job Number  
 Control Section  
 Photo Job Number  
 Photo Scale & Date  
 Mapping Scale  
 Ground Pixel Resolution of Digital Ortho-Photos  
 Horizontal Datum and Units  
 Vertical Datum and Units

Accuracy certification statements (include one for each type of deliverable including the digital ortho-photos, the DTM and any other mapping) and in a format similar to the following.

(Type of deliverable) was/were compiled by (Consultants Name) for the Michigan Department of Transportation on (Completion Date) to meet \_\_\_\_ feet accuracy (horizontal) at 95 percent confidence level and \_\_\_\_ feet accuracy (vertical) at 95 percent confidence level for hard surface and well defined points and to meet \_\_\_\_ feet accuracy (horizontal) at 95 percent confidence level and \_\_\_\_ feet accuracy (vertical) at 95 percent confidence level for terrain and not well defined points based on the National Spatial Data Accuracy Standard, (date of standard), currently in effect. This statement should be signed by the Certified Photogrammetrist in responsible charge of the work performed.

**(Note: Separate accuracies for both well-defined hard surface locations and for ground/mass point locations shall be described in the above statement. Accuracies based on the NMAS or based on contour intervals and map scales are not acceptable.)**

#### **P/PMS TASK 3330 – Conduct Design Survey for Initial Study Phase**

##### **1) Objectives:**

- a. The intent of this item is to provide for the contingency need to provide more detailed survey information to supplement the Digital ortho-photos and LIDAR for areas of critical need only. It is not intended to provide detailed survey for the entire Study project area.

##### **2) Work Tasks:**

- a. Assume survey includes:
  - i. Limited Hard surface elevations
  - ii. Limited topographic and planimetric information
  - iii. Limited Drainage related information
  - iv. Minimal Alignment information - Interchange tie-ins or major crossing areas only

##### **3) Assumptions:**

- a. Assumes 1 pickup area per corridor to provide better detail to analyze route selection
  - i. Total of 5 areas of survey to locate information in small area of critical concern.
  - ii. The 5 corridors under consideration may each have 3 alignments for a total of 15 routes to be considered in the study. The intent is to utilize the Digital Ortho-photos and LiDAR terrain surface for the bulk of the analysis. It is not intended that the entire length of each of the 15 routes be ground surveyed. The task allows the option to locate critical data via ground

survey to supplement the Digital ortho-photos and the LiDAR terrain with more detailed information, if required, to answer questions critical to the analysis for that corridor. The 5 areas of survey may be located as one in each of the 5 broad corridors or multiple survey areas in one corridor with no survey pickup in other corridors.

iii. Items not covered in this task:

- (1) Bridge Surveys
- (2) Under-clearances
- (3) Underground Utilities
- (4) Property Lines

4) Deliverables:

- a. The final report for this project shall include **Two Complete Sets** of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."
  - ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
    - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
    - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
    - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
  - iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
  - iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must be clearly noted as legal or best-fit.**
  - v. Least squares analysis for horizontal and vertical control.
  - vi. Documentation of horizontal and vertical datum sources.
  - vii. Control sketch with control points, government corners and alignment plotted.
  - viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.
  - ix. Legible copies of all **recorded** Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
  - x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.



- xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
- xii. It is not necessary to submit hardcopy mapping data in the survey portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
- xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including MicroStation files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. Micro Station drawings and research data, etc. will need to be scanned into PDF format.
- xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

### **P/PMS TASK 3350 – Conduct Hydraulics Survey for Initial Study Phase**

#### **1) Objectives:**

- a. The intent of this task is to provide for limited survey information to provide more detailed survey information to supplement the Digital ortho-photos and LIDAR for areas of critical need only. It is not intended to provide detailed hydraulics survey for the entire Study project area.
- b. Gather information to be used in analysis of hydraulics of an existing or proposed site for a structure(s). The survey provides data with regard to the channel and the floodplain, both upstream and downstream of the site.
- c. This task can also include data collection for:
  - i. Shoreline protection
  - ii. Determination of flood plain limits
  - iii. Stream scour analysis
  - iv. Other types of investigation as directed by the Design Engineer – Hydraulics/Hydrology

**2) Work Tasks:**

- a. Gather existing plans, control points, bench marks, old survey notes, right of way information and other available information.
- b. Conduct hydraulics survey.
- c. Prepare field notes and project report.

**3) Assumptions:**

- a. Average to small stream crossings at approximately 20 feet wide.
- b. Assume average of 3 crossings per 2 alternative areas.
- c. Information for larger rivers such as the Ecorse River and Rouge River may be required
- d. Data for the Detroit River can be obtained from the Corps of Engineers but may require converting the data from IGLD85 Datum to NAVD88 Datum.
- e. A hydraulics survey of the Detroit River is not to be included for the initial study. It is assumed that existing information for the Detroit River is sufficient. This task is to provide supplemental detail, if necessary, to the LiDAR terrain surface for critical areas. Not all of the 5 corridors or 15 alternative routes will require hydraulics surveys. Assume the amount of data required at each crossing may vary from limited hydraulics information on up to full hydraulics surveys depending on the particular crossing involved, and any existing hydraulics survey information that may be available. Hydraulics surveys for the Appendix E-1 phase need not comply with MDOT Hydraulics Survey Standards and formats. The information acquired shall be formatted as needed by the consultant engineer doing the analysis.

**4) Deliverables:**

- a. Survey portfolio in MDOT format containing a surveyors report, coordinates, control adjustments, Micro Station files
- b. The final report for this project shall include **Two Complete Sets** of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."
  - ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
    - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
    - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
    - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
  - iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
  - iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must**

**be clearly noted as legal or best-fit.**

- v. Least squares analysis for horizontal and vertical control.
- vi. Documentation of horizontal and vertical datum sources.
- vii. Control sketch with control points, government corners and alignment plotted.
- viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.
- ix. Legible copies of all **recorded** Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
- x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
- xii. It is not necessary to submit hardcopy mapping data in the survey portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
- xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004 formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.
- xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

**P/PMS TASK 4510 – Conduct ROW Survey for Initial Study Phase****1) Objectives:**

- a. The intent of this item is to provide location for a minimal number of major government corners, major plat corners, and major property information to assist Real Estate in planning rough existing property line location and rough proposed ROW concerns.
- b. This task is used to provide appraisers and/or buyers with the area of properties to be purchased as part of a project or to stake an area to determine new right of way lines. The survey provides the right of way lines for both the main line and side streets. This information is used to make comparisons between new and existing right of ways.
- c. This task can also include:
  - i. Location of building or other structures, and
  - ii. Determination of encroachments on existing right of way.

**2) Work Tasks:**

- a. Gather existing plans, control points, old survey notes, right of way information and other available information.
- b. Stake area requested. (This is a contingency intended to address the potential concerns that may arise relative to high valued properties as related to the alternative routes under consideration. For Appendix E-1, a small amount is anticipated. For Appendix E-2, more detailed information may be required.)
- c. Prepare field notes and/or project report.

**3) Assumptions:**

- a. Use of existing property information products from county and local municipalities such as:
  - i. Existing tax parcel information
  - ii. Existing county and municipal GIS information
- b. Any GIS and existing parcel information is very rough in location and should not be solely relied upon
  - i. Critical areas may require verification through ground survey and research by a Professional Surveyor
  - ii. Overlay of GIS or parcel information from other sources may require conversion to this projects' coordinate system and datum
- c. An exhaustive property survey for entire Study area is not included
- d. Some limited ground survey may be needed to locate major government section corners or plat corners to facilitate overlaying CADD parcel or subdivision information

**4) Deliverables:**

- a. The final report for this project shall include Two Complete Sets of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."

- ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
  - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
  - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
  - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
- iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
- iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must be clearly noted as legal or best-fit.**
- v. Least squares analysis for horizontal and vertical control.
- vi. Documentation of horizontal and vertical datum sources.
- vii. Control sketch with control points, government corners and alignment plotted.
- viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.
- ix. Legible copies of all recorded Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
- x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
- xii. It is not necessary to submit hardcopy mapping data in the survey portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
- xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004 formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control

section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.

- xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

## APPENDIX E2

### Photogrammetry and Survey Tasks Recommended Alternatives Phase Detroit River International Crossing (DRIC) STUDY

#### **General Considerations, Staffing and Scheduling**

The **mapping** related to/resulting from P/PMS Tasks 2320, 3310, and 3320 for the Recommended Alternative phase **may require several months** to about a year to complete depending upon the timing of the selection of the Recommended Alternative routes. **Leaf-off flight season must be considered** when planning and scheduling this part of the project.

The **specific parameters and verification of the scope** for the Photogrammetric and Survey tasks for each of the Recommended Alternatives **shall be discussed** with the MDOT Project Manager, MDOT Photogrammetric Project Manager and MDOT Survey Project Manager prior to commencing these tasks.

**Appendix E2** includes P/PMS Tasks 2320, 3320, 3310, 3330, 3350, and 4510 and **includes acquisition of more detailed base mapping information** to provide the information necessary for work on the **Evaluation of the Practical Alternatives** leading to **Selection of Technically Recommended Alternative**.

**Tasks 2320 and 3320 are critical path tasks for the completion of Appendix E2 and maintaining the schedule of the entire project.** The Consultant is requested to **focus on these critical tasks early.** Some of these tasks may need to be **started prior to the normal schedule** and prior to obtaining the **final decisions on Selection of Practical Alternatives.** To provide **optimal conditions** for Photogrammetric flights and survey, these tasks shall be scheduled to **occur during the Spring flight season, prior to the completion of the Selection of Practical Alternatives.** **Critical task scheduling may require that multiple alternative routes be selected, targeted and flown prior to the final selected routes.** Not all of these flown routes may be required to be carried to full completion of mapping. The project schedule must be maintained.

It is assumed that a **minimum of two alternatives** will need to be flown and will require work on tasks 2320, 3320, 3310, 3330, 3350, and 4510. **In addition, the Consultant shall expect that photogrammetric and survey work tasks will be ongoing concurrently on all of the alternatives selected and that additional staffing may be required to accomplish this.** Consultant shall evaluate the information needs of each alternative, **prioritize and focus staffing appropriately to eliminate delays in preparing and evaluating the Practical Alternatives.**

### **Detailed Project Schedule**

The Consultant shall prepare and provide to the MDOT Photogrammetric Project Manager and MDOT Survey Project Manager, a **detailed schedule**, in MS Project 2000 format (or equivalent), including a **breakdown of tasks and sub-tasks** necessary to complete the work outlined in Appendices E1 and E2. An electronic copy of the detailed schedule in MS Project 2000 format (or equivalent) shall also be provided. This schedule shall also include the **relationship to the overall project schedule**. A **detailed work plan** for these tasks and sub-tasks shall also be submitted with the **detailed schedule**.

### **Monthly Progress Reports**

On the first of each month, the Consultant shall submit a **monthly** project progress report to the MDOT Photogrammetric Project Manager and MDOT Survey Project Manager. The report shall include information **specifically** related to all **Photogrammetric and Survey tasks**. List the items completed each month, contacts made, anticipated problems, work anticipated for the following month and progress related to project schedule.

### **Consultant Coordination**

The Ontario Ministry of Transportation (MTO) will be concurrently contracting with a consultant to perform the Canadian portion of the Study. The MTO consultant will be preparing mapping utilizing the MTO CADD symbology and standards based on AutoCAD Land Development Desktop (LDD) 2004. The MDOT consultant shall prepare mapping utilizing the latest MDOT CADD symbology and standards for Micro Station Version 8. It is anticipated that mapping and design files will be shared among the consultants and the Partnership members. To provide for compatibility, the consultant shall provide all CADD files in Micro Station Version 8, AutoCAD LDD Rel 2002, and AutoCAD LDD Rel.2004 file formats. MDOT will utilize the Micro Station Version 8 to read both Micro Station and AutoCAD LDD Rel. 2002 files. MTO and their consultant will use the AutoCAD LDD Rel. 2004 files. It is intended that the MDOT consultant prepare the CADD files to meet MDOT standards and then save out the files in the AutoCAD Rel. 2002 and 2004 formats. It is **not** intended to map/design duplicate files each meeting MDOT and MTO standards. When adjoining files from each consultant are prepared for presentation, the consultants shall coordinate with each other to eliminate overlapping symbology and CADD data.

### **Survey and Mapping Deliverables**

Final deliverables for survey and mapping products shall conform to MDOT survey and photogrammetric standards. Deliverables shall also include files in GEOPAK format per MDOT Survey deliverables formats.

### **Design Deliverables**

All design files and project deliverables throughout the study need to use and include electronic files adhering to MDOT's CADD standards and in the standard version of GEOPAK and MicroStation used by MDOT at the time of delivery.



**P/PMS TASK 2320 – Conduct Aerial Photography for Recommended Alternatives Phase**

**1) Objectives:**

- a. The primary objective is to obtain aerial photography to support creation of base mapping for design engineering for the final recommended corridor alternative. The Consultant will obtain design level aerial photography covering the length of the corridor located on the Michigan side only. The limits of the individual corridors shall be determined once the Recommended Alternatives are chosen and shall be discussed with the MDOT Photogrammetry Project Manager.

