

**MICHIGAN DESIGN MANUAL  
ROAD DESIGN**

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# MICHIGAN DESIGN MANUAL ROAD DESIGN

## CHAPTER 10

### ENVIRONMENTAL

#### 10.01

#### REFERENCES

- A. Clean Air Act
- B. Environmental Quality Improvement Act
- C. Executive Order 11514 (Protection and Enhancement of Environmental Quality)
- D. Federal Clean Water Act
- E. Transportation Efficiency Act for the 21<sup>st</sup> Century (TEA-21)
- F. Michigan Natural Resources and Environmental Protection Act (P.A. 451 as amended, 1994)
- G. National Environmental Policy Act

#### 10.02

#### ENVIRONMENTAL POLICY

The National Environmental Policy Act (NEPA) requires an examination and consideration of the potential impacts of a transportation project upon sensitive resources. These resources include, but are not limited to, floodplains, wetlands, endangered species, historic and archeological sites, parklands, air quality, water quality, wildlife habitat, etc. It is the policy of the Federal Highway Administration that this examination be completed as part of the NEPA process, that evidence of compliance with the process be contained in appropriate documentation, and that public involvement must be an essential part of the process.

#### 10.02.01

#### General

Every project that utilizes federal funding must be analyzed for environmental impacts and environmental clearance obtained before the funding is released. The depth of analysis of a project is determined by the severity of its impact upon the environment, not the size of the project. It is possible to have a small project which has such severe impacts that extensive analysis is required. Conversely, it is possible to have a very large project which has very little impact and which requires relatively little analysis. In general, large and complex projects often require more analysis than small, simple projects, but it should be kept in mind that this is a coincidental connection, not a procedural one.

The term "environment" may be confusing in this usage. While "environment" encompasses those areas customarily thought of as the environment; i.e., water and air quality, wetlands, endangered species, etc., it also includes the "social environment". Such things as impacts upon historical structures, parks and recreational areas, adverse economic and social consequences, etc. are also a part of the analysis.

The purposes of the analysis are, basically, to determine, what the adverse effects of the project are, whether the positive benefits of the project outweigh the negative effects, to attempt to avoid the negative effects, and to attempt to mitigate those negative effects which can't be avoided. This approach recognizes that the project itself will become a part of the environment. It must therefore be integrated into the existing environment rather than imposed upon it.

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**10.02.02** (revised 3-21-2016)

### **Documents / Definitions**

There are three levels of analysis: categorical exclusion, environmental assessment, and environmental impact statement.

#### **A. Categorical Exclusion**

Most projects are cleared through the Categorical Exclusion (CE) process. This process consists of a cursory examination of the proposed scope of work by specialists in the Environmental Section of the Project Planning Division. If there are no apparent "significant" long term negative environmental impacts, "substantial" controversy on environmental grounds, or significant impacts upon public parks, recreation areas, or refuges, the project receives an environmental clearance to proceed. Environmental Study for Project Classification (MDOT only Form 1775), with any necessary attachments, serves as the documentation of compliance with the NEPA process. Environmental Study for Project Classification (MDOT only Form 1775) will often include mitigation measures such as limitations on areas where work can occur, or compensation such as replacement trees in order to avoid or minimize environmental impacts. These mitigation measures must be incorporated into the design of the project.

**10.02.02 (continued)**

### **B. Environmental Assessment**

When it is uncertain whether or not a project may have a "significant" impact upon the environment, an Environmental Assessment (EA) is prepared. The purpose of the EA is to conduct a more in-depth analysis of the project and to determine either that there is a "Finding of No Significant Impact" (FONSI) or that there is significant impact. If it is determined that there is significant impact, an Environmental Impact Statement will be required.

### **C. Environmental Impact Statement**

When it is obvious that a significant impact upon the environment will result from a project, or when an Environmental Assessment determines that a significant impact will result, an Environmental Impact Statement (EIS) must be prepared. The main purpose of the EIS is to insure that all considerations and deliberations required by NEPA are carried out and that the decision making process is documented.

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### 10.02.03 (revised 4-22-2019)

#### Permits / Laws / Ordinances

There are a number of federal, state, and local laws which govern many of the activities or tasks which make up a project. In some cases, permits are required before certain actions can be taken. In others, certain actions must be taken to avoid incurring liability, fines or worse.

#### A. Wetlands

##### 1. Statutes

###### a. Federal

###### 1) Federal Water Pollution Control Act

- Section 404: This section regulates the discharge of materials into wetlands. Such discharges, or “fills” require a permit. Although the permit program is the responsibility of the U.S. Army Corps of Engineers (ACOE), in Michigan the actual administration of the permit program has been formally delegated to the Michigan Department of Environment, Great Lakes and Energy (MDEGLE). Oversight and audit of MDEGLE’s permitting process and performance is conducted by the U.S. EPA. In some cases which involve navigable waters, the ACOE may also issue a permit either separately or jointly with the MDEGLE.