**2) Work Tasks:**

- a. Discuss with MDOT the exact parameters of the work task and verify the scope prior to beginning work
- b. Verify limits of project aerial mapping
- c. Prepare Flight Map(s)/Plan(s)
- d. Determine location of Photogrammetric Control Targets and Prepare Target Plan(s)
- e. Once Targets are placed on the ground, Schedule Flight(s)
- f. Fly Project – contingent on proper weather conditions and flight season
- g. Develop/process film
- h. QC Film for compliance with standards
- i. Develop contact prints, diapositives, and scan film
- j. Identify targets on photographs – Add any necessary control points if needed.
- k. Submit deliverables

**3) Assumptions:**

- a. Two corridor routes have previously been identified with a description of limits
- b. Corridor length approximately 4.8-14.8 km (3-9 miles) per corridor
- c. Corridor width approximately 500 feet
- d. Proposed Photo Scale: 1:2000 or 1:2400
  - i. Option to use Very Low Altitude Helicopter {Possibly Photo Scale of (1:720) to (1:960)} Photography en lieu of some ground survey to minimize exposure to traffic.
- e. Approximately 160 models at photo scale 1:2000 are anticipated to be mapped
- f. Proposed Mapping Scale = 1:500
- g. The use of Airborne GPS is not a requirement to complete the tasks in Appendix E-2. Airborne GPS has become more widely used in the industry. The intent is that Airborne GPS can be used to enhance the ground control and the photogrammetric aerial triangulation process and products. Airborne GPS is **not** to be used alone without any benefit of ground control. When Airborne GPS is used, the associated data and reports, as listed in the Deliverables to follow, must be included in the deliverables.

**4) Deliverables:**

- a. Original film negatives (uncut rolls)
- b. Raw image scans on DVD or external hard drive (additional copies may be required)
- c. Camera calibration report(s)
- d. Airborne GPS Report and Data including electronic copies of raw GPS data files, GPS Rinex files and Coordinates of photo centers, offsets and diagram of sensor locations related to GPS antenna phase center.
- e. Contact prints marked up with control point and targets identified (Several copies may be required)
- f. Copy of Flight Plan(s) and Target Layout Plan(s)
- g. Diapositive of each exposure

**P/PMS TASK 3310 – Prepare Aerial Topographic Mapping for Recommended Alternatives Phase****1) Objectives:**

- a. The primary objective is to prepare aerial mapping to support creation of base mapping for design engineering for the final recommended corridor alternatives. The Consultant will prepare design level aerial mapping covering the full length of the selected corridor(s) on the USA side of the study area. Aerial mapping is intended to be enhanced by a more detailed ground survey to provide supplemental information to be merged with aerial mapping data.

**2) Work Tasks:**

- a. Receive Photogrammetric Control Survey information.
- b. Verify the mapping limits.
- c. Perform aerial triangulation.
- d. Perform Planimetric and Terrain Mapping.
- e. Create digital ortho-photographs.
- f. Prepare map to design scale
- g. Submit deliverables

**3) Assumptions:**

- a. Horizontal Datum = NAD83(CORS/NSRS) based on 2002 Epoch adjustment /(CSRS)
- b. Horizontal Coordinates = UTM Zone 17 N Meters
- c. Vertical Datum = NAVD88
- d. Units = Meters
- e. Two corridor routes have previously been identified with a description of limits
- f. Corridor length approximately 4.8-14.8 km (3-9 miles)
- g. Corridor width approximately 500 feet

- h. Proposed Photo Scale: 1:2000 or 1:2400
- i. Option to use Very Low Altitude Helicopter {Possibly Photo Scale of (1:720) to (1:960)} Photography en lieu of some ground survey to minimize exposure to traffic.
- i. Approximately 150 models at photo scale 1:2000 are anticipated to be mapped
- j. Proposed Mapping Scale: 1:500

#### 4) Deliverables:

- a. Photogrammetrists Project report summarizing the Photogrammetry tasks involved in the project, issues involved with the project, datums, coordinate systems and units used for the deliverable products and the accuracies attained as submitted for the deliverable products.
- b. All project reports and final CADD file deliverables shall be also converted into and submitted in a single Adobe Ver. 6, linked and book-marked, PDF file.
- c. Digital Ortho-photos
- d. Aerial Triangulation Report(s)
- e. Planimetric feature file
- f. 3D Terrain file
- g. Contour file
- h. CADD file outlining and labeling the perimeter and map limits of each model
- i. Archived CAiCE project containing the edited CAiCE terrain surface named "EXPHO" and Geopak files (See MDOT QA/QC Checklist)
- j. Digital Ortho-photos in geo-referenced Intergraph Tiff or world tiff format and MrSid format of composite image mosaic of the geo-referenced digital ortho-photos with compression ratio not greater than 10:1 (Digital Ortho-photos and MrSid files shall not be part of the PDF report files.)

### **P/PMS TASK 3320 – Conduct Photogrammetric Control Survey for Recommended Alternatives Phase**

#### 1) Objectives:

- a. The primary objective is to prepare aerial mapping to support creation of base mapping for design engineering for the final recommended corridor alternative. The Consultant will prepare design level aerial mapping covering the full length of the selected corridor(s) on the USA side of the study area. Aerial mapping is intended to be enhanced by a more detailed ground survey to provide supplemental information to be merged with aerial mapping data.

#### 2) Work Tasks:

- a. Set targets.
- b. Notify Photogrammetric firm of completion of target placement so flights can be scheduled.
- c. Research and reconnaissance of existing horizontal and vertical controls in the area.

- d. Run bench loop to establish elevations.
  - e. Establish primary and photo control [UTM Zone 17N Coordinates based on NAD83 (CORS/NSRS based on 2002 Epoch adjustment)/CSRS] using global positioning or existing horizontal and vertical controls.
  - f. Compute coordinates for photo targets.
  - g. Prepare and compile field notes and job/project reports.
  - h. Transmit Control coordinates and project results to Photogrammetric firm for processing aerial mapping
- 3) **Assumptions:**
- a. Two corridor routes have previously been identified with a description of limits
  - b. Corridor length approximately 4.8-14.8 km (3-9 miles) per route
  - c. Corridor width approximately 500 feet
  - d. Coordinates based on UTM Zone 17N coordinates based on NAD83(CORS/NSRS based on 2002 Epoch adjustment)/CSRS] and tied to the Michigan Spatial Reference System(MSRS) CORS stations, NGS horizontal and vertical control stations and previous project ground control target points
  - e. Proposed Photo Scale: 1:2000 or 1:2400
    - i. Option to use Very Low Altitude Helicopter [Possibly Photo Scale of (1:720) to (1:960)] Photography en lieu of some ground survey to minimize exposure to traffic. This could reduce amount of ground survey needed.
      - (1) Provides a potential vertical accuracy of 0.05-0.10 feet from Aerial Photogrammetry.
      - (2) Better safety for Survey crews.
      - (3) Still requires some ground survey by field crews in areas not visible from the air.
    - ii. Approximately 170 models per corridor at photo scale 1:2000 are anticipated to be mapped.
- 4) **Deliverables:**
- a. Photogrammetric Ground Control Survey Project Report(s) formatted per MDOT Survey Standards of Practice of April 1998 and QA/QC checklist and scope.
  - b. The final report for this project shall include **Two Complete Sets** of the following:
    - i. The first pocket of the first portfolio shall contain MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL" and the project's Professional Surveyor's Report on company letterhead. The Surveyor's Professional Report shall contain the following:
      - (1) A comprehensive synopsis, written and signed by the project's Professional Surveyor, of the work performed on this project.
      - (2) The source and the methods used to establish the state plane

coordinates for the horizontal control system and the elevations for the project.

- (3) A detailed explanation of anything discovered during the survey of this project that may create a problem or be of interest to the designer or another surveyor. The concrete shoulder point numbers should be referenced here.
- ii. A signed copy of the MDOT QA/QC Certification Check List.
  - iii. Least squares analysis of both the horizontal and vertical components of this project, along with the input or \*.dat files used.
  - iv. Sketch or printout of the Control Network.
  - v. All electronic files of Primary NGS control used. (DDPROC).
  - vi. Witness lists for the primary horizontal control points, bench mark lists including descriptions, Control Point witness list for all intermediate control used, and any photogrammetric target control points that have been witnessed. The lists shall be delivered in text files, in ASCII format per Attachment ASC.
  - vii. Photogrammetric Target X, Y, Z list with standard deviations of each X, Y, Z component, in ASCII text file format, without tabs. The file shall be formatted with one point per line and shall **not** be arranged per Attachment ASC.
  - viii. The consultant is responsible for verifying all residuals and standard deviations to ensure they meet this scope and the Standards of Practice for MDOT Design Surveys dated April 1, 1998.
  - ix. All supporting and supplemental information/data. Include any instructions from the Prime consultant.
  - x. All original field survey notes include data gathering sheets at each point, all electronic data, and all research records obtained for this project. All survey notes are to be placed near the beginning of the first portfolio and included on CD with the rest of the project files, in ASCII format. Data collection files may be in electronic format only, no hard copy is necessary for submission.
  - xi. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004 formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.
  - xii. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents

- are legible.
- xiii. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.
  - xiv. ASCII text must meet Attachment ASC specifications.
  - xv. **MDOT QA/QC check list filled out or the portfolio will be returned.**

### **P/PMS TASK 3330 – Conduct Design Survey for Recommended Alternatives Phase**

#### **1) Objectives:**

- a. Survey is intended to provide supplemental data to be merged with the photogrammetric mapping.

#### **2) Work Tasks:**

- a. Survey includes:
  - i. Terrain and Planimetric data in Obscured areas.
  - ii. Horizontal Ground control
  - iii. Benchmarks
  - iv. Hard surface elevations
  - v. Limited topographic and planimetric information
  - vi. Drainage related information
  - vii. Alignment information for Interchange tie-ins or major crossings only
  - viii. Some major Government corners and Property corners to determine ROW and Property concerns for major critical areas of the Alternative
  - ix. Under-clearances for major crossings
  - x. Some above ground utilities not located by aerial mapping as deemed critical
  - xi. Underground utility location, including SUE component.
  - xii. Bridge surveys
  - xiii. ROW, Government corners and Property surveys for a portion of the route

#### **3) Assumptions:**

- a. Option to use Very Low Level photography (VLAP) (Helicopter) over the urban areas may be necessary to eliminate the need to have ground survey crews in the dangerous locations in the urban roadways.
  - i. Provides a potential vertical accuracy of 0.05-0.10 feet from Aerial Photogrammetry.
  - ii. Better safety for Survey crews.
  - iii. Still requires some ground survey by field crews in areas not visible from the air.
- b. Assume survey includes:
  - i. Limited Hard surface elevations
  - ii. Limited topographic and planimetric information
  - iii. Drainage related information

- iv. Minimal Alignment information Interchange tie-ins or major crossings only
- v. Bridge Surveys
- vi. Under-clearances
- vii. Above and below ground utilities, including SUE component
- viii. Property Lines for the portion of the corridor

**4) Deliverables:**

- a. The final report for this project shall include Two Complete Sets of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."
  - ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
    - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
    - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
    - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
  - iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
  - iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must be clearly noted as legal or best-fit.**
  - v. Least squares analysis for horizontal and vertical control.
  - vi. Documentation of horizontal and vertical datum sources.
  - vii. Control sketch with control points, government corners and alignment plotted.
  - viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.
  - ix. Legible copies of all recorded Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
  - x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
  - xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
  - xii. It is not necessary to submit hardcopy mapping data in the survey

- portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
  - xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004 formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.
  - xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
  - xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

**P/PMS TASK 3350 – Conduct Hydraulics Survey for Recommended Alternatives Phase**

**1) Objectives:**

- a. Gather information to be used in analysis of hydraulics of an existing or proposed site for a structure(s). The survey provides data with regard to the channel and the floodplain, both upstream and downstream of the site.
- b. This task can also include data collection for:
  - i. shoreline protection
  - ii. determination of flood plain limits
  - iii. stream scour analysis
  - iv. Other types of investigation as directed by the Design Engineer - Hydraulics/Hydrology.

**2) Work Tasks:**

- a. Gather existing plans, control points, bench marks, old survey notes, right of way information and other available information.
- b. Conduct hydraulics survey
- c. Prepare field notes and project report



### 3) Assumptions:

- a. Assume a minimum of 2 Recommended Alternatives
- b. Average to small stream crossings at approximately 20 feet wide.
- c. Assume average of 3 crossings per each final Recommended Alternative.
- d. Includes one potential crossing or major River (Either the Ecorse River or Rouge River.
- e. Includes possible New Survey of Detroit River at the Recommended Alternative location.
- f. The hydraulics surveys need to conform to MDOT standards for the Recommended Alternative(s). Appendix E-2 hydraulic surveys may be in addition to or may be supplemental to E-1 hydraulic surveys depending upon the locations of the particular crossings resulting as part of the preferred routes to be analyzed. The need for a hydraulics survey of the Detroit River will be dependent upon the particular location of the preferred route selected and level of detail determined to be required at the time of analysis.

### 4) Deliverables:

- a. Prepare field notes and project report to MDOT Survey Standards for Hydraulic surveys
- b. The final report for this project shall include **Two Complete Sets** of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99) entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."
  - ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
    - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
    - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
    - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
  - iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
  - iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must be clearly noted as legal or best-fit.**
  - v. Least squares analysis for horizontal and vertical control.
  - vi. Documentation of horizontal and vertical datum sources.
  - vii. Control sketch with control points, government corners and alignment plotted.
  - viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.

- ix. Legible copies of all recorded Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
- x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
- xii. It is not necessary to submit hardcopy mapping data in the survey portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
- xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004 formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.
- xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

#### **P/PMS TASK 4510 – Conduct ROW Survey for Recommended Alternatives Phase**

##### **1) Objectives:**

- a. The intent of this item is to provide location for a minimal number of major government corners, major plat corners, and major property information to assist Real Estate in planning rough existing property line location and rough proposed ROW concerns. This task will cover more specific ROW or

property concerns dealing with areas of a critical nature related to the Recommended Alternatives.

- b. This task is used to provide appraisers and/or buyers with the area of properties to be purchased as part of a project or to stake an area to determine new right of way lines. The survey provides the right of way lines for both the main line and side streets. This information is used to make comparisons between new and existing right of ways.
- c. This task can also include:
  - i. Location of building or other structures, and
  - ii. Determination of encroachments on existing right of way.

## 2) Work Tasks:

- a. Gather existing plans, control points, old survey notes, right of way information and other available information.
- b. Stake area requested. (This is a contingency intended to address the potential concerns that may arise relative to high valued properties as related to the alternative routes under consideration. For Appendix E-1, a small amount is anticipated. For Appendix E-2, more detailed information may be required.)
- c. Prepare field notes and/or project report.

## 3) Assumptions:

- a. Assume two Recommended Alternative corridors
- b. No Legal Alignment
- c. Use of existing property information products from county and local municipalities such as:
  - i. Existing tax parcel information
  - ii. Existing county and municipal GIS information
- d. Any GIS and existing parcel information is very rough in location and should not be solely relied upon
  - i. Critical areas may require verification through ground survey and research by a Professional Surveyor
  - ii. Overlay of GIS or parcel information from other sources may require conversion to this projects' coordinate system and datum
- e. An exhaustive property survey for entire Recommended Alternative area is not included
- f. Some limited ground survey may be needed to location major government section corners or plat corners to facilitate overlaying CADD parcel or subdivision information. (For Appendix E-2, the government and property corner information would supplement previous information from Appendix E-1, but it is anticipated more detailed information may be needed in areas focused along the Preferred Alternatives.)

## 4) Deliverables:

- a. The final report for this project shall include Two Complete Sets of the following:
  - i. In the first pocket of the first portfolio, MDOT's Form 222(3/99)

entitled "SURVEY NOTES: RECEIPT AND TRANSMITTAL."

- ii. The project's Professional Surveyor's Report on company letterhead consisting of the following:
  - (1) A comprehensive report, written and signed by the project's Professional Surveyor, of the work performed on this project.
  - (2) The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.
  - (3) A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
- iii. Coordinate and witness lists for the horizontal alignment ties, government corners, traverse control points, and bench marks.
- iv. A sketch of the alignment(s) with reference points and angle of crossing (if appropriate), stationing, horizontal coordinates, curve data, and a station equation to existing stationing if different. **The alignment must be clearly noted as legal or best-fit.**
- v. Least squares analysis for horizontal and vertical control.
- vi. Documentation of horizontal and vertical datum sources.
- vii. Control sketch with control points, government corners and alignment plotted.
- viii. All field survey notes, all electronic survey data files, all calculation sketches, and all research records obtained for this project. All electronic survey data files shall be submitted on Compact Discs only, specifically labeled. No paper copy of raw survey data is required.
- ix. Legible copies of all recorded Land Corner Recordation Certificates (with Liber and Page number) filed or used for the performance of this survey, and for any PLSS corners, including Property Controlling Corners, which may be disturbed by construction.
- x. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xi. The consultant must organize and label the various sections of the portfolios as required by the MDOT Design Surveys *Standards of Practice* dated April 1, 1998.
- xii. It is not necessary to submit hardcopy mapping data in the survey portfolio for a consultant survey/consultant design in the same authorization. Final planimetric map must be submitted in .PDF format.
- xiii. It is desirable to include as much electronic data as possible on Compact Disc, including scanned items, to facilitate future electronic storage and transmission of survey data.
- xiv. Electronic files must be recorded on non-rewritable Compact disks (CD's). All data, whether electronic or paper, including Micro Station Version 8, AutoCAD LDD Rel. 2002, and AutoCAD LDD Rel. 2004

formatted files, must be scanned or converted to Acrobat PDF format and recorded on CD. CD's must be organized in the same manner as the portfolio, such as by Administrative section, Control section, etc. CD's must be labeled with the consultant name, route, location, control section, job number, data type, file names and date. A Table of Contents is required in the PDF file and will have all parts/pages of the portfolio book-marked/linked so that any part/page of the portfolio can be accessed immediately. Microsoft Word files can be saved directly into PDF format. CADD drawing plots and research data, etc. will need to be scanned into PDF format.

- xv. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format and all documents are legible.
- xvi. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.

## APPENDIX F

### Monthly Progress Report Example Detroit River International Crossing (DRIC) STUDY

#### MONTHLY PROGRESS REPORTS

The first two pages of this attachment are the necessary layout of the Monthly progress reports and the last three pages are a completed example.

**Control Section 00000**  
**Job Number 00000C**  
**Structure Number S00**  
**Date 00/00/00**

#### MONTHLY PROGRESS REPORT

- A. Work accomplished during the previous month.
- B. Anticipated work items for the upcoming month.
- C. Real or anticipated problems on the project.
- D. Update of previously approved detailed project schedule (attached), including explanations for any delays or changes.
- E. Items needed from MDOT.
- F. Copy of Verbal Contact Records for the period (attached).

Structure Number - Control Section - Job Number  
Route, Location Description  
Design Schedule as of 00/00/95

**LIST TASKS, SUBMITTALS, APPROVALS AND MEETINGS AS OUTLINED IN SCOPE OF DESIGN SERVICES AS NEEDED. THIS LIST IS JUST AN EXAMPLE.**

Control Section 12345  
Job Number 11111C  
Structure Number S02  
Date 07/31/95

**MONTHLY PROGRESS REPORT**

- A. Work accomplished during the previous month.
  - 1. During the last month we completed the Final Right of Way plans and submitted them to Thomas Nelson, Jr. on 05/01/99.
  
- B. Anticipated work items for the upcoming month.
  - 1. Submit the Preliminary Plans and related material on 03/11/99.
  - 2. Attend the meeting regarding the Ameritech lines on the bridge, scheduled for 03/12/99.
  
- C. Real or anticipated problems on the project.
  - 1. We foresee no problems at this time.
  
- D. Update of previously approved detailed project schedule (attached), including explanations for any delays or changes.
  - 1. The design is falling behind schedule because we had problems resolving the geometries of the ramps in relation to the bridge. The Preliminary Plan submittal will be the only task affected by this delay because we will make up the lost time prior to submitting the Final Plans and Specifications.
  
- E. Items needed from MDOT.
  - 1. Prior to final Plan submittal we will need the latest Special provision and Supplemental Specification checklist.
  
- F. Copy of Verbal Contact Records for the period (attached).
  - 1. Discussed bridge and ramp geometries with Tom Myers of M•DOT Traffic and Safety Division on 07-24-95.

**SN: S02 - CS: 12345 - JN: 11111C**  
**M-111, from There Village Limits to north of That Road**  
 Design Schedule as of 07/31/95

Original Authorized Start Date	Original Authorized Finish Date	(Anticipated) or Actual Start Dates	(Anticipated) or Actual Finish Dates	Task	Task Description
01/12/95	01/12/95	01/12/95	01/12/95??		Initial project meeting.
01/29/95	01/29/95	01/30/95	01/30/953330		Conduct Design Survey.
02/17/95	04/10/95	02/17/95	04/20/953360		Prepare Base Plans.
02/29/95	02/29/95	02/29/95	02/29/953390		Develop the Construction Zone Traffic Control Concepts
03/12/95	03/13/95	03/12/95	(03/30/95)	3540	Develop Construction Zone Traffic Control Plan
03/20/95	03/19/95	03/25/95	(03/30/95)	3551	Develop/Review Preliminary Traffic Signal Plan
07/01/95	07/01/95	(07/01/95)	(07/01/95)	3590	The Plan Review Meeting
07/11/95	08/11/95	(07/11/95)	(08/11/95)	3821	Complete/Review Traffic Signal Plan
09/15/95	09/15/95	(09/15/95)	(09/15/95)	3830	Complete Construction Zone Traffic Control Plan.
09/16/95	09/16/95	(09/16/95)	(09/16/95)	3840	Develop Final Plans and Specifications
09/25/95	09/23/95	(09/25/95)	(09/25/95)	3870	Omissions/Errors Check (OEC) Meeting



**VERBAL CONTACT RECORD**

**Control Section 12345  
Job Number 11111C  
Structure Number S02  
Date 07/31/95**

Joe Engineer talked to Tom Myers and decided to use a 0.05'/ft super on ramp A leading into the bridge.

## APPENDIX G

# Work Specifications for Archaeological Cultural Resources Investigations Detroit River International Crossing (DRIC) STUDY

December 8, 2004

### MICHIGAN DEPARTMENT OF TRANSPORTATION

### WORK SPECIFICATIONS FOR

### ARCHAEOLOGICAL CULTURAL RESOURCES INVESTIGATIONS

1. PROFESSIONAL STANDARDS:

The archaeological work is expected to be carried out in accordance with the Code of Ethics and Standards of Research Performance as established by the Register of Professional Archaeologists (RPA). All project work will be evaluated in light of these standards. While RPA accreditation is not mandatory, all principal investigators are encouraged to join RPA.

2. PHASE I ARCHAEOLOGICAL SITE LOCATION SURVEY:

The objective of this research is to locate all archaeological sites within the study area. Professional standards and techniques are expected to be sufficiently rigorous to demonstrate the presence or absence of sites within the study area.

3. PHASE II ARCHAEOLOGICAL SITE EVALUATION:

The objective of this research is to gather additional archaeological site data in order to determine the potential eligibility of the site(s) for the National Register of Historic Places. The basis for such determination is established in The Criteria for National Register Evaluation (Department of Interior, National Park Service 36CFR60.4, National Register of Historic Places, Criteria for Evaluation).

4. PHASE III ARCHAEOLOGICAL SITE MITIGATION:

The objective of this research is the scientific recovery of the archaeological site

data from the area of planned construction. The Advisory Council on Historic Preservation has established a procedure whereby the salvage of sites determined significant for the data they contain effectively mitigates the potential adverse effect of a proposed construction project. The highest standards of professional conduct and fitness are expected for this level of research.

5. **REPORTING STANDARDS FOR PHASE I PROJECTS:**

The following outline from Niquette (1981), represents a synthesis of the existing guidelines or standards utilized by public agencies. The outline also includes some of the recommendations made by the Society for American Archaeology's House Report (McGimsey and Davis 1977) for the preparation and evaluation of archaeological contract reports and draft report outlines proposed by the Advisory Council on Historic Preservation. The Department of Interior's standards and guidelines for archaeology and historic preservation (NPS 1983) can also provide guidance. Although the following outline may appear rigid, these expectations are not intended to dictate format or to stifle creativity. The outline remains flexible in that organization may change from one report to the next. The outline provides a checklist of basic information that MDOT and MDHAL fully expect to find in reports of this type. If certain information listed in the outline is not present, the reason(s) for the omission should be clearly stated.

**A. STANDARD REPORT - LONG FORM - ARCHAEOLOGICAL RESOURCES ARE LOCATED**

**I. Title Page**

- A. Report title (Indicate if the report is a draft)
- B. Type of investigation (e.g., Phase I Survey)
- C. Location of investigation (e.g., county and state)
- D. Contracting sponsor
- E. Principal investigator and research organization
- F. Author(s)
- G. Date of report
- H. State Historic Preservation Office Environmental Review Number and MDOT Job Number (both can be found on the Work Authorization form)

**II. Abstract (should not exceed one page)**

- A. Identify specific type of project (e.g., road widening) and purpose of investigation (e.g., Phase I Survey).
- B. Provide concise summary of report's content including location, research orientation (which includes methodology), conclusions, number and nature of resources located, and any new information that may have resulted from this work.
- C. Provide reference to significance and National Register eligibility of site(s).

**III. Table of Contents**

- A. Appropriately arranged and paginated
- B. Should include list of tables, maps, and figures

**IV. Introduction**

- A. Sponsor and contract number and/or permit number, expiration date, and other appropriate agency specific information such as the disclaimer statement.
- B. Geographical limits of project area
- C. Description of proposed project, nature and extent of ground disturbance anticipated
- D. Purpose of study
- E. Discussion of Management Objectives (e.g., Scope of Work, agency's program authority, and applicable implementing regulations)
- F. Constraints on the investigation (non-budgetary)
- G. Dates of investigation
- H. Personnel and work organization
- I. Disposition of field notes and artifacts
- J. Project location map
- K. Number of acres surveyed

**V. Environment**

These data should not be provided pro forma and without an attempt to relate them to the archaeological potential of the area. They must present a framework in which to determine how the natural resources may have been used through time or how soil and geomorphological characteristics have affected the ability to identify sites. These data must be integrated into the study through the research design.

- A. Description of physiographic province (e.g., topography, drainage)
- B. Microenvironment of the project area
  - 1. Flora
  - 2. Fauna
  - 3. Geology
  - 4. Soils (type should correspond to U.S.D.A. Soil Conservation Service Soils Survey Data)
- C. Relevant climatic history
- D. Historic land use patterns
- E. Current condition of land within project area (e.g., land in crops--specify type of crops, pasture, timber, swamps)
- F. Prehistoric and historic resource utilization potential (e.g., availability of raw lithic resources)

**VI. Research Design**

- A. Research objectives
- B. Theoretical orientation
- C. Justification of problem selection
- D. Definition of "site" and "isolated find" used for purposes of the survey
- E. An explicit discussion of the survey and/or testing strategy, expected results, and relationship to research objectives
- F. Hypotheses to be tested, test implications, and analytical techniques required to test hypotheses

### VII. Existing Data and Literature Review

- A. Dates, purpose, intensity, and results of previous research
- B. Historic documents and records (e.g., deeds to historic sites, records, and files of federal, state and local governments, research institution files, maps and published material)
- C. Informants and their addresses (when used)--both amateur and professional as well as procedures used to locate these persons
- D. Location and nature of field notes, unpublished manuscripts, and collected materials from previous investigations
- E. Relevant ethnographic and/or ethnohistoric data of the project area
- F. Relevant data obtained from satellite or other remote sensing imagery
- G. Information on historic properties in the area already included in the National Register of Historic Places or in state or local inventories
- H. The project area should be placed in its regional setting in regard to the known culture history. This is to include a description of the major outlines of prehistoric and historic cultures of the project area and should include chronology, settlement subsistence patterns, and other significant data available.