###### b. State

- 1) Michigan Natural Resources and Environmental Protection Act (Act 451, P.A. of 1994) This act formally collects and codifies most previously existing state environmental laws into a single statute. The formerly independent laws have become Parts of this Act.
- Part 303 – Wetlands Protection  
The purpose of this Part is to protect the wetlands of the state.

### 10.02.03 (continued)

##### 2. Discussion

When it is necessary to take a wetland in the course of a project, the need must be established and permit issued by the MDEGLE. It will be necessary to mitigate or replace the taken wetland. This Part interacts to a certain extent with Section 404 of the Federal Water Pollution Control Act in that it establishes the basis for the delegation of the 404 program to the MDEGLE and allows the use of the State permitting process to administer that program.

##### 3. Contacts

Regulation of Discharge into Wetlands (Section 404) and Wetlands Protection (Part 303): The staff of the Environmental Section of the Project Planning Division serve as a liaison with these agencies. When provided with sufficient and correct information, they will assemble and file the permit application with the appropriate agency(s), respond to their questions, and monitor the status of the application.

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### 10.02.03 (continued)

#### Permits / Laws / Ordinances

#### B. Water Quality

##### 1. Statutes

###### a. Federal

###### 1) Federal Water Pollution Control Act

- Section 402: National Pollutant Discharge Elimination System (NPDES) permits. This section regulates the discharge of materials into the surface waters of the U.S., including soil particles.

###### 2) Rivers and Harbors Act of 1899

- Section 10: This statute regulates the “creation of an obstruction” in “any port, roadstead, jetty, haven, harbor, canal, navigable river, or other water of the United States.” This act is administered by the U.S. Coast Guard.

###### b. State

###### 1) Michigan Natural Resources and Environmental Protection Act (Act 451, P.A. of 1994) This act formally collects and codifies most previously existing state environmental laws into a single statute. The formerly independent laws have become Parts of this Act.

- Part 31 - formally known as the Water Resources Commission Act
  - a) Floodplain protection
  - b) Incorporates language which allows the MDEGLE to administer the NPDES Permit program, including the Notice of Coverage.
- Part 91 - Soil Erosion and Sedimentation Control.
- Part 301 - Inland Lakes and Streams
  - a) Fill or construction below the ordinary high water mark (OHWM) of any inland lake or stream requires a permit issued by the MDEGLE.

### 10.02.03B (continued)

#### 2. Discussion

Any actions which require an earth disturbance of more than five acres of land and have a storm water discharge to waters of the state, require an NPDES Notice of Coverage to be filed with the MDEGLE. Plans of the proposed actions and plans to control or prevent loss of sediments and other polluting materials during the actions are required. Certain project personnel who will be on-site during construction are required to receive soil erosion and sedimentation control training (Phases I, II and III), and become certified storm water discharge operators under NPDES.

Construction activities in or near a floodplain, lake, river or stream will require a permit from MDEGLE and/or the Army Corps of Engineers.

#### 3. Contacts

Water Quality, Non-point Source Pollution (NPDES Notice of Coverage) (Section 402): The staff of the Grading/Drainage and Consultant Contracting Unit of the Construction Field Services Division.

Soil Erosion and Sedimentation Control (Part 91): The staff of the Grading/Drainage and Consultant Unit of the Construction Field Services Division.

Floodplain Protection (Part 31) and Inland Lakes and Streams (Part 301): The staff of the Environmental Section of the Project Planning Division.

Rivers and Harbors (Section 10): The staff of the Environmental Section of the Project Planning Division.

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## ROAD DESIGN

### 10.02.03 (continued)

#### Permits / Laws / Ordinances

##### C. Endangered Species

###### 1. Statutes

###### Federal Endangered Species Act

Part 365 of the Michigan Natural Resources and Environmental Protection Act (Public Act 451 of 1994)

###### 2. Discussion

Threatened and endangered plants and animals are afforded all protection granted to them under the state and federal Endangered Species Acts. An Endangered Species Permit is required from the MDEGLE for all state and federal species that may be directly or indirectly impacted during construction. This may require field surveys during the proper season and coordination with numerous state and federal agencies during the project clearance process. Additionally, a formal consultation process and permit may be required by the U.S. Fish and Wildlife Service (USFWS) for all federal endangered species that may be impacted. These agencies may require MDOT to completely avoid the habitat area, change the scope of work to reduce impacts, and provide suitable mitigation prior to the granting of each permit.