### VIII. Field Methods

- A. Predictive models used, where applicable.
- B. Sampling systems used, where applicable.
- C. Surface survey techniques--both site specific and general (e.g., level of survey and where accomplished, deployment of survey crew, site recording techniques, site marker placement.
- D. Subsurface testing techniques--both site specific and general (e.g., testing methods, excavation levels, locations and size of test pits, trenching, and/or auger tests.
- E. Specify transect intervals and number of transects done.
- F. Describe what was done to determine the approximate extent of any sites found during the survey.
- G. Description of any non-disruptive techniques used for survey or testing (e.g., proton magnetometer, aerial photography, soil).
- H. Description of interdisciplinary methods (e.g., geomorphology, palynology) when

- used.
- I. Description of data collection techniques (e.g., surface collection techniques, artifact provenience recording techniques, GPS location using Latitude-Longitude and UTM coordinates, size of screens recovery of soil samples) and measuring devices and circumstances when used or not used. GPS equipment used must be identified and have a  $\leq 1$  meter accuracy tolerance.
  - J. Constraints on investigation (e.g., limitations of access, poor ground visibility or other environmental limitations such as adverse weather conditions, etc.).
  - K. Controls for personal bias.
  - L. Justification of any in-field modifications of research strategy.
  - M. Provide maps showing locations of shovel tests and/or test pits. Indicate whether the results of the tests were possible or negative. Indicate areas surveyed at different levels of intensity or those suggesting variable deployment of crew members. Any areas not surveyed or not tested should be clearly delineated. Provide justification for not surveying a given area as well as not testing below the surface.

## IX. Site Descriptions, Analysis and Evaluations

Provide the following information for each site found.

- A. Site Description
  1. Physical characteristics of the site
    - a. Location (legal description and UTM)
    - b. Site extent must be clearly delineated on a site map. For Phase I testing a sketch map of every site found must show the relationship of the site to surrounding features, whether natural or man-made, and the locations of positive and negative shovel tests using acceptable GPS equipment.
    - c. Site distribution within project area must be plotted on a U.S.G.S. 7.5 minute topographic map, if available.
    - d. Site size (both vertical and horizontal)
    - e. Appropriate photographs of the adjacent environment
    - f. Topographic setting
    - g. Vegetation
    - h. Proximity to water
    - i. Elevation
    - j. Soil descriptions with appropriate graphics (Munsell soil color chart designation)
  2. Cultural/Temporal characteristics of the site
    - a. Material cultural

- b. Site type with supporting evidence
  - c. Site function with supporting evidence
  - d. Intrasite structure
  - e. Artifact provenience data
  - f. Distribution of artifacts by type (horizontal and vertical)
  - g. Cultural/temporal placement within regional chronology
  - h. Appropriate photographs of features
3. Nature and extent of previous disturbance
  4. Relationship between site location and probable project impacts
  5. Site specific research activities conducted and results (e.g., for testing there must be a full description of the site, number, and location of shovel tests and/or test pits relative to the site datum. All shovel tests and/or test pits should be graphically displayed and accompanied with appropriate description/interpretation)

#### B. Laboratory Results

1. Classificatory (topological) scheme(s) used in artifact description and analysis--give rationale for decisions
2. Method of chronological determination (topological, radiometric, etc.)
3. Other special analytical methods and techniques (e.g., functional analysis of lithic tools through edge-angle studies, predictive model(s))
4. Description of all natural material observed (e.g., soils descriptions and profiles graphically displayed)
5. Description of other potential paleoecological data
6. Description of assemblage(s) with illustrations, distribution tables, weights, and other measures
7. Scaled photographs and/or line drawings of all diagnostic or a representative sample of each type and class of artifacts
8. Justification for any changes in research strategy

#### C. Site Evaluations

1. The National Register criteria for significance must be explicitly addressed. Provide a concise discussion of known and potential contributions of site or district to current, regional, archaeological research. The rationale for significance as well as nonsignificance evaluations should be clearly stated.

### X. Summary and Conclusion

- A. Provide an evaluation of the research performed covering the following topics when appropriate.
  - 1. Reliability of data (e.g., potential for unknown or unidentified resources within project area)
  - 2. Relationship between results of analysis and stated goals
  - 3. Identification of changes in research goals
  - 4. Synthesis and comparison of results of analysis
  - 5. Integration of ancillary data
  - 6. Identification and discussion of perceived patterns and relevant cultural processes
  - 7. Contribution of this project to the state research plan and/or theoretical and substantive concerns
- B. Summarize the results of the study. For large projects include a table showing the site number, the recommended National Register status of the sites, and a brief description of a sites' temporal component (prehistoric/historic, etc.)
- C. Assess the project impact(s) on a site by site and/or district basis
  - 1. Provide professional opinion concerning the kind and degree of project impacts (both direct and indirect)
  - 2. Assessment of the potential loss of information should the site(s) be destroyed
  - 3. Recommendations for avoidance or alternative mitigation measures for affected properties

**XI. Reference--Use American Antiquity's Style Guide 44:193-205**

**XII. Appendices--as appropriate**

- A. Supporting Data (e.g., computer readouts, copies of site forms)
- B. A copy of the Work Authorization (should be included in all reports)
- C. Ancillary Studies (e.g., palynological report)

**B. ARCHAEOLOGICAL REPORT - SHORT FORM - ARCHAEOLOGICAL RESOURCES ARE NOT LOCATED**

**I. MDOT Archaeological Report Short Form (AR-SF), Form #1707 (05/01):**

The AR-SF, and required attachments, is to be used as the archaeological report format in those instances where no archaeological sites are located as a result of Phase I Archaeological Site Location (Reconnaissance) Survey. This form shall not



be used if any archaeological resources are located, including isolated finds and/or structures, and/or if directed by MDOT. The MDOT form #1707 and instructions in its use are attached to these specifications (Attachment A) and made a part hereof.

6. REPORTING STANDARDS FOR PHASE II PROJECTS:

There is no established format for Phase II archaeological reports. The consultant is referred to The Airlie House Report (McGimsey and Davis 1977) and Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (NPS 1983) for guidance. The preceding Phase I survey report outline may also contain portions relevant to a Phase II report. The report must address the National Register criteria for eligibility. Both the nature of the site's significance and its integrity must be established. How to Apply the National Register Criteria for Evaluation (NPS 1982) is an excellent resource for addressing significance.

7. REPORTING STANDARDS FOR PHASE III PROJECTS:

There is no established format for Phase III archaeological reports as the requirements for each project are usually unique. The consultant should consult The Airlie House Report (McGimsey and Davis 1977) and Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (NPS 1983) for guidance. There are, however, certain requirements for the final report.

- The cover format will be supplied by MDOT and MDOS.
- Copy will be typed single spaced, double spaced between paragraphs, and printed on both sides of the paper.
- Exhibits will be no larger than the standard report page (no foldouts).

Additional copies of the final report are required for Phase III projects. The exact number is prescribed in the RFP. In addition, one print ready copy is required.

8. PROJECT PERFORMANCE:

While the highest standards of archaeological research are expected, this must not be at the expense of other responsibilities. Contractual responsibilities and the obligations to clients and the public in conducting Public Archaeology are equally important. FAILURE TO PERFORM ADEQUATELY ON ANY PORTION OF A PROJECT WILL BE CONSIDERED IN EVALUATING FUTURE PROPOSALS, AS WILL A SUPERIOR PERFORMANCE. More serious violations of professional standards or contractual obligations may result in removal from the approved bidder list, professional charges, or civil action.



References Cited

McGimsey, Charles R. III and Hester A. Davis

1977 The Airlie House Report. Special Publication of the Society for American Archaeology.

National Park Service

1982 How to Apply the National Register Criteria for Evaluation.  
(Draft) National Park Service, Department of the Interior.  
Washington, D.C.

National Park Service

1983 Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. National Park Service, Department of the Interior. Federal Register 48(190): 44716-44742, Washington, D.C.

Niquette, Charles M.

1981 Guidelines for the Preparation of Archaeological Contract Reports. Division of Parks and Historic Preservation, Department of Natural Resources, State of Missouri.

## APPENDIX H

# The Michigan Department of Transportation Work Specifications for Survey of Above-Ground Cultural Resources Detroit River International Crossing (DRIC) STUDY

December 8, 2004

MICHIGAN DEPARTMENT OF TRANSPORTATION

MICHIGAN DEPARTMENT OF STATE

WORK SPECIFICATIONS FOR

SURVEY OF ABOVE-GROUND CULTURAL RESOURCES

The Michigan Department of Transportation (MDOT) and the Michigan Department of History, Arts & Libraries (DHAL) survey of above-ground cultural resources is intended to both discover potentially historic buildings, structures, sites, objects, and districts within a project study area, and assess the potential eligibility of those individual properties and districts for the National Register of Historic Places. It combines elements of both the reconnaissance level survey and intensive level survey as defined by the U.S. Department of the Interior, National Park Service.

The project work shall be conducted by a person meeting the professional qualifications set forth in 36 CFR 61 - Appendix A for Historian or Architectural Historian.

The project consists of the following six steps:

Step I. Collect National Register Quality Historic Information.

- A. Research the historic materials available from the Bureau of History and from other sources such as educational institutions, museums, historical societies, libraries, archives, and knowledgeable local residents. Conduct a literature search of such materials as books, personal records, deed and title books, censuses, historical narratives, journals, vital records, personal records, newspapers, tax records, ethnographies, folk life documentation, biographies, oral histories, etc. Review available graphics such as historical maps, atlases, "birds-eye" views, and photographs. Copies of maps and atlases should be included in the report.
- B. The archival research shall be used to document the chronological development of the survey area and the historic contexts within that area. Historic contexts describe the historic development of the area and identify the significant broad patterns associated with history, architectural history, historic engineering, or culture that may be represented by individual properties and districts within the project area.

## Step II. Field Work.

- A. Review the "Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation;" focus attention on the sections entitled, "Guidelines for Identification - Performing identification" and "Guidelines for Evaluation - The Evaluation Process." Next, review National Register Bulletin No. 24: "Guidelines for Local Survey: A Basis for Preservation Planning." Finally, review Section 2 on "Historic Context as the Basis for Evaluating Significance" in National Register Bulletin 16, "Guidelines for Completing National Register of Historic Places Forms."
- B. Acquire one or more maps which clearly and accurately show all the roads and highways within the project area and which facilitate the accurate recording of the locations of all individual properties and all properties within historic districts identified and photographed during the survey field work. The maps should be accurately scaled representations of the survey area.
- C. If survey materials exist from earlier field work efforts, they need not be prepared again if the physical appearance of the properties has not changed. The reuse of earlier field work materials, however, shall not eliminate the need to conduct the historical research described in Step I. Be certain to note in the report the existence and present location of any earlier survey materials whether they are reused or not.
- D. Photograph individual properties within the project area.
1. Define individual properties as being all buildings, structures, sites, and objects that stand outside of any districts but within the project study area.
  2. Complete photographs for all individual properties that date from World War II or before, and those after World War II if those resources appear to contribute to the significance of the area.
  3. Photos should include a three-quarter view of the structure showing two sides at once. The photos should show the landscaping around the building. Depending upon the circumstances, it may be necessary to acquire a streetscape photo illustrating the type of landscaping present around the structure or structures.
- E. Photograph all districts within the project area. One of the purposes of the survey is to assess whether or not the project area or areas within the project area form all or parts of one or more potential historic districts. This may require the researcher to briefly look outside the boundaries of the project to determine if the project area or part of it is located within a larger potential historic district.
1. Define properties within a district as being all buildings, structures, sites, and objects in that district.
  2. Delineate boundaries of any district that includes properties in the study area following the instruction provided in Russell Wright's A Guide to Delineating Edges of Historic Districts (Washington, D.C.: National Trust for Historic Preservation, Preservation Press, 1976).
  3. When boundaries have been delineated, complete photo documentation for all properties that lay within the part of a potential historic district that is within the project area boundaries regardless of the age of the properties. The consultant is not required to provide photos of each individual property outside of the project area within the possible

historic district. However, enough photos need to be provided of the potential historic district to give the MDOT and the MDOS evidence of the historic district's existence. Provide streetscape photos keyed to a district sketch map that are geographically representative of all parts of the district and that are representative of the building types and styles indicative of the district.

- F. Take a few streetscape views of neighborhoods adjacent to the project limits illustrating the nature of surrounding neighborhoods even if no potential historic district has been identified. For example, take photos down each cross-street (or from a sample of them if there are more than a dozen cross-streets) from the project area.
- G. In the event that the project area includes a park and/or cemetery take photos showing general views from the street. Take individual photos of significant man-made features such as gates, walls, ornamental fencing, buildings such as chapels, public mausolea, sexton's lodges or offices, important family mausolea and monuments.

Step III. Conduct post-field work research and National Register eligibility evaluations.

- A. Undertake any additional research necessary to document which of the National Register selection criteria and criteria considerations which of the historic context(s) each specified individual property and district addresses. (See National Register Bulletin 16: Guidelines for Completing National Register of Historic Places Forms.) Efforts should be made to acquire information on the date of construction, the architect and/or builder of the property, its original owners or other historically significant owners and appropriate contexts in order to support recommendations for National Register eligibility.
- B. For a proposed individual property located outside a district, there should now be information available on its locally defined context, its historical and/or architectural significance, its physical description, and its level of physical integrity.

For a proposed district, there should now be information available on its locally defined contexts, the historical and/or architectural significance of the key buildings, structures, sites, objects, features, and open spaces reflecting its themes, its physical description, and its level of physical integrity.

- C. Conduct rigorous evaluations of individual properties and districts for their National Register eligibility. Eliminate those individual properties and district properties that are unimportant examples of property types, have only weak associations with the people, events, and patterns, or display a poor level of physical integrity.

Select those individual properties and district properties which appear to be eligible for the National Register. For each individual property and district property selected as eligible, justify in writing how it meets the National Register criteria. In the case of an individual property, this completes the evaluation process. In the case of a district, an additional decision will have to be made as to whether or not enough properties representing an important theme or themes exist to justify the district. Are there key properties or a concentration of typical properties that clearly reflect the people, events, and patterns, etc. developed in each theme's narrative? Are there additional properties that, while not key or typical within the narrative, are supportive of the theme? Do all the properties together give the district a high enough level of physical integrity? If several themes were found, do they make sense coexisting in the same district?

- D. For each specified individual property and each district, prepare a summary paragraph of physical description and a summary paragraph for significance that will summarize the results of all the field work and research.

In the summary paragraph for description, describe the property or district, note its major physical attributes, assess its physical integrity, and describe its environment.

In the summary paragraph for significance, cite the applicable National Register selection criteria and explain why the resource is significant in terms of the applicable National Register areas of significance. In doing so, demonstrate why an individual property or district is a good representative of one or more of the historic contexts defined earlier as being important in the historic development of the area.

For a district, provide information beyond the physical description summary paragraph if necessary to support conclusions. Following the summary paragraph for significance, however, be certain to provide historical and architectural overview statements for pivotal properties that reflect the National Register selection criteria, the areas of significance, and the historic contexts represented by the district.

Step IV. Organize the collected field data and research in the following fashion:

A. Building-Structure Inventory Cards.

For each site documented during the survey, prepare a Bureau of History Building-Structure Inventory Card that shall include at a minimum: street and number; municipal unit; county; present usage; complete photographic information providing negative number, date, and view; survey name and date; surveyor's name; recorder's name and date; USGS map title, area map title; one clear black and white glossy site photograph; on the reverse side, a brief physical description of the documented site noting any and all distinguishing features; and any historic research collected for the property. Fill in the date of construction, the architect/builder and the context(s) information on the back of the card if the information is available.

B. Historic District Inventory Cards.

For each district documented during the survey, prepare a Bureau of History Historic District Inventory Card that shall include at a minimum: name of the district; municipal unit; county; USGS map title; area map title; present usage; complete photographic information including negative numbers for all photographs taken within the district and the negative number for the streetscape photograph actually attached to the card, date of the inventory photographs, streetscape location for that photograph attached to the card, and date of the attached streetscape photograph; survey name and date; surveyor's name; survey report title; one (1) clear black and white glossy streetscape photograph; on the reverse side, a brief physical description of the district and an approximate boundary description or small sketch map indicating the district's boundaries; and any historic research collected for the district.

C. Maps.

Maps must clearly and accurately show all roads and highways and other significant natural and cultural features within the project area. Maps should facilitate the accurate recording of all property locations and district boundaries. Include copies of historic maps in the report if possible.

Label each photographed property on the appropriate map with its street address as well as the photo roll and frame number of the negative; any photographed district streetscape shall be labeled on the appropriate map with an arrow illustrating the direction the photographer was facing when the photograph was taken, and the negative number of the streetscape photograph.

Boundary lines for any district shall be provided on the appropriate map. If a district falls both within and outside the project study area, delineate boundaries within and outside the project area. All maps shall include a scale bar (that will retain meaning even if the map is enlarged or reduced), a north arrow, a date of production, and a title incorporating the survey's name, project area, municipal unit if different from the project area, county, and state.

D. Photographs.

Provide black and white glossy 35 mm photographs printed to be between 2" x 3" and 3" x 5" in size. At a minimum, one (1) photograph shall be attached to a Bureau of History Building-Structure Inventory Card for each recorded site and one (1) representative streetscape shall be attached to a Bureau of History Historic District Inventory Card for each recorded district. Adhere photographs to Inventory Cards using a milk-based glue, watered down to a workable consistency, if necessary. Staples and tape are not acceptable.

E. Negatives.

Provide negatives for all black and white photographs taken during the survey. At a minimum, each roll of negatives shall be cut into strips of not more than six (6) frames and placed in a clean protective envelope which shall be numbered with the appropriate roll number.

Step V. Develop a draft report. Include the following.

A. Introductory material should include:

1. Title.
2. Abstract.
3. Disclaimer from contract.
4. Name the author or authors of the report and all the people who assisted with the project.
5. Project history and methodology.
  - a. Sketch briefly the proposed construction project that required the undertaking of the Survey and identify its sponsor.
  - b. Give a brief history of the survey project itself. State when it was awarded and when the work took place.
  - c. Describe the methodology used in the survey. Tell what types of information were gathered and from where.
6. Describe previous research conducted in the project area; note the existence and location of any survey materials that may have come from earlier survey efforts.

B. The body of the report should:

1. Describe the project area and its general environmental setting including its exact location. Illustrate the project area on a map. Count all the acres within the project area



as acres surveyed and note them in the report. Note any areas within the project area that were not surveyed at all and explain why.

2. Based on all the research data collected during the project, provide an overview of the project area's historical and architectural significance. Prepare a historical narrative that sets forth the area's history from the beginning of white settlement to the World War II era and places the significant events in their proper context in relation to the broad historic themes -- such as settlement, industry, commerce, or architecture -- to which they relate in local, state or national history. There should be a basic chronological introduction to the project area's history that introduces each of the documented themes.

The narrative should primarily concern itself with the project area, but must relate the project area's history to the general history of the larger community or area around it of which it is a part. The narrative must identify the buildings, structures, objects, districts, and/or sites in the project area that relate to the significant events and historical patterns noted in the narrative.

The narrative must be followed by separate lists (1) of the historic themes for the project area discussed in the narrative and (2) the property types represented by the project area's resources. Property types normally will be based on function, such as residential, commercial, industrial, or religious, and may be further subdivided as appropriate to the best understanding of the project area's historic resources.

3. Using the summary paragraphs and any other materials written to support the conclusions drawn in the paragraphs, assess the eligibility of the specified individual properties and districts for the National Register of Historic Places using The Criteria For National Register Evaluation (Department of Interior, National Park Service 36 CFR 60.4, National Register of Historic Places, Criteria for Evaluation). Prepare a brief significance statement for each property deemed to meet the National Register criteria that explains the property's significance in terms of its property type and the historic contexts it represents. It should also explain how it meets the physical integrity requirements set for its property type.
5. Note which groups of properties fell within the districts. Add the written justification for each district and its boundaries.

C. Conclusion:

1. Assess the proposed construction project's potential impacts on surveyed resources and offer mitigation recommendations.
2. Recommend the need for additional study (i.e., more intensive study, Determinations of Eligibility, mitigation).

D. End materials should include:

1. List in geographical order all properties recorded during the survey and include for each listing, a name or title for the property, location, and negative number; group together those properties located within a district and provide a name or title for the district.
2. Provide a complete bibliography of resources used for the historic research. For books, list the author, full title, place of publication, name of publisher, and publication date. For an article, list the author, the title of the article, the name of the magazine, journal, or

newspaper from which it was taken, the publication date, and, if available, the volume and page numbers. For unpublished manuscripts, list the author, full title, date, and where copies are available. Names and addresses of persons interviewed should be included in the bibliography. (Use A Manual of Style, 1979 16:371-384, bibliographic form).

3. Submit two (2) copies of the draft report to MDOT. Attach to the draft report copies of all the survey materials produced: Research materials and notes, Building-Structure Inventory Cards, Historic District Inventory Cards, maps, and photographs. Attach copies of the inventory cards as appendices to the report.

Submit a copy of the report only to MDOT.

Step VI. Complete final report upon receipt of comments from MDOT/MDOS. Submit two copies of the Final Report to MDOT along with one (1) CD-Rom containing the Final Report and supplementary materials.

- A. Negatives shall be submitted with the final report to MDOT.
- B. Submit the original inventory cards with the draft report to MDOT

## APPENDIX I

### The Michigan Department of Transportation Environmental Section's Guidelines for Addressing Environmental Justice in NEPA Documents August 2004 Detroit River International Crossing (DRIC) STUDY

#### I. INTRODUCTION

##### A. Purpose

In February of 1994, President Clinton signed Executive Order 12898. Its major goal is to ensure that no minority or low-income population suffers "disproportionately high and adverse human health or environmental effects" due to any "programs, policies, and activities" undertaken by a federal agency or any agency receiving federal funds. As the Michigan Department of Transportation (MDOT) does receive federal funding, the above-mentioned order applies to its programs, policies and activities. Environmental Justice (EJ), however, is not a new requirement. In fact, since no additional legislation accompanied the President's order, its authority rests in Title VI of the Civil Rights Act of 1964, and MDOT has long considered these principles in its planning processes.

This guidance document is intended for MDOT, Michigan local governments and Metropolitan Planning Organizations (MPOs). It addresses the issue of Environmental Justice as it relates to Transportation and Transportation Planning. It includes methods for analyzing potential disproportionate effects as well as important information on successful Public Involvement. This document will serve as a guide to agencies who are incorporating EJ into their programs, policies and activities.

This document presents a series of steps that can lead to compliance with the intent of the Executive Order. It provides a framework for MDOT's Environmental Staff and their partners to raise awareness and understanding of environmental justice issues and the necessary steps that are needed to incorporate EJ into the project development process.

##### B. MDOT'S Relationship to Environmental Justice

The people within the state of Michigan depend upon some form of transportation each day. MDOT essentially provides these vital services to millions of people. There are, however,

certain intrinsic disadvantages in the creation and maintenance of the vital infrastructure that comprises the transportation system. It is both in these services and in the disadvantages that the principle of environmental justice applies to MDOT. Whether it is a change in travel time, increased or decreased access to employment, air quality, noise, or even the purchase of right of way, MDOT has an obligation to ensure that any negative consequences of its activities are not borne disproportionately by any group mentioned in the executive order.

This obligation is met in a variety of ways and on a variety of levels. MDOT's first responsibility, when planning specific projects, is to identify those populations may be affected by a given project. If a disproportionate effect is anticipated, mitigation procedures must be followed. If mitigation options do not sufficiently eliminate the disproportionate effect, reasonable alternatives should be discussed, and if necessary, implemented. Disproportionate effects are those effects which are appreciably more severe for one group or predominantly borne by a single group.

In addition to a project-by-project analysis of Environmental Justice, MDOT is responsible for ensuring that its overall program does not disproportionately distribute benefits or negative effects to any population. An analysis at the statewide level should examine the total negative and positive outcomes of transportation projects to see whether there is a disproportionate effect. This process involves establishing a baseline (a geographic representation of the location of those populations mentioned in the executive order) and then examining MDOT's program as a whole as it relates to these areas.

Environmental Justice ensures that transportation services are provided equitably to every population in Michigan. Through careful planning and proactive involvement, MDOT guarantees the highest quality transportation services to all of Michigan's citizens, regardless of race or income.

## II. LEGAL HISTORY OF ENVIRONMENTAL JUSTICE

Under *Title VI of the 1964 Civil Rights Act* and related statutes, each Federal agency (including the Federal Highway Administration) is required to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion.

The *National Environmental Policy Act of 1969 (NEPA)* stressed the importance of providing for, "all Americans a safe, healthful, productive, and esthetically pleasing surroundings." It also required taking a "systematic, interdisciplinary approach" when considering environmental and community factors in decision-making.

This approach was further emphasized in the *Federal-aid Highway Act of 1970*. 23 United States Code 109(h) established a further basis for equitable treatment of communities being affected by transportation projects. It requires consideration of the anticipated effects of proposed transportation projects upon residences, businesses, farms, accessibility of public facilities, tax base, and other community resources.

On February 11, 1994, President Clinton, recognizing that the impacts of federal programs and activities may raise questions of fairness to affected groups, signed **Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations**. The Executive Order requires that each Federal agency shall, to the greatest extent allowed by law, administer and implement its programs, policies, and activities that affect human health or the environment so as to identify and avoid "disproportionately high and adverse" effects on minority and low-income populations. The major difference between Title VI and the Executive Order is that the Order adds low-income populations as another group to be considered when designing programs or activities receiving Federal financial assistance.

The U. S. Department of Transportation published its draft *Order to Address Environmental Justice in Minority Populations and Low-Income Populations* in the Federal Register on June 29, 1995. The report was primarily a reaffirmation of the principles of 1964's Title VI. On April 15, 1997, USDOT published the final *Order To Address Environmental Justice in Minority Populations and Low-Income Populations (US DOT Order 5610.2)*. The order expounds upon the President's 1994 Executive Order, relating the principles directly to transportation.

An October 1, 1999, U.S. DOT letter further clarified that transportation agencies are to ensure that low income populations and minority populations receive a proportionate share of benefits from federally funded transportation investments.