###### 3. Contacts

Endangered Plant Species - The staff of the Environmental Section of the Project Planning Division

Endangered Animal Species - The staff of the Environmental Section of the Project Planning Division

### 10.02.03 (continued)

#### D. Potential Contaminated Sites

###### 1. Statutes

Federal Resource Conservation and Recovery Act

Federal Comprehensive Environmental Response, Compensation and Liability Act (a.k.a. "Superfund")

Part 201 (environmental response); Part 211 (underground storage tanks); Part 213 (leaking underground storage tanks) of the Michigan Natural Resources and Environmental Protection Act (Public Act 451 of 1994)

###### 2. Federal and state laws passed in the 1980s and early 1990s imposed liability for environmental contamination of real property merely for the act of buying the property without proper investigation. The Environmental Assessment Unit (EAU) was established in the Development Services Division to carry out the necessary investigations to avoid liability and to fulfill secondary informational needs (public and worker safety, project constructability, construction contract provisions, exacerbation of contamination and tort liability) regarding contamination.

Sometime after this Unit was established, it was recognized that projects which did not require the acquisition of property for right of way (ROW) were unexpectedly encountering contamination. This often resulted in major project delays and cost overruns. A process parallel to that of the EAU's was developed and assigned to the District Resource Specialists. This process was outlined in Design Division's Information Memorandum IM#408-R dated May 18, 1993. Its purposes were the same as the secondary purposes of the EAU process.

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### 10.02.03D (continued)

#### Permits / Laws / Ordinances

The amendments to the environmental statutes largely removed the liability from the acquisition of property for **ROW purposes**. There still remains a danger of acquiring liability from properties purchased for non-ROW purposes, and there are specialized and somewhat complex procedures that must be followed to avoid it. The Development Services Division still remains a customer for that portion of the process. The amendments removed the need for the bifurcated, overly complex process.

Interim procedures have been developed for identifying potential contaminated sites, conducting the necessary testing, and estimating the cost of remediation. See [Section 14.13](#) for these procedures.

Noteworthy, responsibilities for the Designer include coordinating activities with the EAU and Construction Field Services Division in order to acquire the pay item and quantity information for inclusion in the design package. In some instances, the individual sites should be shown on the plan sheets.

#### 3. Contacts

The Environmental Assessment Unit of the Development Services Division will conduct a survey of the project area for projects which require the acquisition of ROW. A Contaminated/Leaking underground storage tank search will occur. They will make specific recommendations regarding the disposition of any sites found.

Underground storage tanks - removal; The Grading/Drainage and Consultant Contracting Unit of Construction Field Services Division has firms under contract which specialize in the removal of underground storage tanks, leaking or otherwise.

The Region Resource Specialist may also be contacted for assistance.

### 10.02.03 (continued)

#### E. Mining

Mining permits are issued by the local unit of government. The Design Division will contact the local unit of government directly.

#### F. Air Quality

##### 1. Statutes

Clean Air Act, as amended (CAA)

23 CFR 770

##### 2. Discussion

All actions which have the potential to increase vehicle capacity, are taken in order to alleviate congestion, or to create new roadways must meet the requirements of the CAA and 23 CFR 770, and must be included in the State Implementation Plan. Computer modeling projections based upon traffic volumes for comparison of present and future impact must be made.

##### 3. Contacts

Air Quality, Environmental Section of the Project Planning Division



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## ROAD DESIGN

### 10.02.03 (continued)

#### Permits / Laws / Ordinances

##### G. Noise

###### 1. Statutes

23 U.S.C. 109

23 CFR 772

###### 2. Discussion

All actions which have the potential to increase vehicle capacity, are taken in order to alleviate congestion, or create new roadways must have the existing noise level monitored and analyzed, followed by computer modeling for projection of future impacts.

###### 3. Contacts

Noise staff of the Environmental Section of the Project Planning Division

##### H. Farmland Preservation

###### 1. Statutes

Federal - The Federal Farmland Protection Policy Act of 1984

State - The Farmland and Open Space Preservation Program, Public Act 233, commonly known as PA 116

### 10.02.03H (continued)

#### 2. Discussion

The federal requirement involves all federal agency proposed projects that may convert farmland / forest land, as defined in the Federal Farmland Protection Policy Act, to nonagricultural uses. MDOT or its consultant will complete a farmland conversion impact rating in conjunction with the Natural Resources Conservation Service of the U.S. Department of Agriculture. This analysis is a land evaluation / site assessment which must accompany the environmental clearance document when new right-of-way (subject to review) is needed.

Under the Farmland and Open Space Preservation Act, the state program allows farmers to lease their property development rights (PDR) to the state in exchange for a tax credit for a minimum of ten years. It also allows, farmers to sell their development rights to the state. When new right-of-way is required from parcels enrolled in either part of the state program there are certain acquisition procedures to follow and financial penalties due. These lands are also unavailable for borrow. Projects are reviewed for this factor during the environmental review process and again when right-of-way plans are available.

#### 3. Contacts

Farmlands / PDR staff of the Environmental Section of the Project Planning Division

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.02.03 (continued)

#### Permits / Laws / Ordinances

##### I. Coastal Concerns

###### 1. Statutes

Federal - The Coastal Zone Management Act of 1972

Federal - The Coastal Barrier Resources Act of 1982

State - Part 353 of Act 451 (NREPA) Sand Dune Protection and Management

###### 2. Discussion

The Coastal Zone statute requires a consistency determination that federally funded projects are consistent with the Coastal Zone Management Program which has been approved for the State of Michigan. This program is administered by the MDEGLE. Also, activities within a designated critical dune area may require a permit from the MDEGLE.

The purpose of the Coastal Barrier Resources Act is to reduce federal expenditures which encourage development in these hazardous areas and preserve the natural resources of these areas. There are very few areas in Michigan which are designated under this Act. Coordination with other federal and state agencies would be required to determine if the proposed work would be prohibited.

###### 3. Contacts

Coastal Zone staff of the Environmental Section of the Project Planning Division

### 10.02.03 (continued)

#### J. Section 4(f) and 6(f)

Protection of public park and recreation lands, wildlife and wildfowl refuges and historic sites

###### 1. Statutes

Federal - U.S. Dept. of Transportation Act of 1966, 23CFR Part 771

###### 2. Discussion

The use of land from a public park, recreation area, or wildlife and waterfowl refuge or historic site of national, state, or local significance is prohibited unless there are no prudent or feasible alternatives to the use of the land and all measures are taken to minimize harm. **Note: This is often a very difficult issue to resolve and in some cases may not be resolvable. As soon as an actual or potential project involvement with such a facility is known or suspected, the contact person for this issue should be notified.**

###### 3. Contacts

4(f) / 6(f) staff of the Environmental Section of the Project Planning Division

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### 10.02.03 (continued)

#### Permits / Laws / Ordinances

#### K. Section 106, Historical Preservation

##### 1. Statutes

Federal - National Historic Preservation Act of 1966, 36 CFR Part 800 (Section 106)

##### 2. Discussion

Section 106 of the National Historic Preservation Act requires a Federal agency with jurisdiction over a federally assisted, or federally licensed undertaking to take into account the effects of the agency's undertaking on properties included in or eligible for the National Register of Historic Places. The Federal Agency must also afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. The Agency with jurisdiction over an undertaking has legal responsibility for complying with Section 106. This includes identifying historic properties, assessing effects upon them, and considering alternates to avoid or reduce those effects.

Projects are reviewed for historic resource impacts during the environmental review process. This includes both above-ground structures and archaeological resources.

##### 3. Contacts

Historic Preservation staff of the Environmental Section, Project Planning Division

### 10.03

#### PROJECT ENVIRONMENTAL CLASSIFICATION

Every MDOT project is reviewed and it is assigned an environmental classification. The classifications are: Class I Action (Environmental Impact Statement), Class II Action (Categorical Exclusion) and Class III Action (Environmental Assessment). The majority of projects receive a Categorical Exclusion classification.

#### 10.03.01

##### General

Projects are classified according to the significance of the impact(s) that they will have on the environment. The level of analysis of a project increases as the potential significance of its impacts increases. Those projects in which there are no potential impacts are classified as Class II Action (Categorical Exclusions). Those projects in which there is uncertainty as to whether significant impacts will occur receive a Class III Action (Environmental Assessment) classification. Projects in which it is known or strongly suspected that significant impacts will occur receive the Class I Action (Environmental Impact Statement) classification.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.03.02

#### Environmental Impact Statement

##### A. Draft Environmental Impact Statement (DEIS)

A DEIS containing a description of project, a discussion of alternatives to the construction of the project (including “no build”), an analysis of the impacts that the project and the alternatives would have on the human and natural environment is developed. The DEIS is then circulated to the appropriate federal and state regulatory agencies and made available for public review. A public hearing on the DEIS is held and public comments recorded.

At this stage of analysis, no decisions are made. It is a fact and opinion finding stage.

##### B. Final Environmental Impact Statement (FEIS)

The FEIS includes discussion of the “recommended alternate” and presents justification for its selection. It also responds to comments gathered from the DEIS and the Public Hearing, and incorporates any corrections to the DEIS. Mitigation and / or enhancement measures intended to reduce or correct any adverse impacts of the recommended alternative are described. Any major unresolved issues will also be incorporated.

The FEIS is then given a final distribution to the public and agencies. A Record of Decision (ROD) is issued by FHWA. After issuance of the ROD, which constitutes environmental clearance and design approval, the project can proceed to the final design, right-of-way acquisition and construction stages.

### 10.03.03

#### Environmental Assessment

##### A. Significance of Impacts

When the significance of the impacts of a project are not clearly established, an EA is prepared. It generally describes the project, discusses the purpose of and need for the project, the alternatives to the project, the impacts of the project and their mitigation, comments and coordination with appropriate agencies, and any Section 4(f) Evaluations that may be necessary.