### III. PUBLIC INVOLVEMENT AND ENVIRONMENTAL JUSTICE

One of the most critical elements for complying with EJ is the need to ensure opportunity for active participation from low-income populations and minority populations in the transportation decision-making processes. For many low-income and minority populations in Michigan there has been limited or no participation in transportation-related public involvement meetings. The key to involving these groups is the need for MDOT, local governments and the MPOs to assure them that they will have a genuine voice in determining the fate of transportation projects in their respective areas, and that their input is both welcomed and encouraged.

There are also proposed federal rules that expand target populations to include identifying and engaging the elderly and the persons with a disability. It is recommended that these groups be considered relative to this guidance.

### **A. Targeting Low-income and Minority Populations**

As with the first step in addressing EJ, it is necessary to first identify the target geographic locations and neighborhoods in which low-income populations and minority populations reside. The identified populations will need to be engaged and involved in the transportation decision-making processes. Second, it is important to develop focused advertising, and take meetings to these neighborhoods rather than expect these populations to come to the MPO, local government or state.

After identifying the appropriate neighborhoods to target, it is extremely useful to identify neighborhood leaders or individuals who live and work in these neighborhoods, and who have knowledge of its residents and their respect. Ministers, priests, school and church leaders, local human service providers and business owners who are also residents of the targeted neighborhoods can be "tapped" to help in developing advertising, identifying locations for meetings and even helping to facilitate meetings.

### **B. Advertising Needs**

Meeting advertising, project flyers, and other project materials need to be free of technical jargon, and be written in the language and educational level that is appropriate for the general populations. Creative thinking is helpful in generating interesting slogans or ads that may be of interest to the target populations.

Notifications of meetings, hearings, and public outreach events need to be looked at from the viewpoints of these populations. Notices in local newspapers may meet the letter of the law, but often do not reach the intended audience. Distributing flyers or meeting notices through the appropriate neighborhood shops, churches, at social service agencies, county departments of human services, public health clinics, the bureau of employment services, community centers or organizations may be a better approach. Announcements on ethnic radio stations or neighborhood newsletters should also be considered.

Flyers or postcards are likely to get more attention than standard notices on letterhead. These can be sent to residences and posted in public places and popular meeting places to reach target audiences. Care should be exercised to see that too much text is avoided, and that the written content uses a tone familiar within the community. It may be helpful to have local

community leaders review printed materials in advance to see if they feel the approach used will be effective. In addition, notices in languages besides English are beneficial.

Word of mouth can be an effective way of generating interest in meetings, by tapping into the networks of respected community leaders and activists.

### **C. Meeting Location Consideration**

Meetings should be held in accessible, neighborhood-based ADA accessible locations. Meetings could possibly be combined with regularly scheduled meetings of an organization in the community or neighborhood schools; or conducted at places where the target populations frequently go, such as churches, community centers, libraries, or adult education facilities.

Many low-income people are limited in their ability to attend meetings by their lack of transportation and by childcare issues. Providing rides to meetings, or locations near public transportation routes and on-site childcare can increase attendance.

### **D. Public Interest and Trust**

Sometimes the lack of interest and trust are major hurdles that must be overcome in meetings. Often the sentiment is that transportation officials don't really want to hear what the groups have to say. The implementation of the Transportation Service Centers has placed MDOT employees much closer to their customers and is serving to bridge the gap. Transportation people are often perceived as outsiders who have made pre-determined decisions. The feeling may be that MDOT and/or other transportation officials conduct meetings to describe a problem the state or local agency has identified, rather than a problem the community has identified. It is difficult to generate enthusiasm for a project that solves a problem for which the local community feels no ownership.

In some cases, past highway construction and other transportation decisions have resulted in negative effects on low income and minority neighborhoods. Often, the time frames that transportation officials talk about are long term that target populations lose interest. These issues will be considered both during the development of the meeting advertising and during the development of the meeting content and format.

### **E. Meeting Accommodations**

It is unusual to find anyone from any population who truly likes to attend meetings. The advertising and location selected should set the tone for the meeting. Attendees should enter the meeting with the feeling that it is worth their time and effort to attend. They should feel they will be a part of a discussion or decision that will directly affect them. They should feel like their ideas will be listened to and valued.

When attendees arrive it is important to provide a comfortable, inviting atmosphere. If feasible, MDOT or the MPO should use representatives at their meetings who are culturally, racially, and ethnically compatible with the target populations. Culturally specific media may also provide a positive assist.

Holding meetings at a variety of times of day and providing food or refreshments make attendance more inviting. Target populations may include senior citizens who may prefer to meet in the daytime, particularly those who have safety concerns about being out after dark. The provision of childcare may also be considered.

Some of the attendees may have some apprehension about talking in a large group setting. This potential problem can be overcome by the use of small breakout sessions, facilitated by local community people. Another way to overcome this problem is the use of the open house meeting style where participants may speak one-to-one with the experts and they may visit in anytime during the scheduled period.

Finally, most people look favorably upon brief meetings. It is better to hold several shorter meetings than to turn people off with long sessions.

#### **F. Availability of Public Documents**

Documents relative to the transportation plan or project being addressed should be placed in locations convenient and frequented by low income and minority target populations. Community centers, county court houses, recreation centers, libraries or churches are appropriate. Locations should include some that are open after 5:00 p.m. The summary documents should be written briefly in the language and to the educational level that is appropriate for the area population considering the populations that are to be reached by the environmental justice process.

### **IV. ANALYSIS PROCESSES**

#### **A. Scope of Analysis**

The first step in EJ compliance is to identify the low income and minority populations who should be involved in the decision making process and who will be impacted by the expenditure of federal transportation funds.

An Environmental Justice analysis must include an appropriate geographical area for the project. All areas that could logically be considered part of the "project impact area" should be evaluated. On a project level, analysis begins by identifying the population of people potentially



affected, and then identifying the negative effects. These data, as well as information garnered through the Public Involvement process, are then analyzed to see if any disproportionate effect will exist as a result of the proposed action. If such an effect is identified, mitigation steps are taken.

## B. Definitions

Low income and minority populations are defined by final USDOT Order 5610.2 on Environmental Justice, contained in the Federal Register on April 15, 1997.

**Low-Income** means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines.

**Minority** means a person who is: (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

**Low-Income Population** means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.

**Minority Population** means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity. It should be noted that the proposed new Federal Rules require expanding the analysis to the persons with a disability and the elderly.

<sup>1</sup> **Elderly** means a person aged 65 or older.

<sup>2</sup> **Persons with a disability** means anyone with a physical or mental impairment substantially limiting one or more major life activities; has a record of such impairment; or is regarded as having such an impairment [(A) self-care, (B) receptive and expressive

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<sup>1</sup> Definition from the U. S. Department of Labor

<sup>2</sup> Based on the U. S. Census distribution of population tables

language, (C) learning, (D) mobility, (E) self-direction, (F) capacity for independent living, (G) economic self-sufficiency, (H) cognitive functioning, and (I) emotional adjustment.

### C. Sources and Quality of Data Needed

MDOT recommends using U.S. Census data to identify low income and minority populations. The 2000 Census data is recommended as the best available source for demographic data for EJ analysis purposes. FHWA recommends the use of U.S. Census data to identify minority persons or populations, because the data has specific definitions of minority groups and can be useful to determine minority populations, especially in urban areas.

In rural areas, census data may be more difficult to utilize than in an urban area, since one family can live on a tract of land. Suggested local sources for more accurate information include township assessors, social service agencies, local health organizations, local public agencies, and community action agencies. As an additional check, during the public involvement process, the participants may be asked if all the low income and minority populations have been identified and included in the process.

However, should a data source other than the census be selected, the following factors will be used to evaluate the quality of the data:

- **Accessibility**
- **Update cycle**
- **Format**
- **Comprehensiveness**

**Accessibility:** Some sources of income and minority data are "proprietary" and may not be easily available to all.

**Update Cycle:** Some sources of data may not be uniformly updated. For example, if school district data is used, and more than one district's data is needed, one district may update their data every year, whereas another may update it every three years.

**Format:** Some data may not use "break points" that are compatible with U.S. poverty guidelines. Single data sources may not cover the entire geographic area. If county welfare data or school district data is used, and the impacted area requires using data from several different districts, each may collect it differently or use different break points in defining income levels. Lack of uniformity in quality of data could create problems.

**Comprehensiveness:** Some databases maintained by state or local government agencies identify specific segments of the population, e.g., school district students receiving free lunches, welfare recipients, and Head Start participants. These databases began with a limited or partial population. They may have left out minority

populations or low- income individuals without school age children or those who are no longer eligible for or receiving welfare or food stamps.

#### **D. Census Data**

Census data is preferred over other sources because it counts both the number of people and records the demographic information necessary for an EJ analysis. US Census data is recognized and used by all federal funding agencies. This guidance document is being developed on the heels of the 2000 decennial U.S. census. The first pieces of socio-economic data from the 2000 census were made available in March 2001. For the remaining data, the 1990 U.S. Census data remains the best source of data for EJ purposes.

In its present format, the decennial census not only counts the population, but also obtains demographic, housing, social, and economic information for the administration of federal programs and the distribution of billions of federal dollars, by asking a 1-in-6 sample of households to fill out a "long form." Since this is currently done only once every ten years, long-form information becomes out of date.

The Census Bureau is in the process of replacing the long form with the American Community Survey. This survey will provide data to communities every year instead of every ten years. Data will be collected through on-going surveys that will give community leaders and other data users' newer information for planning and evaluating public programs.

The survey will include three million households, with data collection by mail and Census Bureau staff follow up for those who do not respond. The American Community Survey will provide estimates of demographic, housing, social, and economic characteristics every year for all states, as well as for all cities, counties, metropolitan areas, and population groups of 65,000 people or more. For smaller areas, it will take two-to-five years to accumulate sufficient samples to produce data for areas as small as census tracts. For example, areas of 20,000 to 30,000 can use data averaged over three years. For rural areas and city neighborhoods or population groups of less than 15,000 people, it will take five years to accumulate a sample that is similar to that of the decennial census. These averages will be able to be updated every year, so that eventually, the Census Bureau will be able to measure changes over time for small areas and population groups.

Full implementation of the survey will begin in 2003 in every county of the United States. Once the survey is in full operation, American Community Survey data will be available every year for areas and population groups of 65,000 or more beginning in 2004.

#### **E. Identifying Target Populations**

After determining the geographic area to be impacted by the program or activity, and after acquiring census data or the best available data to use to identify low income and minority populations, identifying target low income and minority populations for EJ purposes can begin. It is recommended that any existing planning studies on the proposed project area should be reviewed first. It is possible that locations housing minority and low-income populations have already been identified. If these are not adequate, the following is one recommended approach:

- identify the number and the percentage of low income and minority populations in the entire MPO area, project impact region or statewide;
- calculate the average percentage of low income and minority populations for the entire region, project area or state;
- use that percentage as a reference point to identify locations with target EJ populations of low income and minority populations.
- Typically, low income and minority populations are spread throughout the regional area and state but are likely to be located in concentrated locations or neighborhoods. These areas should have a significantly higher percentage of low income and minority population than the regional or statewide average.  
These areas can then be identified as "target areas."

Several methods may be used to identify "target areas." For example:

- If there is no concentrated low income or minority population in a project area, it may be reasonable to use the state or regional average as the base and any area with a percentage equal to or several percentage points more than the state or regional average being considered adequate to identify a "target area."
- There are several ways to decide on what percentage or ranges of percentages higher than the regional or statewide average is reasonable to designate an area as a "target area." One way to do this is to determine the regional or statewide percentage of minority or low income populations. Use this number as the threshold population percentage for defining a low income or minority target area. Then plot or map the locations of low-income areas in increments 25% lower and greater than this average.

For example if the statewide minority population were at 12%, define ranges from 0-9%, 9-12 %, 12-15% and over 15%. The first range would be areas significantly below the regional or statewide average and would likely not be a target area. The second and third ranges would be close to but just below or above the regional or statewide average. These areas may or may not be included depending on how these pockets fell with regard to the fourth range. The final range would be areas significantly above the regional or statewide average. These areas would generally be part of the target area.

- if there is any doubt about what is a reasonable concentration of low income or minority populations to be considered a target population, it is recommended that the statewide average be used as the minimum base percentage for an area to be designated a target population area.
- if the opposite is true, and the entire project or regional area contains, for example 90 % low income people (such as sections of Appalachia), then all sub- sections would be both equally benefited and negatively impacted regardless of where a particular project might go. EJ analysis for such an area would require applying the tests for benefits and harm of such a project or plan to a statewide perspective.

The basis for Environmental Justice is disproportionate impact. Even a very small minority or low-income population in a project (or study) area does not eliminate the possibility of a disproportionately high or adverse effect of a proposed action or project on these populations. It is especially important, in cases where a project impacts a very small number or area of low income or minority population, to thoroughly document in both the planning and NEPA processes that:

- other reasonable alternatives were evaluated and were eliminated for reasons such as they impacted far greater numbers of people or did greater harm to the environment, etc.
- the project's impact is unavoidable,
- the benefits of the project far out-weigh the overall impact, and
- identify the mitigation measures being taken to reduce the harm to the low income or minority population.

If it is concluded that no minority and/or low-income population is present in a project area, documentation needs to be made that indicates how that conclusion was reached. If it is determined that one or more of these populations are present in the area, potential, disproportionate tests will have to be administered.

## **V. DISPROPORTIONATE EFFECTS TESTS**

After the target population areas have been identified, the actual EJ analysis or "tests" for disproportionately high and adverse effects and equal benefit should be conducted.