##### B. Finding of No Significant Impact (FONSI)

The EA process has one of two results. If no impacts are determined to be significant a document known as a FONSI is issued. It states the findings and the basis for the findings and references the EA. If, however, significant impacts are determined to be probable, the Environmental Impact Statement process is initiated for the project.

### 10.03.04

#### Categorical Exclusion

All MDOT projects receive at least a cursory analysis for environmental impacts. If no significant impacts are known or anticipated, the project receives a Categorical Exclusion classification. If, subsequent to this designation, significant impacts are found to be possible or probable, the project is reclassified as either an EA or an EIS.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 10.04

#### DESIGN CONSIDERATIONS

As developers of the plans and proposals for various road improvements, the Designer should strive to provide for the needs of highway users while maintaining the integrity of the environment. Unique combinations of requirements that are often conflicting result in unique solutions to the design problems.

#### 10.04.01

##### General

Designers should recognize the implications of how the proposed road improvement is going to impact the human and natural environment. When the design details are being developed, care should be taken to either minimize or totally eliminate negative impacts to critical environmental conditions.

This can sometimes be accomplished by the Designer choosing values from a recommended range of design guidelines which satisfy the needs of the proposed improvement while at the same time lessening or eliminating any negative influence to the environment. Any chosen design should be cost effective in comparing the highway user benefits with the needs of non-users and the environment.

The effects of the various environmental impacts can and should be mitigated by thoughtful design processes. This principle is intended to produce highways that are safe and efficient for users, acceptable to non-users, and in harmony with the environment.

### 10.04.02

#### Human Environment

##### A. Social Impacts

The effects of a project upon the social fabric of an area must be considered. "Social" is a very broad and vague term which can be applied to everything from the temporary disruption of an annual celebration or festival by construction activities to the permanent division of a historically cohesive ethnic neighborhood by a new road. It may encompass such things as the increase in noise due to an increase in volume of traffic or a change in the composition of traffic; e.g., a new routing which takes heavily loaded tractor-trailers on a steep climb near a formally quiet rural area. Effects, both temporary and permanent, must be considered and weighed. When unavoidable adverse effects result, mitigative measures must be developed and applied as part of the project.

##### B. Economic Impacts

Projects can have impacts on a local economy which range from a temporary and minor inconvenience to customers and business owners or operators to the permanent devastation of the economy. Measures must be considered and applied to mitigate the former while the latter must be avoided to the extent possible (the project may not be built).

##### C. Environmental Justice

Presidential Executive Order 12898 requires that each federal agency ensure that its actions do not adversely affect minority and low income communities disproportionately with regard to human health or environmental effects. The U.S. DOT has issued Order 6640.23 to comply with these requirements.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 10.04.02 (continued)

#### Human Environment

##### D. Impact to Community Facilities and Services

###### 1. Emergency Services

The effect that closing a road or bridge may have upon the access of the community to such things as fire, ambulance, police, hospital services, etc. must be carefully considered. What may have been a 5 or 10 minute trip for response time may be transformed into hours, or even become impossible altogether. It may become necessary to establish a temporary alternate route or routes to ensure delivery of these services during the project.

###### 2. School Bus Services

In the same manner that the impacts to emergency services must be considered, so must the effects on school bus routing. Similar mitigative measures; e.g., temporary alternate routes, bridges, etc., must be considered.

###### 3. Special Events, etc.

It is now commonplace for communities to have recurring celebrations or other activities on an annual or more frequent basis. Often, this activity has major economic or cultural significance to the community. Examples are sporting events, parades, celebrations of historic events, harvest events, etc. Since most of these events are short lived and usually occur at very specific intervals or on specific dates known well in advance of projects, the easiest form of mitigation is usually project scheduling to avoid conflicts with them.

### 10.04.02 (continued)

#### E. Historical / Archeological

Historic buildings and archaeological sites are protected by federal law and in some cases state law. A project which will result in adverse impacts to such properties must first be reviewed and cleared to proceed by the State Historic Preservation Officer (SHPO). If the effects are unavoidable, measures to mitigate the damage must be developed and applied. Unavoidable adverse effects require preparation of an Environmental Assessment or an Environmental Impact Statement. Adverse effects can include both direct and indirect project impacts.