### **A. Disproportionately High and Adverse Human Health or Environmental Effects**

The following definitions are contained in the final US DOT Order on Environmental Justice, contained in the Federal Register on April 15, 1997.

**Adverse effects** means the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities.

**Disproportionately high and adverse effect on minority and low-income populations** means an adverse effect that: (1) is predominately borne by a minority population and/or a low-income population, or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

## **VI. INCORPORATING EJ INTO TRANSPORTATION PLANNING AND ENVIRONMENTAL PROCESSES**

The EJ process is an analysis and process that should be incorporated into all NEPA related documents.

### **A. Environmental Justice Assessment**

The following steps and guidelines are provided to assist the project manager with a method to conduct an environmental justice assessment for transportation related projects.

**Step One:** Determine if a minority or low-income population is present within the project area. If the conclusion is that no minority and/or low-income population is present within the project area, document how the conclusion was reached and indicate this in the project NEPA document (Categorical Exclusion, Environmental Assessment, or Environmental Impact Statement). If the conclusion is that there are minorities and/or low-income populations present, proceed to Step Two.

**Step Two:** Determine whether project impacts associated with the identified low-income and minority populations are disproportionately high and adverse. The questions are to be dealt with in this order:

**Question 1:** Is the anticipated adverse impact high? Any impact that exceeds a state or federal standard should be considered high. If an impact is determined to be "significant" per NEPA, it would also be considered high. In some areas there may be quantitative standards to draw upon, e.g., noise, air quality, water quality contamination, etc. In other impact areas, the decision will be based on qualitative standards. A public involvement effort will often be necessary to address qualitative impacts thoroughly.

**Question 2:** Is the high and adverse impact anticipated to fall disproportionately on a low-income or minority population?

Both questions need to be answered to determine whether there maybe disproportionate impacts. The first question is whether the overall adverse impact is predominantly borne by the minority or low-income group? If the answer is "NO", then the impact may not be disproportionate in nature. The second question is whether the adverse effect is "appreciably more severe" than that experienced by non-minority or non-low-income persons". (See potential impacts and questions.) If it is determined that there is disproportionately high and adverse impacts to minority and low-income populations, proceed to Step Three.

*When an adverse effect will be experienced by a low income or minority population, the second question is will the effect experienced by either of these groups be "appreciably more severe" than that experienced by non-minority or non-low-income persons? If the project is similar in its design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas, the project may not reach the disproportionately high and adverse standard. That is, if the proposed facility is similar to that used in many other locations throughout the state or region, and there are non-minority or non-low-income populations who have been affected in a similar manner in these locations, then the adverse impact resulting from the proposed action may not reach the high adverse and disproportionate standard.*

**Step Three:** Propose measures that will avoid, minimize, and or mitigate disproportionately high and adverse impacts, and provide offsetting benefits and opportunities to enhance communities, neighborhoods, and individuals affected by the proposed project.



**Step Four:** If after mitigation, enhancements, and offsetting benefits to the affected populations, there remains a high and disproportionate adverse impact to minority or low-income populations, then the following questions must be considered:

**Question 1:** Are there further mitigation measures that could be employed to avoid or reduce the adverse effect to the minority or low-income population? If further mitigation measures exist, then those measures must be employed unless they are "not practicable".

**Question 2:** Are there other additional alternatives to the proposed action that would avoid or reduce the impacts to the low income or minority population? If such an alternative exists, and it is "practicable", then that alternative must be selected. If further mitigation or alternatives that avoid the impact are judged to be not practicable, that conclusion must be documented, supported by evidence, and included in the NEPA document.

**Question 3:** Considering the overall public interest, is there a substantial need for the project?

**Question 4:** Will the alternatives that would still satisfy the need for the project and have less impact on protected populations (a) have other social, economic, or environment impacts that are more severe than those of the proposed action, or (b) have increased costs of extraordinary magnitude.

**Step Five:** Include all findings, determinations, or demonstrations in the environmental document prepared for the project.

Possible sources of information or other assistance to help determine if a low income or minority population is present in the project area.	
1	Examine census information at the lowest level of aggregation available for the project area.
2	Contact Tribal Governments in the project area.
3	Identify organized groups who may reside in the project area. This may involve contacting places of worship, or initiating contact with various state councils.
4	Contact relevant city or county officials. This may include a city administrator, city or county planner.
5	Contact various state agencies.
6	Contact appropriate federal agencies. This may include Housing and Urban Development, Bureau of Indian Affairs, and others.
7	Contact the appropriate Metropolitan Planning Organization (MPO) or Regional Development Commission.
8	Talk directly to people who live in and near the project area.
9	Undertake direct observation - walk or drive through the project area (scoping process).

The following variables help to scale the impacts in the table.

1. Current measure or value in region or state
2. Altered measure or value in region or state
3. Positive Impact / Benefit to region or state
4. Adverse impact to region or state
5. Current measure or value w/in Target Population or Area
6. Altered measure or value w/in Target Population or Area
7. Positive Impact /Benefit to Target Population or Area
8. Adverse Impact to Target Population or Area
9. Short term impact
10. Long term impact

The following table contains a list of potential impacts and questions that one might ask as part of any EJ evaluation.

	IMPACT	Questions
1	Pedestrian Accessibility	<p>How will the traffic speed within the target area change?</p> <p>How will traffic volumes change?</p> <p>Is there a change in traffic type or volume on local (target area) streets?</p> <p>Will there be a change in the relative safety in the target area for pedestrians, bicyclists, motorists?</p> <p>Will the safe and easy access to community or regional resources (shopping, bus stops, schools, etc) be changed?</p>
2	Air, Noise, and Water Pollution and Soil Contamination	<p>Will the traffic noise level change?</p> <p>Will the traffic induced air quality increase?</p> <p>Will local waters and soil contamination levels change?</p> <p>Will the overall air, water, and noise quality of the target area change?</p>
3	Destruction or Disruption of Man-made or Natural Resources	<p>Will the number of trees and other plants change?</p> <p>Will waterways such as streams and brooks change?</p> <p>Will the number or size of parks, parkland or outdoor recreational opportunities change?</p> <p>Will the changes provide overall improvement or harm to the natural and man made resources?</p>
4	Destruction or Diminution of Aesthetic Values	<p>Will any public art or statues be added, moved or removed?</p> <p>What percentage of project costs are being spent on enhancements?</p> <p>Will the amount of open space change?</p> <p>Is the improvement attractive?</p> <p>Will the view or vista change?</p>
5	Destruction or Disruption of Community Cohesion	<p>Will the man-made dividers, (such as an overpass, bridge, 4 lane or greater roadway or rail tracks) be constructed through a portion of an existing community and cause it to be segmented?</p> <p>Is the proposed project or plan perceived to significantly benefit one portion of existing neighborhoods and significantly harm another portion of the same neighborhood?</p>

6	Destruction or Disruption of a Community's Economic Vitality	<p>Will the number of locally owned businesses in the target area change?</p> <p>Will the total number businesses in the target area change?</p> <p>Will the financial investment benefit the target area's population?</p> <p>Will property owners land value change?</p> <p>Will the number of jobs available in the target area change?</p>
7	Destruction or Disruption of the Availability of Public and Private Facilities and Services	<p>Will the time to travel to public and private facilities and services (such as schools, medical facilities, shopping, community centers, libraries, etc. change?</p> <p>Will there be a change in the number and type of impediments to access public and private facilities (such as more or wider roadways to cross, additional bus transfers, increased distance to them)?</p> <p>Will the number or location of public or private facilities be changed?</p>
8	Vibration	<p>Will vibration levels caused by increased traffic or transit improvements change?</p> <p>Will vibration levels caused by increased traffic or transit improvements change?</p>
9	Adverse Employment Effects	<p>Will time to travel to jobs throughout the regional area change?</p> <p>Will time to travel to jobs within the target area change?</p> <p>Will the number of jobs change (How many jobs within the target area vs. regional area or state will be lost / gained?)</p> <p>Will the type of jobs available within the target area change?</p> <p>Will the target area become a more attractive place for employers to locate their facilities?</p>
10	Displacement of Persons, Businesses, Farms, or Nonprofit Organizations	<p>How many target vs. non-target population persons will be displaced?</p> <p>How many target vs. non-target population businesses will be displaced?</p> <p>How many target vs. non-target population farms will be displaced?</p> <p>How many target vs. non-target population non-profit corporations will be displaced?</p> <p>Will an alternative project location or project approach (which meets the project or plan's purpose and need) displaced fewer target vs. non-target population persons, businesses, farms or non-profit corporations?</p>

11	Increased Traffic Congestion	Will traffic congestion levels change?
12	Isolation	Will access roadways into and out of the target area become dead ends or be cut-off?  Will roadways, bridges and other traffic improvements be constructed to surround the target area and create the feeling of an isolated "island"?
13	Exclusion or Separation of Minority or Low-income Individuals Within a Given Community or from the Broader Community	Will the transportation changes result in increased travel time from the target area to community resources such as schools, churches, shopping, jobs, recreational facilities, etc.  Will the transportation improvements increase the feeling of exclusion or alienation between the target populations and the broader region or state?
14	The Denial Of, Reduction In, or Significant Delay in The Receipt Of, Benefits	Will access to or use of the transportation improvement be denied to any low income or minority population or groups (for reasons such as cost to use, ability to access, etc.)?  Will access to or use of the transportation improvement be denied or more difficult to access based on its location?  Will the overall benefits and improvements being proposed by the plan or project be available to the same level and within the same basic time frame to the target population, as it will to the broader community, region, or state?

## B. Questions and Answers on Environmental Justice and Title VI

The following Questions and Answers below were taken from the Federal Highway Administration website on Environmental Justice.

([www.fhwa.dot.gov/environment/ei2.htm](http://www.fhwa.dot.gov/environment/ei2.htm))

### 1. What are the fundamental concepts of Environmental Justice?

There are three fundamental Environmental Justice principles:

- 1) To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
- (2) To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- (3) To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

### 2. Is Environmental Justice a new requirement?

No. The recipients of Federal-aid have been required to submit assurances of compliance with, and the U.S. DOT must ensure nondiscrimination under, Title VI of the Civil Rights Act of 1964 and many other laws, regulations, and policies. In 1997, the Department issued its U.S. DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations to summarize and expand upon the requirements of Executive Order 12898 on Environmental Justice.

**3. What is the legal basis for addressing the concerns of low-income populations?**

The Department's planning regulations (23 C.F.R. 450) require metropolitan planning organizations (MPOs) and States to "seek out and consider the needs of those traditionally underserved by existing transportation systems, including, but not limited to, low-income and minority households." As required by NEPA and 23 U.S.C. 109(h), impacts on all communities including low-income communities must be routinely identified and addressed.

**4. What is Title VI of the Civil Rights Act of 1964?**

Title VI declares it to be the policy of the United States that discrimination on the ground of race, color, or national origin shall not occur in connection with programs and activities receiving Federal financial assistance, and authorizes and directs the involved Federal departments and agencies to take action to carry out this policy. Title VI prohibits discrimination: whether intentional or where the unintended effect is unduly burdensome.

**5. What is the relationship between the U.S. DOT Order on Environmental Justice and Title VI?**

The U.S. DOT Order clarifies and reinforces Title VI responsibilities as well as addresses effects on low-income populations. The goal of the U.S. DOT Order is to ensure that programs, policies, and other activities do not have a disproportionately high and adverse effect on minority or low-income populations. This goal is to be achieved, in part, by implementing both Title VI and NEPA during the development and implementation of transportation activities.

**6. What types of activities require Title VI and Environmental Justice considerations?**

Title VI and environmental justice apply to all U.S. DOT programs, policies, and activities, including, but not limited to: contracting, system planning, project development, implementation, operation, monitoring, and maintenance.

**7. How early can issues which give rise to Title VI/ Environmental Justice concerns be addressed?**

At the start of the planning process, planners must determine whether Environmental Justice issues exist and use data and other information to: (1) determine benefits to and potential negative impacts on minority populations and low-income populations from proposed investments or actions; (2) quantify

expected effects (total, positive and negative) and disproportionately high and adverse effects on minority populations and low-income populations; and (3) determine the appropriate course of action, whether avoidance, minimization, or mitigation. If issues are not addressed at the planning stage, they may arise during project development, or later when they could be more difficult to mitigate and delay project decisions.

Environmental Justice is an important part of the planning process and must be considered in all phases of planning. This includes all public-involvement plans and activities, the development of Regional Transportation Plans [In Michigan they are commonly known as the Metropolitan Planning Organizations Transportation Long Range Plan], Transportation Improvement Programs (TIP's), Statewide Transportation Improvement Programs (STIP's), and work programs (such as the Unified Planning Work Programs (UWP's). A truly integrated and effective planning process actively considers and promotes environmental justice within projects and groups of projects, across the total plan, and in policy decisions.

**8. Must Title VI and Environmental Justice be considered ONLY on projects requiring an Environmental Impact Statement (EIS)?**

No. Title VI and Environmental Justice applies to all planning and project development programs, policies and activities. In project development, environmental justice should be considered in all decisions whether they are processed with an Environmental Impact Statements (EIS's), Environmental Assessments (EA's), Categorical Exclusions (CE's), or Records of Decision (ROD's). Potential impacts to the human environment should drive the processing option decision as much as potential impacts to the natural environment. Impacts to both the natural and human environment are to be given comparable consideration throughout transportation decision making.