### 10.04.03 (revised 2-27-2012)

#### Natural Environment

##### A. Wetland Impacts

Compensatory mitigation will be required for any wetland impacted by the proposed project which are over one-tenth of an acre in extent. Under state and federal law, every effort must be made to avoid and/or minimize wetland impacts before the resource agencies will grant a construction permit. Therefore, the design engineer must be able to demonstrate and document that there is no feasible and prudent alternative to the proposed project that will avoid the wetland impacts. The design engineer will also be required to provide an acceptable wetland mitigation plan. These steps are outlined as follows:

1. **Avoidance** - During the design phase of the project every effort must be made to avoid wetlands to the extent possible. This effort may include, but is not limited to, minimizing road widths, narrowing shoulders, adding guardrail and steepening side slopes to the extent current safety standards will allow.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.04.03A (continued)

#### Natural Environment

2. **Minimization** - When impacts are not otherwise avoidable, steps must be taken to minimize impacts on the wetlands. Specific soil erosion and sedimentation control plans must be developed during the design stage to ensure impacts to area watercourses and wetlands are minimized. Areas disturbed during construction must be stabilized and seeded as soon as possible. Existing drainage patterns to wetlands adjoining the right-of-way must be maintained by providing culverts or other means of hydraulic connection.
3. **Compensatory or Replacement Mitigation** - When there is no prudent or feasible alternative to destroying regulated wetlands, state and federal regulations require compensatory mitigation. This may take the form of wetland restoration and/or creation. Project on-site opportunities for mitigation measures must be evaluated for suitability before off-site mitigation is considered. The wetland mitigation must also usually be in the same watershed and as close to the project as possible. In some cases, such as general permit projects, the mitigation may be consolidated with those of other small projects and/or credited to existing "moment-of-opportunity" wetlands. General permit projects do not need to be mitigated within the same watershed.

### 10.04.03A (continued)

For larger or more complex projects which involve the preparation of an Environmental Impact Statement or Environmental Assessment, mitigation is generally identified during the clearance process and included in the document for approval by the resource agencies. The Design Project Manager is responsible for coordinating this with the Wetland Mitigation Specialist in the Environmental Section of the Project Planning Division.

For categorical exclusions projects, the Design Engineer should notify the Environmental Section as soon as they are aware of potential wetland impacts on the project. The Permits Coordinator will then arrange for a preliminary review of the project, if necessary, with the resource agencies, and/or an in-house review with the appropriate environmental staff, including the Wetland Mitigation Specialist. When the need for wetland mitigation is suspected, it is important to notify the Permits Coordinator as soon as possible to allow enough time to locate and design an acceptable wetland mitigation site.

**Note: The wetland mitigation plan must be approved by the regulatory agency before it will issue a construction permit for the project.**

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.04.03 (continued)

#### Natural Environment

##### B. Floodplains

The evaluation and documentation of 100 year floodplain and floodway encroachments must be provided in conjunction with the environmental classification of the project. The level of analysis required depends upon the potential impacts and risks which are associated with the proposed work. Encroachment into a floodplain, floodway, or stream is regulated and requires state and/or federal permits. To obtain a permit for floodplain or floodway encroachments, the applicant must demonstrate that the work will not cause a "harmful interference". For more information about floodplains and floodways, based on hydraulic analysis, contact the MDOT Hydraulics Unit.

Encroachments in floodplains and floodways are often also regulated by local governments (zoning ordinances). In such instances, the Designer should contact the Hydraulics Unit, Design Division for coordination in contacting the local agency to determine their requirements. Types of projects which might involve encroachment include widening, passing lanes, realignments, slope flattening, culvert replacements, culvert extensions, bridge widening, bridge replacements, and scour countermeasures. Contact the Design Engineer - Hydraulics with questions. (See [Chapter 4 – Drainage](#) and the *MDOT Drainage Manual*)

### 10.04.03 (continued)

#### C. Inland Lakes and Streams

An inland lake or stream is defined as a body of water that has definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water. Any work in an inland lake or stream below the Ordinary High Water Mark requires state and/or federal permits and must be documented during the environmental classification process. In some instances, work within 500 feet of an inland lake and stream is also regulated. Many inland lakes and streams have special regulatory concerns that must be addressed before a permit will be issued. Designated trout streams, Natural Rivers, and Wild and Scenic Rivers may involve special design or construction requirements, such as construction restrictions for fish spawning or aesthetic improvements. In some locations, approval of the US Army Corps of Engineers or the US Coast Guard may be required. The US Army Corps of Engineers regulates watercourses near the Great Lakes and on navigable waters. Work in navigable waters of the US may also require approval from the US Coast Guard. Project types that often require an Inland Lakes and Streams permit include culvert replacements, culvert extensions, bridge replacements, pier repairs, riprap placement, stream relocation and other drainage work. Contact the Environmental Section with questions. Also, the Designer should contact the Design Engineer - Hydraulics to discuss any hydraulic analysis requirements. (See [Chapter 4 – Drainage](#) and the *MDOT Drainage Manual*)



# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 10.04.03 (continued)

#### Natural Environment

##### D. Threatened / Endangered Species

Plant or animal species which are threatened with extinction are protected by state and federal law. If any use of habitat area for a threatened or endangered plant or animal is proposed, a permit must be obtained from the appropriate regulatory agency. A typical component of the application is a mitigation plan, subject to approval by the agency, to eliminate or offset the damage to the habitat and/or the species. All project areas are surveyed to some extent for the presence of endangered or threatened plant and/or animal species or habitat that would support them.

##### E. Natural, Wild and Scenic Rivers

Rivers may be designated as “natural” or “wild and scenic” by either state or federal agencies. This designation greatly restricts the number and type of construction and structures allowed in the designated area.

##### F. Air Quality Impacts

1. **Impact** - Increase in both regional and immediate project area air pollution due to increased traffic.

**Mitigation** - The CAA and 23 CFR 770 require transportation control measures (TCM) to be implemented before such a project can be approved.

2. **Impact** - Increase in carbon monoxide concentrations on adjacent residential properties due to widening of the roadway which brings the traffic flow closer to residents.

**Mitigation** - Widen away from the residential areas or buy the affected properties.

### 10.04.03 (continued)

#### G. Noise Impacts

1. **Impact** - Increase in noise due to an increase in the volume of traffic, the speed of the traffic, and/or in the number of trucks.

**Mitigation** - Create buffer zones, construct barriers (noise walls or berms), planting vegetation, and installing noise insulation in buildings.

#### H. Hazardous Waste Sites

When potential project areas are suspected to be contaminated, the Project Manager must contact the Environmental Assessment Unit (EAU) of the Development Services Division, the Region/TSC Resource Specialist (RRS) and the Project Coordination Unit (PCU) of the Environmental Section, Project Planning Division. The entire project area will be examined for the presence of contaminated sites which might affect the project. If such sites are found, they will be analyzed in detail and a strategy for dealing with them in the course of the project will be developed. These sites are usually extremely expensive to clean up, and sometimes physically dangerous. Careful evaluation by specialists is required.

It is sometimes necessary to perform a physical investigation of a site which involves the collection and analysis of soil, water, groundwater, and/or other material samples. The purpose of the investigation is to determine the nature and extent of any existing contamination, determine a strategy for dealing with it, and to make an estimate of the cost of such an effort. (See [Section 14.13](#))

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 10.04.03 (continued)

#### Natural Environment

##### I. County Drains

When a project involves drainage to a county drain, it is the responsibility of the Project Manager to coordinate the submittal of plans (required by law under the Drain Code) to the County Drain Commissioner or Drainage Board, with the MDOT Drainage Coordinator (Supervising Engineer, Utilities, Drainage, and Roadside Section) and the respective Region/TSC Drainage Coordinator.

Any project that may change the amount of storm water flow to a county drain will require a hydrologic and hydraulic design analysis. See Section 2.5.5 of the *MDOT Drainage Manual* for "Intracounty and Intercounty Drainage Systems for State Trunkline Stormwater".

### 10.04.04 (revised 1-23-2023)

#### Mitigation of Impacts During Construction

##### A. Maintenance of Multi-Modal Traffic

Disruption of traffic in the construction area must be minimized to the extent possible. Although prevention of all construction related inconveniences is not possible, multi-modal safety will be ensured by signing of all construction areas. Access will be maintained to properties adjacent to the construction area to the maximum extent possible. Traffic will be maintained using part-width construction techniques; e.g., maintaining traffic on one half of the roadway while the other half is being reconstructed, or by use of a detour route. Consideration should also be given to maintaining pedestrian and/or non-motorized travel as needed.

### 10.04.04 (continued)

#### B. Drainage and NPDES Runoff Controls

Drainage - All drainage within the project area must be controlled in terms of velocity and volume. No increase in volume of water (above the pre-existing level) leaving the site is allowed. Water velocities must be maintained at non-erosive levels to reduce the potential for off-site erosion and sedimentation. Controlling runoff velocity and volume can be accomplished using standard soil erosion and sedimentation controls. (See [Section 2.05](#))

The Federal Water Pollution Control Act requires that on-site personnel, certified as Storm Water Operators under the National Pollutant Discharge Elimination System (NPDES) program, inspect these soil erosion and sedimentation measures on a weekly basis and after storm events. Any measures which are inadequate or which have failed require immediate corrective action. A written report of each inspection must be made and kept on file for every inspection. The reports must be made available to the MDEGLE or U.S. EPA staff upon request. (See Section 10.04.04C)

#### C. Soil Erosion and Sedimentation Control

The erosion and sedimentation control quantities and locations are set up on the plans for the contractor to install and maintain. Failure by the contractor to install and maintain adequate soil erosion/sedimentation controls may result in project shutdown and/or possible fines from MDEGLE for MDOT and the contractor. Refer to [Section 2.05](#) for detailed information on this topic.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.04.04 (continued)

#### Mitigation of Impacts During Construction

##### D. Wetland Mitigation

If wetland mitigation is being constructed with the project, a detailed design plan will be included in the project plans. A MDEGLE and possibly a U.S. Army Corps of Engineers permit application should be included in the project proposal. Prior to the pre-construction meeting, the Environmental Section in the Project Planning Division should be notified. A person will be available during construction to answer questions regarding the design of the wetland and also to inspect the initial staking and give final approval of the site. Existing wetland or vegetation to be preserved on the site must be protected with either silt fence or protective fencing when necessary.