At the scoping stage in the NEPA process, which provides early identification of public and agency issues, there should be adequate consideration of Title VI and environmental justice. Minority and low-income populations should be identified as early as possible and their concerns should be examined and addressed, preferably in planning. Because the nondiscrimination requirements of Title VI extend to all programs and activities of State DOTs and their respective sub-recipients and contractors, the concepts of Environmental Justice apply to all State projects, including those which do not involve Federal-aid funds, whether Advance Construction, Design Build, or not.

Communities are constantly changing, so evaluation of human impacts must be given continuous attention throughout planning, project development, implementation, operation, and maintenance. Mitigation of any sort can cause negative as well as positive impacts. Be aware of who is being impacted and how.

**9. Do all impacts have to be evaluated for Title VI and Environmental Justice, or just health and environmental impacts?**

All reasonably foreseeable adverse social, economic, and environmental effects on minority populations and low-income populations must be identified and addressed.

As defined in the Appendix of the USDOT Order, adverse effects include, but are not limited to:

- Bodily impairment, infirmity, illness, or death
- Air, noise, and water pollution and soil contamination
- Destruction or disruption of man-made or natural resources
- Destruction or diminution of aesthetic values
- Destruction or disruption of community cohesion or a community's economic vitality
- Destruction or disruption of the availability of public and private facilities and services
- Vibration
- Adverse employment effects
- Displacement of persons, businesses, farms, or nonprofit organizations
- Increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community
- The denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities

**10. Who is considered a "Minority" for purposes of Title VI and Environmental Justice?**

The U.S. DOT Order (5610.2) on Environmental Justice defines "Minority" in the Definitions section of the Appendix, and provides clear definitions of the four (4) minority groups addressed by the Executive Order. These groups are:

1. Black (a person having origins in any of the black racial groups of Africa).
2. Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.)
3. Asian American (a person having origins in any of the original people of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands).
4. American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

**11. What is considered "Low-Income" for purposes of Environmental Justice?**

The FHWA Order defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." The Department of Health and Human Services (HHS) poverty guidelines are used as eligibility criteria for the Community Services Block Grant Program and a number of other Federal programs. However, a State or locality may adopt a higher threshold for low-income as long as the higher threshold is not selectively implemented and is inclusive of all persons at or below the HHS poverty guidelines. The most current HHS poverty guidelines can be found at HHS's website:



<http://aspe.os.dhhs.gov/poverty/poverty.htm>.

**12. Can the determinations and discussions of minority and low-income be combined?**

The two terms "minority" and "low-income" should not presumptively be combined. There are minority populations of all income levels; and low-income populations may be minority, non-minority, or a mix in a given area. As the definition of minority indicates, even minority populations can be of several categories. When such distinctions exist, appropriate assessment, discussion, and consideration should be provided using appropriate and accurate descriptors. Within documentation, an Environmental Justice discussion may appear either with discussion of other demographic information (other protected-group and general area information), assessment, and consideration, or as a separate discussion. As in any public document, specific information about any one individual or any very small group should not appear in the document to protect privacy; however, backup data should appear in the files. Descriptions in such documents should be statistical, group, or location-based.

**13. Should discussions about populations, such as the elderly, children, or the disabled be included when addressing Environmental Justice and Title VI?**

Yes. Within the framework provided by Executive Order 12898 on Environmental Justice, the U.S. DOT Order (5610.2) addresses only minority populations and low-income populations, and does not provide for separate consideration of elderly, children, disabled, and other populations. However, concentrations of the elderly, children, disabled, and other populations protected by Title VI and related nondiscrimination statutes in a specific area or any low-income groups should be discussed.

For community impact assessment, concentrations of the elderly, children, the disabled, or similar population groups (i.e., female head of household) could also experience adverse impacts as the result of an action. All impacts on sectors of the community, including minority and low-income populations as well as impacts on the community as a whole, should be routinely investigated, analyzed, mitigated, and considered during decision making, similar to investigations of impacts on minority populations and low-income populations. All NEPA processing documentation should address all impacts (to the human and natural environments), and describe any mitigating protections or benefits that would be provided by Federal or State law, or as part of the action. In particular, the Age Discrimination Act of 1975, as amended (42 U.S.C. 6101 et seq.), prohibits discrimination on the basis of age in programs receiving Federal financial assistance while persons with a disability are protected by Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794 and 49 C.F.R. Part 27.7).

**14. How can minority populations be determined for a given area?**

U.S. Census data has specific definitions of minority groups and can be useful for determining minority populations. Census data is available at the census tract, census block, and block group level. Explanation of how these classifications can be found at the following website:

<http://www.census.gov/geo/www/tiger/glossary.html>.

The U.S. Census data also includes economic census data and TIGER (Topologically Integrated Geographic Encoding and Referencing) files, which are a digital database that can be used with mapping or Geographic Information System (GIS) software to show geographic distribution of populations and other census data. The types of data sets and resources available from the U.S. Census Bureau are summarized on their website at <http://www.census.gov>.

Other data can supplement U.S. Census data, if it has a sound basis and gives an accurate assessment of income levels. In some instances, population characteristics can be derived from information available from MPOs, councils of government, and city or county agencies. Other local sources of information include State and local tax and financing agencies, economic and job development agencies, social service agencies, local health organizations, school districts, local public agencies, and community action agencies. Whatever is used for income, the source and basis of the information and what it represents should be identified. It is recommended that each situation be evaluated in context.

However, State and local data sets may prove more useful for developing up-to-date profiles of minority populations. Analysts should be resourceful in seeking out supplemental sources of information. Some of this information, however, may vary widely in quality, level of specificity, and format. Therefore, it is important when collecting information that analysts recognize when the data was collected, the data sources used, and data reliability. The FHWA's 1996 publication, *Community Impact Assessment: A Quick Reference for Transportation* identifies potential sources of information that can be used to develop community profiles. The guide is available by calling FHWA Headquarters at (202) 366-0106.

No matter the source, analysts should use the most up-to-date data available, understand the basic assumptions used in each compilation, and recognize the purposes for which data were originally collected.

**15. How large must the minority or low-income population be to consider Environmental Justice?**

Disproportionately high and adverse effects, not size, are the bases for Environmental Justice. A very small minority or low-income population in the project, study, or planning area does not eliminate the possibility of a disproportionately high and adverse effect on these populations. What is needed is to show the comparative effects on these populations in relation to either non-minority or higher income populations, as appropriate.

Some people wrongly suggest that if minority or low-income populations are small ("statistically insignificant"), this means there is no environmental justice consideration. While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action. Environmental Justice Determinations are made based on effects, not population size. It is important to consider the comparative impact of an action among different population groups.

**16. Must there be a neighborhood or community of minority or low-income groups in order for there to be a Title VI and Environmental Justice effect?**

No. The Executive Order 12898 on Environmental Justice and the DOT Order (5610.2) on Environmental Justice refer exclusively to "populations," while the White House distribution memo refers to both "communities" and "populations." The DOT Order defines each "population" as: (1) any readily identifiable group of minority persons or low-income persons who live in geographic proximity; or (2) geographically dispersed persons, such as migrant workers or Native Americans. Therefore, depending on the context and circumstances, a proposed action could cause a disproportionately high and adverse effect on a population even in cases where there are no clearly delineated neighborhoods or communities.

Neighborhood and community boundaries and impacts, however, should be considered in planning, programming, and project development activities, whether there are minority or low-income populations involved or not. Most importantly, the public should always be involved in defining "neighborhood" and "community" through the public-involvement process, since the identification or definition of neighborhood and community boundaries can be subjective.

**17. How should Environmental Justice be addressed in the planning process?**

Environmental Justice must be considered in all phases of planning. Although Environmental Justice concerns are frequently raised during project development, Title VI applies equally to the plans, programs, and activities of planning.

On October 7, 1999, FHWA and FTA issued a memorandum to their respective field administrative offices clarifying Title VI requirements in metropolitan and statewide planning. The memorandum provides technical assistance for three key areas of planning: (1) provides questions and concerns to raise during annual self-certification of compliance with Title VI, metropolitan planning certification reviews in Transportation Management Areas (TMAs), and statewide planning findings; (2) provides questions and concerns to raise while reviewing public-involvement efforts regarding the engagement of minority populations and low-income populations; and (3) encourages and State Planning and Research to begin developing or enhancing technical capability for assessing impact distributions among populations.

**18. How should Environmental Justice be addressed in the NEPA process?**

Environmental Justice should be considered and addressed in all NEPA decision making and appropriately documented in Environmental Impact Statements, Environmental Assessments, Categorical Exclusions, or Records of Decision. The Executive Order and the accompanying Presidential Memorandum call for specific actions to be directed in NEPA-related activities. They include:

- Analyzing environmental effects, including human health, economic, and social effects on minority populations and low-income populations when such analysis is required by NEPA;

- Ensuring that mitigation measures outlined or analyzed in EA's, EIS's, and ROD's, whenever feasible, address disproportionately high and adverse environmental effects or proposed actions on minority populations and low-income populations;
- Providing opportunities for community input in the FHWA NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving accessibility to public meetings, official documents, and notices to affected communities; and
- In reviewing other agencies' proposed actions under Section 309 of the Clean Air Act, EPA must ensure that the agencies have fully analyzed environmental effects on minority communities and low-income communities, including human health, social, and economic effects.

**19. What role does Public Involvement play in the consideration of Environmental Justice?**

Public involvement is an integral part of transportation planning and project development decision-making. The DOT Order (5610.2) on Environmental Justice directs the Department to provide minority populations and low-income populations' greater access to information on, and opportunities for public participation in matters that may impact human health and the environment. TEA-21 also emphasizes the meaningful involvement by all the public in transportation decision making.

Effective public involvement in the planning process and the project-development process can alert State and local agencies about environmental justice concerns so that they do not result in surprises during the project-development stage. Continuous interaction between community members and transportation professionals is critical to successfully identify and resolve potential Environmental Justice concerns.

State, regional, local, and tribal agencies should all have public-involvement procedures established that provide for consideration of Environmental Justice. These procedures should provide an inclusive, representative, and equal opportunity for two-way communication resulting in appropriate action that reflects this public involvement. Environmental Justice should be considered in all aspects of planning and project development.

**20. What role does community impact assessment play in Environmental Justice?**

The DOT Order (5610.2) on Environmental Justice asks whether a proposed action or plan causes disproportionately high and adverse effects on minority populations and low-income populations, and whether these populations are denied benefits. A framework of analysis that can determine how a proposed action or plan could differentially impact different populations is required. Community impact assessment can provide this framework.

Like public involvement, community impact assessment is an integral part of planning and project development. Community impact assessment is a process to evaluate the effects of a transportation action on a community and its quality of life. Its information should be used to mold the plan and its projects, and provide documentation of the current and anticipated social and economic environment of a geographic area with and without the proposed action. The assessment process is comprised of the following steps: (1) define the project, study, and planning area; (2) develop a community profile; (3) analyze impacts; (4) identify solutions; (5) use public involvement; and (6) document findings. These steps are elaborated on in FHWA's Community Impact Assessment: A Quick Reference for Transportation, and its companion document, Community Impact Mitigation: Case Studies, published in 1998.

**21. What technical assistance or resources are available on Environmental Justice?**

FHWA's website at [www.fhwa.dot.gov/environment/ej2.htm](http://www.fhwa.dot.gov/environment/ej2.htm) provides a summary of the DOT Order and the FHWA Order, as well as a list of available technical assistance, resources, and contacts on Environmental Justice and Title VI. The "Overview of Transportation and Environmental Justice" brochure has been developed and provides a cogent summary of Environmental Justice, in a single, easy-to-read format. The brochure explains what Environmental Justice is and discusses how transportation partners including the public can support and integrate Environmental Justice and Title VI in transportation decision making. Upcoming products to be developed include case studies and effective practices and will appear on this site.

## APPENDIX J

### Sample Green Sheet Detroit River International Crossing (DRIC) STUDY

C.S. \_\_\_\_\_ *Project, Limits & County(s)*

*Date*

J.N. \_\_\_\_\_

*Type of Document:*

*Mitigation Summary (Green Sheet)*

*For the Preferred Alternative*

#### ***I. Social and Economic Environment***

- a.) Relocations
- b.) Environmental Justice
- c.) Parking and Access to Residential and Commercial
- d.) Emergency Service Access
- e.) Noise Impacts
- f.) Air Quality
- g.) Aesthetic/Visual

#### ***II. Natural Environment***

- a) Stream Crossing/Lakes/Streams
- b) Wetlands
- c) Floodplains
- d) Tree removal/Clearing/Landscaping
- e) Water Quality
- f) Groundwater
- g) Threatened/Endangered Species

#### ***III. Cultural Environment (Memorandum of Agreement Mitigation)***

- a.) Historic
  - 1. Bridges
  - 2. Buildings
  - 3. Landmarks
  - 4. Other

## b.) Archeological

1. Burials/Cemetery
2. Prehistoric
3. Historic

## c.) Tradition and Culture

1. Native American- Tribal Consultation
2. Religious and Cultural Places

**IV. Hazardous/Contaminated Materials**

- a) Lead Base Paint Removal/Disposal
- b) Underground Storage Tanks
- c) Water Well Abandonment
- d) Soil Contamination (Petroleum, Metals)
- e) Groundwater Contamination
- f) River/Lake Sediment Contamination

**V. Construction**

- a) Temporary Stream or Wetland Crossing
- b) Construction Access or Haul Roads
- c) Construction Pads or Work Areas
- d) Maintain Traffic- Part Width Construction or Detour
- e) Soil Erosion/Sedimentation Control
- f) Permits- MDEQ, MDNR, U.S. Army Corps of Engineers, U.S. Coast Guard
- g) Permit- Time Restrictions For Clearing or Working in Water.