The Roadside Development Unit in the Design Division should be contacted prior to any project tree and/or shrub plantings in order that they may provide detailed planting instructions to the contractor. The Region Resource Specialist must inspect any plant material before it is installed.

##### E. Water Quality

Water quality protection during construction should consist of using adequate and appropriate soil erosion and sedimentation controls. Water quality mitigation during operation of the facility could consist of employing control methods such as: vegetative swales, detention basins, limited use of wetlands. Design of such controls should concentrate upon eliminating direct discharges of storm sewers to receiving waters and upon slowing runoff to non-erosive velocities.

### 10.04.04 (continued)

#### F. Air Quality / Pollution

1. Impact - Dust migration from construction traffic and wind blowing across open construction areas.

Mitigation - Spray the access roads and the open areas with water to eliminate dry dust conditions.

2. Impact - Emissions from concrete and HMA batch plants.

Mitigation - The contractor must obtain an air quality permit from MDEGLE prior to start up.

#### G. Noise Levels and Vibration

1. Impact - Construction noise may interfere with the social environment such as church functions, schools, etc.

Mitigation - Construction may be limited to certain times of the day or week.

2. Impact - Construction vibrations may cause danger to adjacent structures.

Mitigation - Preliminary review of adjacent structures including taking pictures for future reference. If damage has occurred during construction reparations must be made.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 10.04.04 (continued)

#### Mitigation of Impacts During Construction

##### H. Tree Removal and Replacement

Although some tree removal may be necessary in some projects, the existing natural and ornamental vegetative cover will be maintained whenever possible. Where existing ground cover must be removed, replacement vegetation must be established in a timely manner by use of seed or mulch.

Roadside trees adjacent to residences will be preserved whenever possible. If trees must be removed from the front of a residence, the property owner must be given appropriate notice and offered replacement trees as a mitigation for the loss of the functional or aesthetic value of the trees.

The species and number of replacement trees will be determined by the Region Resource Specialist or by the Roadside Development Unit in coordination with adjacent property owners. In those cases when an owner requests replacement trees, the trees will be installed, with the owner's concurrence, as close to the right-of-way line as possible. The property owner then assumes ownership and responsibility for maintaining the trees.

### 10.05

#### MISCELLANEOUS

##### 10.05.01

##### Changes Affecting Environmental Clearance and Required Permits

As the design of a particular roadway improvement is developed, it is sometimes necessary, for a variety of reasons, to change the original scope / location of the project. These changes in scope will often affect the conditions under which the environmental clearance and required permit applications for the project were originally approved. Care should be taken whenever the original project scope or location is modified to ensure the environmental clearance is still valid and to make sure that new permit applications or modifications to existing permits are acquired if necessary.

Some items that require review/discussion with the Environmental Section of the Project Planning Division and the Hydraulics/Hydrology Unit, Design, to determine if environmental clearance and permits are affected are listed below.

##### Changes in Drainage

1. Culvert extensions, size changes, or new replacements
2. Widening bridges, piers, and abutments
3. Relocating drains or streams
4. Ditch cleanouts
5. Construction access pads or roads in watercourses, lakes, or wetlands

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 10.05.01 (continued)

#### Changes Affecting Environmental Clearance and Required Permits

##### Other Factors

1. Guardrail upgrading, including elimination and slope flattening
2. Additional ROW or Grading Permits than originally scoped including commercial or residential displacements
3. Any grading operations added to the project outside existing shoulders including commercial or residential developments
4. Addition of tree removal to the scope
5. Addition of a detour route or a change in the detour route (i.e., change location, upgrading existing roads, etc.)
6. Temporary roads or ramp closures
7. Changes to project limits of change to project scope, such as a resurfacing project that becomes a reconstruction project

If these, or any other items which are suspected to impact the existing environmental clearance and permit situation arise, the Designer should contact the Environmental Section.

### 10.05.02

#### Historic Bridges

MDOT has a statewide historic bridge inventory. Designation as a historic bridge offers agencies opportunities to plan preservation efforts for bridges under their jurisdiction and opens the door for additional funding assistance. To qualify a bridge must be at least 50 years old and display a unique or distinguishing feature. Examples include one-of-a-kind bridges, bridges associated with historic events, or bridges with an unusual design.

Designers should be aware that if a historic bridge is located within the project limits of a proposed road improvement project, the environmental clearance process may be impacted as historic bridges are protected by both Section 4(f) of the Department of Transportation Act, and the National Historic Preservation Act. It may be necessary to have an Environmental Assessment completed to determine the extent of any impacts the project may have on the structure. Also, if any work is proposed for the bridge itself as part of the overall project, the Designer may be required to accommodate the design features of the bridge into the design of the roadway. Contact the Environmental Section of the Project Planning Division with questions.